

MASTER

Internet cafes in Dar es Salaam : problems and opportunities : recommendations for eThinkTank Tanzania

Nnafie, I.

Award date:
2002

[Link to publication](#)

Disclaimer

This document contains a student thesis (bachelor's or master's), as authored by a student at Eindhoven University of Technology. Student theses are made available in the TU/e repository upon obtaining the required degree. The grade received is not published on the document as presented in the repository. The required complexity or quality of research of student theses may vary by program, and the required minimum study period may vary in duration.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain

**Internet cafés in Dar es Salaam:
Problems and Opportunities**
Recommendations for eThinkTank Tanzania

Issmail Nnafie
November 7, 2002



Internet cafés in Dar es Salaam: Problems and Opportunities

Recommendations for eThinkTank Tanzania

**Master of Science thesis
November 7, 2002**

Author: Issmail Nnafie

**Mentors: Drs. Herman Gaillard
Prof. dr. ir. Gert Brussaard
Dr. ir. E.L.C. van Egmond**

**Faculty of Technology Management
Faculty of Electrical Engineering
Faculty of Technology Management**

**Eindhoven University of Technology
Faculty of Technology Management
Technology and Society Program
Department of Technology Development Sciences**

Executive summary

Internet cafés can potentially help break down some of the major barriers to development that are presently faced by low-income populations. They can provide *shared* access to information and communication technologies (ICTs) that can offer development services in a number of areas that can assist in the development process. Nevertheless, with obstacle such as poor infrastructures, high prices and inconsistent legislation still many challenges have to be faced.

This research is a Master of Science research for the Department of Technology Development Sciences at the Faculty of Technology Management, Eindhoven University of Technology, and is part of the Technology and Society program. *The main goal of this research is to determine the problems and opportunities with respect to Internet cafés in Dar es Salaam and to suggest recommendations for the eThinkTank Tanzania.* In order to reach this goal four baseline studies and two field studies (surveys) have been carried out. The field studies were performed in Dar es Salaam between January and June 2002, during which **45 administrators** and **346 users** of Internet cafés have been interviewed.

Based on the performed studies and surveys the following problems and opportunities with respect to Internet cafés in Dar es Salaam are identified:

- Since Internet cafés are the main access to the Internet in Tanzania, they could **provide basic access to services such as health and education**. Moreover, they could **provide relatively cheap and efficient way of communicating**, considering the limited purchasing power and poor infrastructure in Tanzania. Nevertheless, **increased interest in the Internet is not in line with increased awareness** in terms of using the Internet for educational, commercial, social or political purposes.
- **The existing business model of most Internet cafés is unsustainable and uneconomic**. This is due to the unrealistic charges for offered services, lack of reliable power supply, expensive bandwidth, connectivity down-time and high competition. **This will result in the closing down of Internet cafés in the future**.
- The current **provision of courses and training by Internet cafés in the use of computers and the Internet is very limited**. Considering the limited ICT personnel in Tanzania, these **cafés could be appropriate training centers** as they are already equipped with the necessary ICT facilities. Also **in the field of education Internet cafés could play a major part**, given the absence of computers in Tanzanian schools. Furthermore, **Internet cafés could be a good alternative to the subsidized telecenters** when connectivity is provided.
- Due to an absence of a national IXP **Tanzania lacks cheap and high capacity connections to the global Internet**. The high cost of Internet bandwidth is passed on to the Internet cafés. Even **though the price charged by these cafés for offered services is not extremely high**, it could **obstruct a certain group** with limited financial means from using Internet cafés, **hindering the further diffusion of the Internet**.

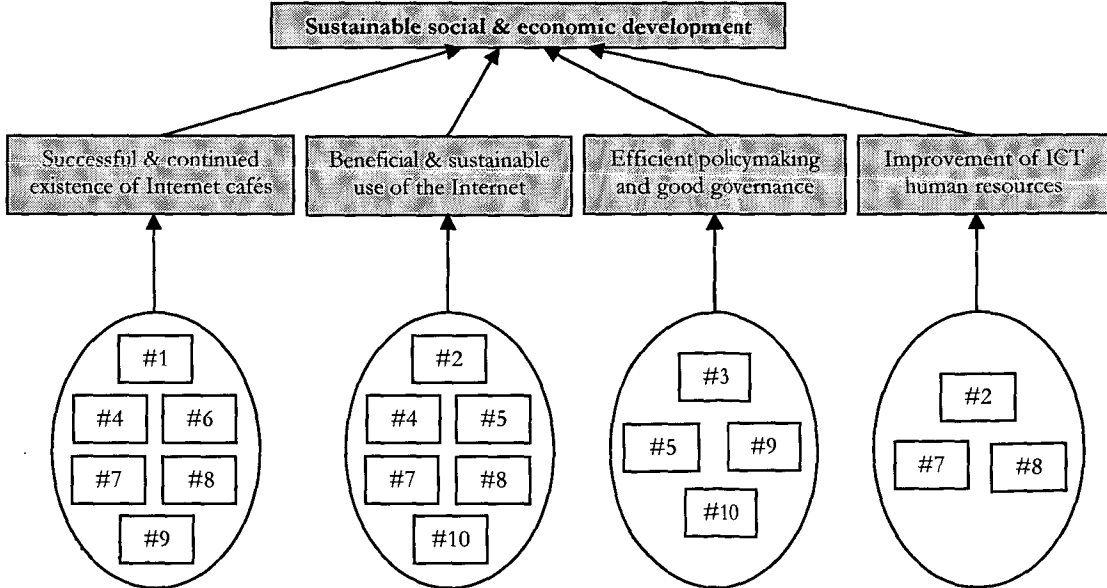
- **The inconsistent ICT policies, the monopoly in fixed-line services and the lack of compensation for suffered losses are undermining further development of Internet cafés.** This is also to the detriment of growth of the local ICT market.

On basis of these findings the following recommendations are suggested. These recommendations are primarily for the eThinkTank. Additionally, since the eThinkTank consists of members of various backgrounds, the recommendations are directed to the party best able to act on the problem or opportunity. These parties include: (A) *Internet café owners*, (B) *Internet café users*, (C) *ICT regulator*, (D) *Government officials*, (E) *Donors/NGOs*, (F) *Schools*, (G) *ISPs*, (H) *Electricity companies*, and (I) *Other companies*.

Recommendation	A	B	C	D	E	F	G	H	I
<p>1. Since the existing business model is unsustainable and uneconomic Internet café owners should rethink their strategy and reshape their business model.</p> <p>Other parties could play a role here by supporting and providing information and training for Internet café owners on how to run their business in a profit-making and sustainable way in order to survive in the long run.</p>	x		x	x	x				x
<p>2. Internet users should be made aware of the potentials the Internet could have. It is not for communication and entertainment only. Instead, <i>it is a powerful and cheap resource that can be used for learning, education, research, commerce, employment, discussions, exploring the world and other cultures and above all, to make oneself heard.</i> Concerned parties should think of ways to increase the awareness among users in order to get the most out of the Internet.</p>		x	x	x	x	x	x	x	x
<p>3. Very few know about the existence of the telecom regulator TCC and the Tanzania national website. For that reason, the regulator should propagate itself more strongly to the general public in order to build trust and to create an atmosphere of transparency and responsibility. By doing so, <i>the gap between policymakers and the community could be reduced, which could initiate better and more efficient policymaking.</i></p>	x	x	x	x					x
<p>4. The regulator should intervene and impose a strict deadline for all ISPs to set up a national IXP. By doing so, <i>local Internet bandwidth could be increased and can be offered much cheaper.</i> These major benefits could provide and improve access to the Internet for reasonable costs, which could mean lower prices will be paid by Internet cafés for Internet access and eventually users will be charged less for surfing. <i>As a result the Internet could be used more frequently and moreover, more people could access it.</i></p>			x	x	x				x
<p>5. More websites with Swahili and local relevant content should be designed as <i>it might be an essential medium for the Tanzanian society to communicate.</i> Furthermore, it could be an efficient and cheap way for governments, NGOs, institutions, companies etc. to provide information on relevant topics such as health, poverty, education, politics, culture, and business.</p>	x	x	x	x	x	x	x	x	x
<p>6. Internet cafés should join their forces and form a pressure group or representative who looks after their interests. Negotiations could be opened with the regulator, the electricity company, ISPs and others about certain arrangements and compensation in case of, for example, suffered losses due to an electricity or Internet connection failure.</p>	x		x	x				x	x

7. *Since there is a shortage of ICT facilities at schools, it might be an opportunity for these schools to cooperate closely with Internet cafés since the latter already have the necessary facilities. **Schools, Internet cafés and other concerned parties should discuss arrangements and develop methods on how to utilize these cafés for educational purposes.*** For example, students might be given assignments which they carry out in Internet cafés. By doing so, students will not only get familiar with the Internet but also with its practical use such as for educational purposes. x x x x x
-
8. *Since there is a shortage of IT-skilled people and training centers in Tanzania, **Internet cafés should be stimulated and encouraged to offer courses in the use of computers, applications and the Internet.*** *This will also improve their financial situation.* Funds and resources must be sought in order to finance the necessary requirements. x x x x x
-
9. **Internet cafés, policymakers and other concerned parties should start discussions and share ideas and views about existing laws and policies regarding certain technologies, such as Internet telephony.** x x x x
-
10. **Users as well as administrator of Internet cafés should be encouraged and stimulated to start up a discussion forum on the Internet** where they could express their concerns, share and discuss ideas about certain topics such as the Internet, policies, moral values, ethical issues and received services. In addition, *this forum could serve as an important medium to keep policymakers notified about current developments and views within the community.* Also, it might be used by policymakers themselves to inform the community about specific matters. x x x x x

These recommendations are represented in the following diagram in order to clarify their role and importance. Note that each recommendation is represented by its number as given in the table above. This diagram is based on the author's perception and is therefore subjective and open to criticism and discussion.



Foreword

This thesis covers a Master of Science research for the Department of Technology Development Sciences at the Eindhoven University of Technology (TUE)¹. This department aims at the development of technology in development countries. The University Computing Centre (UCC)² of the University of Dar es Salaam has provided the opportunity to perform this research.

I am grateful to many people without whom this research could not have been completed. I would like to thank my supervisors Herman Gaillard, Gert Brussaard and Emilia van Egmond for their coaching and comments during the carrying out of the research. I also would like to thank Jan Cranenbroek for bringing me in contact with UCC and for his practical support.

In Tanzania, my gratitude goes to all administrators and users of Internet café and all member of the eThinkTank who provided me with valuable information for my research. Further, I would like to thank my dear friends and colleagues for their support and kindness towards me and making me feel at home in the beautiful Tanzania. I also owe many thanks to Professor Beda Mutagahywa, the director of UCC, who provided me with the necessary facilities and for his useful advice.

Finally I thank my dear friends, brothers and sister, my father and *yemima* for their unfailing patience and inexhaustible support.

Issmail Nnafie
Eindhoven, the Netherlands
November 2002

¹ <http://www.tue.nl/>

² <http://www.ucc.co.tz/>

Table of contents

Executive summary.....	1
Foreword	4
Table of contents.....	5
1 Introduction.....	9
Part I: Methodology	
2 Theoretical issues	12
2.1 Research relevance.....	12
2.2 Research aim and problem.....	13
2.3 Theoretical framework.....	14
2.4 Operationalisation.....	15
3 Empirical issues	16
3.1 Type and method of research	16
3.2 Research setting.....	16
3.3 Population, sampling method and sample size.....	16
3.3.1 Survey on administrators of Internet cafés in Dar es Salaam	17
3.3.2 Survey on users of Internet cafés in Dar es Salaam.....	18
3.4 Methods of data collection.....	18
3.5 Pre-test.....	21
3.6 Techniques of data analysis.....	21
Part II	
-A: Results of baseline studies	
4 International environment: ICT and development.....	23
4.1 What is ICT?.....	23
4.2 ICT for development	23
4.3 Digital divide.....	25
4.4 Internet.....	27
4.4.1 What is the Internet?.....	27
4.4.2 Internet in developing countries	28
4.5 Telecenters	28
4.6 Conclusions.....	30
5 Tanzanian environment	31
5.1 Overview.....	31
5.2 Current policy statements.....	32
5.3 Education.....	33
5.3.1 The state of primary education.....	33
5.3.2 The state of secondary education.....	33
5.3.3 The state of colleges and universities	34
5.3.4 Other training institutes.....	35
5.4 Conclusions.....	35
6 Tanzanian ICT	37
6.1 Access and connectivity.....	37

6.1.1	Fixed telephony	37
6.1.2	Mobile telephony	38
6.2	Data Market	39
6.2.1	Data Communication Services	39
6.2.2	Internet Service Providers (ISPs)	39
6.3	Internet	40
6.3.1	Internet cafés	41
6.3.2	Telecenters	41
6.3.3	Local applications and content	42
6.4	Conclusions	43
7	ICT regulations	44
7.1	Background	44
7.2	ICT Regulator	44
7.3	Current developments	45
7.3.1	New ICT policy	45
7.3.2	e-government	46
7.4	eThinkTank	47
7.5	Policies regarding Internet cafés	48
7.6	Conclusions	49

-B: Results of field studies

8	Results of survey on administrators of Internet cafés in Dar es Salaam	51
8.1	Basic characteristic of administrators	51
8.2	General information about Internet cafés	52
8.3	Basic economic situation of Internet cafés	53
8.4	Purposes for using Internet cafés	54
8.5	Administrators' perception of the quality of service provided by ISPs	56
8.6	Administrators' perception of the Tanzanian ICT, policies and related issues	57
8.7	Conclusions	58
9	Results of survey on users of Internet cafés in Dar es Salaam	59
9.1	Basic characteristics of users	59
9.2	Purposes for using Internet cafés	60
9.3	Use of computers and the Internet	63
9.4	Users' perception of the quality of service provided by Internet cafés	65
9.5	Users' perception of the Tanzanian ICT, policies and related issues	65
9.6	Conclusions	66

Part III: Conclusions & Recommendations

10	Conclusions and recommendations	69
10.1	Summary of conclusions	69
10.2	Final conclusions	72
10.3	Recommendations	73
	References	76
	Appendix A. Checklist	79
	Appendix B. Internet Exchange Points, Their Importance to Development of the Internet and Strategies for their Deployment – The African Example	79
	Appendix C. Glossary of ICT terms	79

Appendix D. Results of survey on administrators	79
Appendix E. Results of survey on users.....	79
Appendix F. Rough calculation of income of surveyed Internet cafés	79
Appendix G. Questionnaire Administrators	79
Appendix H. Questionnaire Users.....	79

List of figures

Figure 2-1: Theoretical framework	15
Figure 4-1: Percentage of Internet users by region	26
Figure 4-2: Model of the Internet	27
Figure 5-1: Map of Tanzania.....	31
Figure 6-1: Fixed line growth (1995-2001)	38
Figure 6-2: Number of Internet users (1996-2001).....	41
Figure 8-1: Education distribution among administrators	51
Figure 8-2: Income distribution administrators	52
Figure 8-3: Number of computers and type of Internet access	53
Figure 8-4: Charges per hour	53
Figure 8-5: Sources of income for Internet cafes	54
Figure 8-6: Equipment provided by Internet cafes	55
Figure 8-7: Purposes Internet cafés used for.....	55
Figure 8-8: Purposes the Internet used for.....	56
Figure 8-9: Satisfaction with charges paid for Internet access	56
Figure 8-10: Role of government in ICT development.....	57
Figure 9-1: Age distribution of users	59
Figure 9-2: Highest level of education received by users.	60
Figure 9-3: Frequency of using Internet café and time spent during a typical visit	60
Figure 9-4: Main purpose for using Internet cafés	61
Figure 9-5: Secondary purposes for using Internet cafés.....	61
Figure 9-6: Use of Internet café equipment by users.....	62
Figure 9-7: Use of Internet café services by users	62
Figure 9-8: Use and frequency of use of Internet telephony	63
Figure 9-9: Content of interest for users.....	64
Figure 9-11: Satisfaction of users with Internet café services.....	65
Figure 10-1: Role and importance of suggested recommendations	75

List of tables

Table 3-2: Sampling of administrators of Internet cafes	17
Table 3-3: Sampling of users of Internet cafes	18
Table 3-4: Methods of data collection.....	20
Table 5-1: Basic indicators of Tanzania	31
Table 6-2: Mobile subscriber by operator (March 2002).....	39
Table 6-3: Estimate of subscribers of major ISPs (2002).....	40
Table 10-1: Recommendations	73

Acronyms

COSTECH	Tanzania Commission for Science and Technology
DIT	Dar es Salaam Institute for Information Technology
GDP	Gross Domestic Product
ICT	Information and Communication Technology
IDRC	International Development Research Centre
IICD	Institute for International Cooperation and Development
ISP	Internet Service Provider
ITU	International Telecommunication Union
IXP	Internet Exchange Point
LAN	Local Area Network
NGO	Non-Governmental Organization
OECD	Organisation for Economic Cooperation and Development
TCC	Tanzania Communication Commission
TSH	Tanzanian Shilling
TTCL	Tanzanian Telecommunication Company Limited
UCC	University Computing Center
UDSM	University of Dar es Salaam
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
US\$	United States Dollar
VoIP	Voice over Internet Protocol

A glossary of used ICT terms is given in appendix C.

1 Introduction

The Internet is central to the network revolution that is transforming the way people interact all over the world. In many parts of the world, societies are undergoing radical changes as a result of the rapid development of the information and communication technologies (ICTs). Access to ICT is essential for development, but in many developing countries, however, this access is still inadequate or non-existing.

In the last few years, efforts are being made to establish or strengthen access to and dissemination of technology for economic and social development. International communities in general have become interested in *telecenters* as a way to build sensible development strategies, consistent with the situation of poor countries and marginal areas. This strategy holds that there is no point in investing heavily in extending access to those areas, given their limited production capacity and purchasing power, but recognizes the potential impact that increased access could have on their development. "Universal service" to every home is too ambitious a goal in poor countries and low-income areas, but it is possible to have a significant impact through "universal access" by means of shared facilities in a relatively short period of time³.

Before presenting the research aim for this research it should be noted that the focus here will be on *Internet cafés* rather than on *telecenters*. There are two reasons behind this. The first is to be more specific and to avoid ambiguity as a telecenter comprises also centers providing other telecommunication services than the Internet such as basic telephony, fax and photocopying. Instead, in this study the focus is on those *privately-owned* centers whose *main purpose is to provide public access to the Internet and to services available over the Internet*. Second, using the term *Internet café* is more practical as the centers are widely known by that name.

This research is a Master of Science research for the Department of Technology Development Sciences at the Faculty of Technology Management, Eindhoven University of Technology, and is part of the Technology and Society program. *The main goal of this research is to determine the problems and opportunities with respect to Internet cafés in Dar es Salaam and to suggest recommendations for the eThinkTank Tanzania*. The structure of this report is as follows:

Part I: Methodology

Chapter 2 presents the theoretical issues for this research, whereas *chapter 3* deals with the empirical issues.

Part II-A: Results of baseline studies

Chapter 4 provides a general line of thought on the ongoing international developments regarding ICT in general and the Internet in particular. *Chapter 5* gives an overview of some social and economic issues stemming from the Tanzanian national environment. Furthermore, the Tanzanian education system is examined in more detail, where the emphasis is placed on ICT-related education and training. *Chapter 6* provides an overview of the current status of ICT in Tanzania, while *chapter 7* deals with the current state of the ICT regulations.

³ Proenza, F. J. et al, *Telecenters for Socioeconomic and Rural Development in Latin America and the Caribbean*, FAO, ITU, IADB, Washington D.C., 2001.

Part II-B: Results of field studies

Chapter 8 presents the results of a survey on *administrators* of Internet cafés in Dar es Salaam, and subsequently, in *chapter 9* the results of a survey on *users* of Internet cafés are presented.

Part III: Conclusions & Recommendations

Finally, *chapter 10* provides a summary of conclusions of the chapters 4 to 9. Subsequently, the research problem will be answered here by the determination of the problems and opportunities with respect to Internet cafés in Dar es Salaam. On basis of this, recommendations are suggested in the last section of this chapter.

Part I

METHODOLOGY

2 Theoretical issues

2.1 Research relevance

Though the evidentiary record of the benefits derived by poor people from the Internet is expanding rapidly, the documentation of the impact of Internet cafés on economic and social development is limited and not very systematic⁴. There are many underlying reasons, but this is partly because the causal sequence from use to impact is complex and indirect. Nevertheless, an Internet café can potentially help break down some of the major barriers to development that are presently faced by low-income populations.

Internet cafés are generally agreed to be tools and not ends in themselves⁵. The end is usually stated as the support of services in areas such as education, health care, local democracy and small business support. They can provide access to ICT that can offer development services in a number of areas that can assist in the development process. This process is elaborated in the chain below. This is quite a complex chain and each stage is open to question.

Internet cafés → Access to ICTs → Provide services → Assist development

For a community an Internet café can have the following advantages⁶:

- It is a way of sending messages between relatives and friends residing at distant locations but enabled by virtual proximity to provide technical, material, cultural, social or moral support.
- It may mean access to open schools and universities, enabling people to study in areas where there are no facilities.
- It may mean access to books, which can be downloaded and printed.
- It may be a way to obtain urgent medical advice in areas where there is no doctor.
- It may mean a way to get support and information on agricultural projects, natural resource management and small business development.
- And it means being able to connect with government and other institutions: asking questions, raising concerns and sending complaints.

An Internet café can provide opportunities for different parties. Communities benefit because it gives them access to ICT. As noted above, this access has the potential to empower communities so that they can play a part in their own development and make their voices heard. Governments benefit because ICT can help reduce poverty by empowering communities. Governments can also use Internet cafés to deliver many services, such as health education. In addition, Internet cafés enable governments to stay in touch with people in remote areas. The private sector also benefits because ICTs meet development objectives, and integrate isolated communities into the mainstream economy and society in a sustainable way.

Though Internet cafés may have a positive impact on social and economic development there are some important issues which have to be considered. For example, in many low-income countries there is an

⁴ Proenza, F. J. et al, *Telecenters for Socioeconomic and Rural Development in Latin America and the Caribbean*, FAO, ITU, IADB, Washington D.C., 2001.

⁵ Benjamin, P., *Does 'Telecentre' Mean The Centre is Far Away? Telecentre Development In South Africa And Around The World*, LINK Centre, South Africa, 2000.

⁶ The African Connection: www.africanconnection.org/docs/telecomms/moreabout.html

absence of supporting technologies, lack of legal guidelines and appropriate legislation. And as noted before, the knowledge about the impact of Internet cafés is limited and not very systematic. Therefore, more research has to be conducted to acquire knowledge on experiences with these cafés and to identify their impacts on social and economic development.

Besides the above-mentioned relevance, research on experiences with Internet cafés in Tanzania also has a scientific relevance. It contributes to the knowledge on issues which determine the level of use and functioning of Internet cafés in low-income areas and the opportunities of providing access to facilities promoting these cafés. Furthermore, this research can provide a basis for other research concerning this topic in other areas in Tanzania and in other (developing) countries.

2.2 Research aim and problem

The main goal of this research is to *determine the problems and opportunities with respect to Internet cafés in Dar es Salaam and to suggest recommendations for the eThinkTank*. Here, specific emphasis is placed on *technological* (ICT sector), *regulatory* (ICT regulations) and *societal* (administrators and users) factors regarding Internet cafés.

As with the introduction of any broad societal innovation, there are a variety of potential barriers and stimuli to implementation, which can be technological, institutional, legal, or societal in nature. Furthermore, the importance and functionality of an Internet café depend on decisions of individuals or organizations, made within the constraints of the existing technical and legal environment. As a result a general picture could be drawn of the experiences with Internet cafés in Dar es Salaam and the factors stimulating or impeding the functioning of these cafés. Finally, on basis of the results certain conclusions will be reached and recommendations suggested.

In order to reach this goal the following research problem has been defined:

What are the problems and opportunities with respect to Internet cafés in Dar es Salaam?

To be able to tackle this research problem a number of research questions have been formulated. These questions are classified in six sub studies.

Sub study 1: International environment: ICT and development

Related research questions:

- What is ICT and what are its implication for development?
- What is the Internet and what is its state in developing countries?

Sub study 2: Tanzanian environment

Related research questions:

- What is the social and economic situation in Tanzania?
- What is the state of education, particularly ICT-related, in Tanzania?

Sub study 3: Tanzanian ICT

Related research questions:

- What is the current state of the Tanzanian ICT?
- What is the current state of the Internet in Tanzania?

Sub study 4: ICT regulations

Related research questions:

- What is the current state of the ICT regulations in Tanzania?
- What are the implications of these regulations?
- What are the policies regarding Internet cafés?

Sub study 5: Survey on administrators of Internet cafés in Dar es Salaam

Related research questions:

- What are the basic characteristics of administrators of Internet cafés?
- What are the characteristics of Internet cafés?
- What is the basic economic situation of Internet cafés?
- What are the purposes for which the Internet cafés are used?
- What is the administrators' perception of the quality of service provided by ISPs?
- What is the administrators' perception of the Tanzanian ICT, policies and other related issues?

Sub study 6: Survey on users of Internet cafés in Dar es Salaam

Related research questions:

- What are the basic characteristics of users of Internet cafés?
- For which purposes do users use Internet cafés?
- For which purposes do users use computers and the Internet?
- What is the users' perception of the quality of service provided by Internet cafés?
- What is the users' perception of the Tanzanian ICT, policies and other related issues?

2.3 Theoretical framework

Before presenting the theoretical framework for this research the used key concepts are defined to avoid ambiguity.

Text box 2-1: Definition of key concepts

International environment: ICT and development

In many countries ICTs have been a subject of discussion and more and more research is being performed to learn more about the implications of these technologies for social and economic development. Experiences with ICTs by these countries are – to some extent – international, and therefore also apply to Tanzania.

Tanzanian environment

Some social and economic issues stemming from the Tanzanian national environment will be explored, and selected statistical indicators (GDP per capita, birth-rate, life expectancy etc.) will be presented. This is of relevance to get an idea of the level of the socio-economic status in Tanzania. In addition, the Tanzanian education system will be examined in more detail, where the emphasis is placed on ICT-related education and training, in order to assess the ICT human resource situation in Tanzania.

Information and communication technologies (ICTs)

ICT is currently defined as the set of activities that facilitate by electronic means the processing, transmission, and display of information⁷. It covers a range of tools and techniques relating to computer-based hardware and software, to communications including both directed and broadcast, to information sources such as the Internet, and to

⁷ Asian Development Bank: www.adb.org/Documents/Policies/ICT/ICT.pdf

associated technologies such as robots, video-conferencing and digital TV. In this research the emphasis will be placed on the Internet.

ICT regulations

ICT regulations comprise all regulations and policies undertaken by national governments and local authorities to direct the development of ICT into a desired way.

Internet café

As noted in the introduction the term *Internet café* is used in stead of *telecenter*. The main service offered by the basic Internet café that is common in many countries, mainly in urban areas, is access to the Internet and often also to elementary software⁸. An Internet café may be defined as a “shared site that provides public access to ICTs.” As mentioned before, the focus in this research will be on those *privately-owned* sites whose main purpose is to *provide public access to the Internet and to services available over the Internet*.

eThinkTank

The eThinkTank is the most prominent initiative which has been identified to develop a policy that addresses the whole Tanzanian ICT sector. It is a voluntary association on the Internet supported by UNDP and has more than 200 members. These members are experts of various backgrounds with an interest in the development of ICT in Tanzania. The eThinkTank involves senior executives and managers, but also government officials and donor organizations. In chapter 7 the eThinkTank will be discussed in more detail.

The theoretical framework for this research is illustrated in the figure below. Note that the parts of the framework are derived from the defined sub studies.

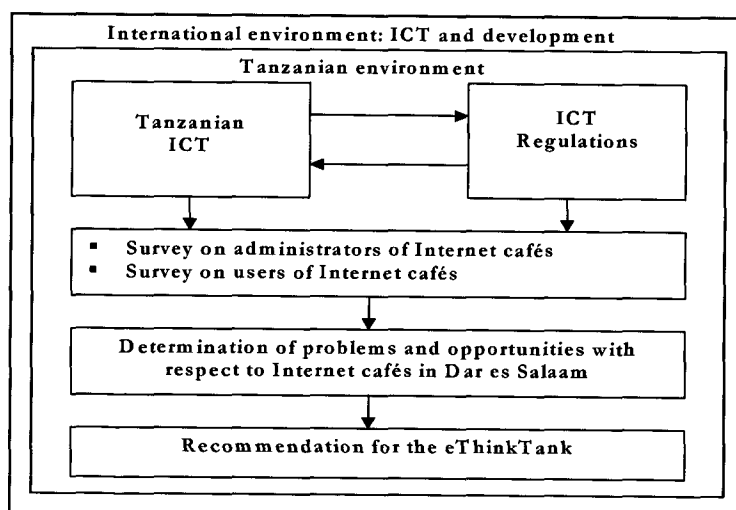


Figure 2-1: Theoretical framework

2.4 Operationalisation

The concepts used in the theoretical framework are translated into a list of measurable indicators which serves as a checklist. This checklist can be found in appendix A.

⁸ Proenza, F. J. et al, *Telecenters for Socioeconomic and Rural Development in Latin America and the Caribbean*, FAO, ITU, IADB, Washington D.C., 2001.

3 Empirical issues

In this chapter empirical issues are formulated and determined. These issues include the type and method of research, research setting, population, research units, sampling method, the methods of data collection and techniques of analysis.

3.1 Type and method of research

Since not much is known about the experiences with Internet cafés in Tanzania, this research will be mainly explorative. As mentioned before, a number of research questions have been formulated to tackle the research problem. These research questions are classified in six sub studies. The first four are mainly baseline studies, while the fifth and sixth are field studies (surveys).

3.2 Research setting

The field studies for this research were performed in Dar es Salaam over a period of six months. Dar es Salaam has an estimated population of 3.5 million, 547,000 households with an average size of 6.4 persons and 70% of the people live in 40 unplanned settlements⁹. In 2001, the city accounted for around 25 percent of the country's urban population¹⁰. The city region has been divided into three municipal districts; *Kinondoni*, *Ilala* and *Temeke*.

3.3 Population, sampling method and sample size

Because of time and money constraints it is impossible to involve the whole population in this research. Therefore, for the fifth and sixth sub studies a sample was derived from the population. Before being able to take a sample the population had to be identified. Because of an absence of a central registration for Internet cafés in Tanzania with data files and other relevant information different sources were consulted to gather information on these cafés in Dar es Salaam.

On July 2001, COSTECH embarked on project aimed to carrying out a national ICT infrastructure and e-Readiness assessments for Tanzania¹¹. A survey on Internet cafés in Tanzania was one part of the main project. In Dar es Salaam, the survey team had to drive around searching for Internet cafés, during which names and locations of the found cafés were recorded. A total of 45 Internet cafés were located in Dar es Salaam. This list was complemented with other cafés from own observations and other sources (Internet, IT Vision, friends and colleagues). Finally, the list contained 61 Internet café names in total.

In order to reach a high statistical value the sample size had to be as large as possible. On the other hand, the sample size depended also on factors like the available time, money, assistance and other forms of support. Mr. Joseph, tutorial assistant at the Department of Sociology of the University of Dar es Salaam and experienced in collecting data, assisted in performing the interviews. Bearing in mind the available

⁹ Constantinides, G., *Final Draft Report – Cost Benefit Case Studies, GPA Strategic Action Plan on Sewage*, October 2000.

¹⁰ Boyd, G., *An Overview of Private Sector Participation in the Dar es Salaam Water and Sewerage Authority (DAWASA)*, June 2001.

¹¹ COSTECH, *Preliminary Results of Internet Café Survey in Tanzania*, infoDev Dar es Salaam, January 2002.

means, the survey aimed to perform 400 interviews over a period of 8 weeks. In the next two sub sections the populations, sampling methods and sizes for each survey are presented.

3.3.1 Survey on administrators of Internet cafés in Dar es Salaam

Population and research units

The population and research units are all administrators of Internet cafés in Dar es Salaam.

Sampling method and sample size

From the 61 cafés 50 were sampled for the survey in order to interview 50 administrators. The reason for starting with interviewing administrators is to acquire more reliable information in order to design a more complete list with the exact locations of the Internet cafés. In the box below the sampling for the administrators is discussed in more detail.

Text box 3-1: Sampling technique for the administrators

The sampling method used is the so-called *area sampling*. This method involves dividing the population according to country, city blocks or other well-defined geographical sections. From each section a *simple random sample* is taken. In this case the initial list of Internet cafés was divided into 3 sub-lists according to the three city districts, Ilala, Kinondoni and Temeke. From each district a number of Internet cafés were randomly selected, using the statistical program SPSS. The sample size for each district is determined as follows: the number of Internet cafés in Dar es Salaam on the initial list was 61; 35 in Ilala, 24 in Kinondoni and 2 in Temeke. Considering the available time and assistance it was intended to have a sample of 50 Internet cafés; 28 in Ilala, 20 in Kinondoni and 2 in Temeke. The execution of the interviews showed that some Internet cafés on the initial list did not exist or were not functioning anymore. The nearest Internet cafés, *not* selected in the initial sample, were chosen to replace the “missing” ones. Finally, 17 from the intended 28 administrators in Ilala have been interviewed. In Kinondoni 23 of the desired 20 administrators responded while in Temeke none have been interviewed. The latter was because Internet cafés on the initial list turned out to be in another district than Temeke. The sampling method for the administrators is illustrated in the table below.

Table 3-1: Sampling of administrators of Internet cafes

City district	Number of Internet cafés (according to the initial list)	Sample size ¹²	Number of interviews
Ilala	35	28	17
Kinondoni	24	20	23
Temeke	2	2	5 ¹³
Total	61	50	45

Representativity

The obtained information is representative of the 45 administrators who cooperated with the survey. The sample (45 out of a total of roughly 100 Internet cafés) is most likely representative of all administrators of Internet cafés in Dar es Salaam.

¹² The total sample size was 50. The sample size per district was divided up proportionally according to the initial list.

¹³ Initially, the sample for Temeke yielded no results. As it was suspected that there were Internet cafés, the interviewer traveled through this district where 5 administrators have been interviewed.

3.3.2 Survey on users of Internet cafés in Dar es Salaam

Population and research units

The population and research units are all users of Internet cafés in Dar es Salaam, excluding transients (visitors to the city) and children under 15 years of age.

Sampling method and sampling size

After interviewing the administrators a new list of Internet cafés was made. For interviewing users it was decided to sample 24 Internet cafés from all Internet cafés *cooperated* with the first part of the survey in the two districts Ilala and Kinondoni. This saved time as the interviewer already knew the exact locations of these cafés. For the district Temeke another strategy was chosen as it was suspected that there were Internet cafés. The interviewer travelled through this district searching for Internet cafés and interviewed administrators and users as well. The sampling method used for users is explained below.

Text box 3-2: Sampling technique for the users

For the survey it was aimed to interview 350 users of Internet cafés. Similar to interviewing the administrators, users were divided according to the three city districts. The adapted list contained 17 Internet cafés in Ilala, 23 in Kinondoni and none in Temeke. From the first two districts two random samples of 12 Internet cafés per district were taken. As noted earlier for Temeke the interviewer had to travel around searching for Internet cafés. Here, 5 new Internet cafés were found and 5 administrators were interviewed, which brings the total to 45 interviews. In all districts 346 users were interviewed, with 11 to 14 users per Internet café. In Ilala 141 users were interviewed in 11 Internet cafés, in Kinondoni 151 users in 12 cafés while in Temeke 54 in 4 Internet cafés. The table below gives an overview of the sampling.

Table 3-2: Sampling of users of Internet cafes

City district	Number of Internet cafés (according to the new list)	Sample size	Intended number of interviews (11 to 14 per café)	Number of interviews
Ilala	17	12	150	141
Kinondoni	23	12	150	151
Temeke	0	5 (after searching)	50	54
Total	40	27	350	346

Representativity

The information obtained is representative of the 346 users who cooperated with the survey. The response rate for this survey was very high; perhaps around 90% approached in 27 cafés during the survey was willing to participate. Hence, the sample of the users can be also considered as representative of all users of Internet cafés in Dar es Salaam.

3.4 Methods of data collection

For the first two sub studies the primary method of data collection was consulting existing information in books, journals, policy documents, statistical and non-statistical records, papers, theses, etc., and of course the Internet. Likewise, available information was consulted for the third and fourth sub studies. Another useful source for the latter studies was the discussion forum eThinkTank Tanzania (www.ethinktanktz.org), a voluntary association of more than 200 experts of various backgrounds with an interest in the development of ICT in Tanzania. Other sources were local newspapers, IT vision (a Tanzanian ICT magazine), UCC, COSTECH, colleagues and friends.

For the fifth and sixth sub studies personal interviews with written questionnaires were used to obtain information from intended respondents. Here two different questionnaire forms were designed; one meant for the survey on administrators and the other for the survey on users of Internet cafés (see appendices G and H). Below the objectives of each questionnaire are addressed in more detail, followed by a clarification of the objectives.

Objectives of questionnaire for administrators of Internet cafés

- A. to identify the basic characteristics of administrators of Internet cafés,*
- B. to obtain general information about the Internet cafés,*
- C. to identify the basic economic situation of Internet cafés,*
- D. to identify purposes for which the Internet cafés are used,*
- E. to identify the administrators' perception of the quality of service provided by ISPs, and*
- F. to identify the owners' perception of the Tanzanian ICT, policies and other related issues.*

Objectives of questionnaire for users of Internet cafés

- G. to identify the basic characteristics of users of Internet cafés,*
- H. to identify purposes for which the Internet cafés are used,*
- I. to identify the use of computers and Internet by users,*
- J. to identify the users' perception of the quality of service provided by Internet cafés, and*
- K. to identify the users' perception of the Tanzanian ICT, policies and other related issues.*

Text box 3-3: Clarification of the objectives

A. Basic characteristic of administrators of Internet cafés

The first posed questions aim to collect data about basic characteristics of administrators. These characteristics include sex, marital status, occupation, education and income.

B. General information about the Internet cafés

This part of the questionnaire aims to collect information about the age of the Internet café, number and type of operating computers and number of computers connected to the Internet. Also information is collected about the type of Internet access and Internet Service Providers (ISP).

C. Basic economic situation of the Internet cafés

To obtain a basic picture of the economic situation of Internet cafés information is gathered on fees paid to ISPs, number of users per week, cost of surfing and sources of income.

D. Purposes for using Internet cafés

This part attempts to determine the equipment and services provided by the Internet café. Administrators are also asked for which purposes the Internet café is used. This information will be used as an extra verification for the data obtained from the users.

E. Administrators' perception of the quality of service provide by the ISPs

Here, information is gathered on the general satisfaction of Internet café administrators with their ISP, and the satisfaction with the Internet access and fee paid for this access.

F. Administrators' perception of the Tanzanian telecommunications, policies and other related issues

In this section administrators are asked about their views on ICT and development. It also attempts to determine the administrators' perception of the Tanzanian ICT and the involvement of the government in it. Furthermore, they are

asked about their knowledge of Tanzanian national websites, their perception of the impact of the Internet on the Tanzanian culture and whether more Swahili websites should be designed. The administrators are also asked whether the Internet café has a license to operate. Another question was added to gather information on other neighbouring Internet cafés in order to have a better estimate of the number of Internet cafés in Dar es Salaam.

G. Basic characteristics of users of Internet cafés

Similar to administrators, this part aims to collect data about basic characteristics of users of Internet cafés.

H. Purposes for using Internet cafés

In this part users are asked how often they use Internet café services and how much time they spend during a typical visit. They are also asked for which purposes they use the café services and which equipment they use. Additionally, this parts attempts to gather information on the use of Internet telephony (VoIP), the frequency of use and the user's opinion regarding this prohibited technology.

I. Use of computers and Internet

This section aims to obtain information on the use of computers and Internet by the users. Users are asked whether they have a computer at home, and where they have access to the Internet. Also questions are posed about how long users have been using Internet cafés and whether they feel their ability to use computers and Internet has improved as a result of using the cafés. Furthermore, this section attempts to gather information on the surfing behaviour of users. They are asked about the types of Internet contents they are interested in and their degree of interest.

J. Users' perception of the quality of service provided by Internet cafés

Here, users are queried about their satisfaction with the quality of services offered by Internet cafés and the cost paid for these services. Additionally, users are asked which changes they propose to improve the services in Internet cafés.

K. Users' perception of the Tanzanian telecommunications, policies and other related issues

Like the administrators, users are asked about their opinions and views on ICT and development. This section also attempts to discover the users' perception of the Tanzanian ICT and the involvement of government in it. Moreover, they are asked about their knowledge of Tanzanian national websites, their perception of the impact of the Internet on the Tanzanian culture and whether more Swahili websites should be designed.

The table below provides an overview of the different methods of data collection that was used for the six sub studies.

Table 3-3: Methods of data collection

Sub study	Methods of data collection		
	<i>Literature, magazines, Internet, policy documents, etc</i>	<i>Experts</i>	<i>Personal interviews</i>
1. ICT and development			
• ICT for development	x		
• Digital divide	x		
• The Internet	x		
• Telecenters	x		
2. Tanzanian environment			
• Social situation	x		
• Economic situation	x		
• Current policy statements	x	x	
• Education	x	x	

3. Tanzanian ICT			
• Access and connectivity	x	x	x
• Data market	x	x	x
• Internet	x	x	x
• Internet cafés	x	x	x
• Telecenters	x	x	
• Local content and applications	x	x	x
4. ICT regulations			
• ICT regulator	x	x	x
• Policy developments	x	x	
• eThinkTank	x	x	
• Policies regarding Internet cafés	x	x	x
5. Survey on administrators of Internet cafés in Dar es Salaam	x	x	x
6. Survey on users of Internet cafés in Dar es Salaam	x	x	x

3.5 Pre-test

A pre-test was done to test the questionnaires before using it to collect data. The purpose of this pre-test was to find out whether the questions would be understood by the respondents. Other reasons were to check the relevance of the questions and the length of the questionnaire.

Questionnaire for administrators

Four colleagues and three system administrators of UCC were asked to fill in the questionnaires and to give feedback. Some were of opinion that the questionnaire was too long and too extensive. There were also some remarks on the sequence, the relevance and outlook of the questions. After considering the provided feedback a number of adjustments were made to the questionnaire.

Questionnaire for users

For pre-testing the questionnaire for users 10 questionnaire forms were left in UCC's Internet café. The system administrator was asked to request users to fill in those forms and to provide feedback. 7 forms were completed and the other 3 were taken along by the students. The pre-test showed that a number of respondents overlooked some questions, while other questions were skipped as the respondents wanted to finish the questionnaire quickly. Also, some complained about the length of the questionnaire. After analyzing the pre-test results some modifications were made to the questionnaire. A number of questions which were not very relevant were removed to shorten the questionnaire. The layout was also changed to improve the overview of the questionnaire.

3.6 Techniques of data analysis

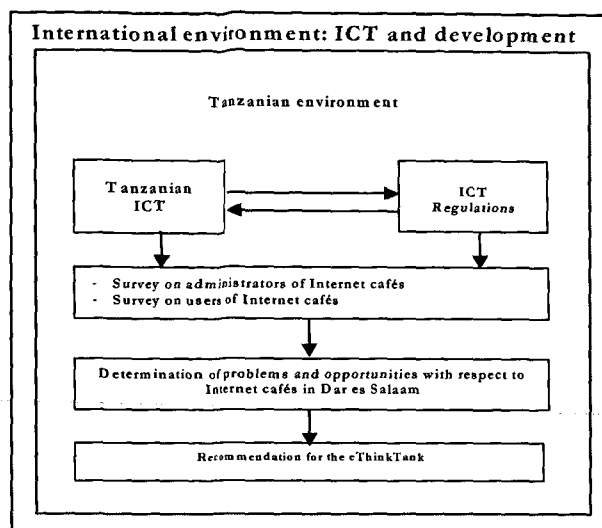
The obtained data was analyzed and evaluated using the programs Statistical Package for Social Sciences (SPSS) and MS Excel. Standard descriptive statistical techniques, mainly frequency distribution and percentages, were used for the analysis.

Part II-A

RESULTS OF BASELINE STUDIES

4 International environment: ICT and development

ICT is widely recognized as a potentially powerful tool which can contribute a great deal to development goals. More and more research is being done to examine and assess its possible role in accelerating a sustainable dynamic of social and economic development. This chapter aims to provide a general line of thought on the ongoing international developments regarding ICT in general and the Internet in particular. It starts with defining ICT and what it can mean for development. Next, the disparity in the ICT use between developed and developing countries is discussed. Subsequently, this chapter examines the Internet where special attention is given to its availability in low-income countries and ways to overcome barriers impeding access to the Internet. Finally, some conclusions on these issues will be presented.



ICT is widely recognized as a potentially powerful tool which can contribute a great deal to development goals. More and more research is being done to examine and assess its possible role in accelerating a sustainable dynamic of social and economic development. This chapter aims to provide a general line of thought on the ongoing international developments regarding ICT in general and the Internet in particular. It starts with defining ICT and what it can mean for development. Next, the disparity in the ICT use between developed and developing countries is discussed. Subsequently, this chapter examines the Internet where special attention is given to its availability in low-income countries and ways to overcome barriers impeding access to the Internet. Finally, some conclusions on these issues will be presented.

4.1 What is ICT?

ICT is a general term sometimes used to apply to many different things by different people. In its broadest sense it refers to a variety of information-handling tools, all of which make it possible to improve communication between individuals and groups. These tools are a varied set of goods, applications and services that are used to produce, store, process, distribute and exchange information. They include traditional communication means such as radio, television, fax machines, copier machines, scanners and telephone, and newer technologies of computers, servers, LANs, software and applications, satellite and wireless technology. ICT also refers to the Internet and Internet-based tools such as newsgroups, ftp, e-mail, telnet, gopher and World Wide Web (WWW). These different tools are now able to work together, and combine to form a network of interconnected telephone services, standardized computing hardware, the Internet, radio and television, which reaches into every corner of the globe.

But what is most important is not the tools themselves, but the way in which people decide to use them to increase the quality, quantity and speed of access to and distribution of information for purposes of advocacy, education, training, research, discussion, governance, and commerce¹⁴.

4.2 ICT for development

Current technological transformations are more rapid (the power of a computer chip doubles every 18 - 24 months without cost increase) and more fundamental (genetic engineering breakthroughs) and are driving down costs (the cost of one megabit of storage fell from US\$ 5,257 in 1970 to US\$ 0.17 in 1999)¹⁵.

¹⁴ UNDP: www.undp.org.al/download/pdf/ict4d.pdf

¹⁵ UNDP (www.undp.org): *Human Development Report 2001*.

These transformations increase the possibilities of what people can do with technology in several development areas.

The spread of ICT can bring about more new opportunities for economic growth and development. New markets, new products, and new services are being created which bring with them new sources of revenue. One of the principal determinants of economic growth is the ability to expand productivity¹⁶. ICTs have the capacity to increase productivity, that is, to create more cost-effective output with the same or less input. Furthermore, the use of ICT is a key to flexibility of the production process itself, of its organization within the firm and of the organization of relations between customer and supplier firms¹⁷. One of the major results of the new electronic and computer-aided production technology is that it allows for rapid switching from one part of a process to another and permits the tailoring of production to the requirements of individual customers.

If ICT can be combined with domestic and external human resources, they can be instrumental in achieving major changes in the organization of industrial activity and the conduct of everyday life. Moreover, the right complement of targeted ICT interventions has the potential to play an even more substantial role in accelerating a sustainable dynamic of social and economic development in developing countries¹⁸.

Below summarizes briefly the role ICT could play or is playing in five key areas identified by the UN Millennium Summit as development imperatives¹⁹: *health, education, economic opportunity, empowerment and participation, and environment*. Below-mentioned illustrative cases are derived from the final report of the Digital Opportunity Initiative (DOI)²⁰.

Text box 4-1: Role of ICT in five key areas.

ICT for health

ICT is being used in many developing countries and communities to facilitate remote consultation, diagnosis and treatment. In Gambia, for example, nurses in remote villages use digital cameras to download images of symptoms onto a computer and transfer them to nearby towns for examination by doctors.

ICT for education

Across a range of educational applications, ICT is being used to improve the efficiency, accessibility and quality of the learning process in developing countries. One of the most clearly demonstrated applications is distance education in developing countries where affordability and geography have been real barriers to access. The six largest distance-learning universities in the world are located in developing countries: Turkey, Indonesia, China, India, Thailand and Korea - all of which offer expanding virtual campuses.

ICT for economic opportunity

ICT can contribute to income generation and poverty reduction. It enables people and enterprises to capture economic opportunities by increasing process efficiency, promoting participation in expanded economic networks, and creating opportunities for employment. In Chile, for example, an Internet network among farmer organizations has dramatically increased farmers' incomes by providing information about crop status, weather, global market prices and training.

¹⁶ IICD (www.IICD.org), *ICTs in developing countries: Booklet I - The importance for sustainable development*, 1998.

¹⁷ Gaillard, H., Dal, A., *Technology and innovation in global perspective*, Eindhoven University of Technology, 2000.

¹⁸ Digital Opportunity Initiative (<http://www.opt-init.org/>), *Creating a Dynamic Development*, 2001.

¹⁹ United Nations (www.un.org/millennium/)

²⁰ The report can be found at: www.opt-init.org/framework/pages/contents.html

ICT for empowerment and participation

ICT can contribute to fostering empowerment and participation and making government processes more efficient and transparent by encouraging communication and information sharing among people and organizations, and within government. In the Indian state of Madhya Pradesh, the government is introducing an experimental intranet computer network for government services and local information. This allows citizens to have faster and more transparent access to government services. For example, farmers can get copies of land titles for 10 cents that previously cost as much as US\$100 from corrupt officials.

ICT for environment

ICT can make a valuable contribution to sustainable environmental management by improving monitoring and response systems, facilitating environmental activism and enabling more efficient resource use. In Nepal, computer imaging has been used to build a land resource database for the Arun River basin. This has generated the first ever basin-wide map of land use indicating forest degradation hotspots. The database, together with simulation models, was crucial to designing and implementing the land management program for the area.

Nevertheless, it should be clear that ICT is not a solution for the developing world's problems. **Social and economic development is dependent on many factors, which should be addressed through an overall development strategy.** Factors such as political stability, macroeconomic governance, transparency and accountability of national and local administrations, the rule of law, physical infrastructure, and basic literacy should also be addressed in an explicit manner - and ICT should not be seen as a substitute. However, the integration of ICT into overall national development strategies can help facilitate implementation, expand the scope and coverage, and increase the results for most of these factors²¹. Moreover, **development goals cannot be achieved by government efforts alone. The involvement of civil society and the private sector is crucial.**

4.3 Digital divide

In developed countries, ICT and the Internet have helped to globalize production and capital markets and to speed up innovation by reducing the time to design new products, through powerful computers that make it easier and cheaper to process large amounts of data. This is not generally the case for developing countries, where the cost of computers and telecommunications remain generally high, because of insufficient liberalization and deregulation of markets, and years of chronic underinvestment. Many telecom authorities do not encourage further liberalization, because in their opinion, this would undermine the existing monopoly of the national telecom company and decrease the company's attractiveness before privatization.

Without the appropriate environment, many developing countries, especially the least developed ones, will account for a smaller fraction of the global digital economy, as the vast majority of economic activity related to ICT will continue to be concentrated in the industrialized world. Concerns for these inequalities between industrialized and developing countries, especially with respect to peoples' access and use of telecommunications and the Internet (see figure), have started a worldwide debate about the existence of the so-called *digital divide* and the dramatic consequences for poor countries if it is not addressed in time²².

²¹ Digital Opportunity Initiative (www.opt-init.org/), *Creating a Dynamic Development*, 2001.

²² Asian Development Bank: *Toward E-Development in Asia and the Pacific- A Strategic Approach for Information and Communication Technology*, 2001.

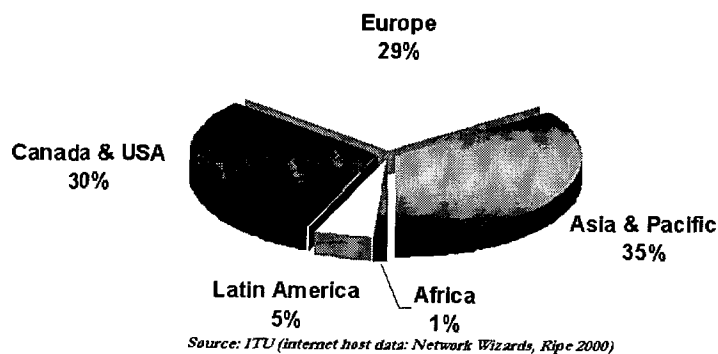


Figure 4-1: Percentage of Internet users by region

The term “digital divide” refers to the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to access ICTs and to their use of the Internet for a wide variety of activities²³. The digital divide reflects various differences among and within countries.

There are two prominent views on how to overcome this digital divide. There is the view that eventually everyone will benefit from the use of ICT and other technologies such as generic engineering. It assumes a model of transfer and adoption of technology to improve people’s lives and to tackle poverty. This is the view largely endorsed by the UN Development Report 2001²⁴. It is widely supported and advocates of this model point to the innumerable micro-projects where ICT lead to a better healthcare, greater social freedoms, increased knowledge and more productive livelihoods.

The second prominent view is that technology that does not build from what the people know and need is bound to fail²⁵. This means starting with poor people and what they need from technology and not starting with technologies and ‘applying’ them to ‘poverty’. This unconventional thinking point out that traditional development has failed the majority of people because it is pointed on the model of technology transfer. What is needed instead is to build on the existing indigenous knowledge and technology so that the people involved understand, adopt and sustain the results. It is not making the technology work for the people but rather starting with what people need from technology.

Both views aim to demonstrate and advocate the sustainable use of technology to reduce poverty in developing countries. However, the mere existence of the digital divide is not an automatic reason to argue that ICTs should be placed near the top of the development agenda. Furthermore, transformation to a networked economy is not a quick process; it takes education, widespread legal reform and significant investments on infrastructure. Nevertheless, for developing countries, the goal is to hasten the pace with which their economies can begin a convergent path regarding the leading countries in the networking revolution. Failure to address the related challenges and opportunities is not an option. Remaining inactive will only extend the period of divergence.

²³ OECD (www.oecd.org): *Understanding the digital divide*, 2001

²⁴ UNDP (www.undp.org): *Human Development Report 2001*.

²⁵ Intermediate Technology Development Group (ITDG): www.itdg.org.

4.4 Internet

In just a few years, the Internet has become a global phenomenon, transforming the way of conducting business, interacting, and learning. In 1995, less than 10 million people were using the Internet²⁶. At the end of 2000, there were over 400 million users worldwide²⁷. This growing medium offers limitless possibilities, providing users with multi-media applications involving data, voice, and video. Internet-based services could have unlimited potential to bring people together from across the world, enhancing opportunities in education, healthcare, commerce, and entertainment.

4.4.1 What is the Internet?

The Internet is a vast network of networks that communicate with each other based upon a set of software protocols that direct traffic so information can pass among the networks. The Transmission Control Protocol (TCP) and Internet Protocol (IP) define the rules by which packets of data are addressed and transmitted across physical fiber, copper, satellite, and wireless networks. The physical Internet network is made up of a variety of components including²⁸:

- Fiber networks owned or leased by Internet backbone providers
- Network Access Points (NAPs) where Internet Service Providers (ISPs) connect their networks in order to exchange Internet traffic
- Host servers that hold the content
- Access lines that provide business customers and home user connections to the point-of-presence (POP) of the ISP

The Internet is made up of a large number of private networks of computers, which make it possible to share information and other resources from any networked computer. The number known as the IP address uniquely identifies each computer on the Internet. Information is transmitted in packets until it reaches the destination as identified by the IP address attached to the information packet. If during transmission the path is broken, the packet will look for the next shortest route until it reaches its destination. In most cases the Internet uses the telephone infrastructure, on which analogue voice signals are converted to digital and vice versa by the use of modems. A model of the Internet is presented in the figure below.

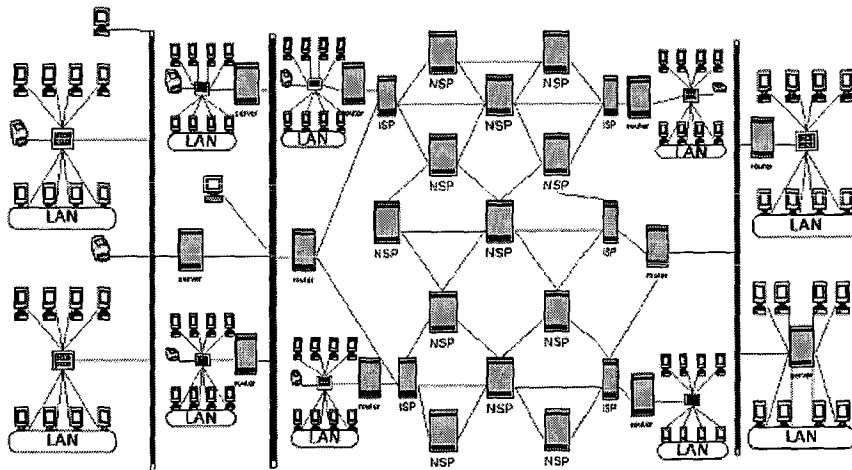


Figure 4-2: Model of the Internet

²⁶ Telecommunication Development Bureau: www.apectelwg.org/apecdata/telwg/ICAIS/ProInfrI.pdf

²⁷ Computer Industry Almanac Inc.: www.c-i-a.com

²⁸ Federal Communications Commission: www.fcc.gov/connectglobe/sec9.html

4.4.2 Internet in developing countries

The Internet has been variously described as important for development. The question is what it can do for those regions of the world that have traditionally had only limited access to ICTs. In theory, it can broaden and enhance access in developing countries because it offers a relatively cheap, versatile and technically efficient service that complements standard telephony²⁹. Furthermore, the Internet can allow businesses from developing countries to “leapfrog” into the development mainstream because Internet commerce will allow them to sell their goods and services directly to customers. The Internet also offers considerable promise in facilitating the delivery of basic services, such as health and education, which are unevenly distributed at present. In this view, the Internet is a way of nullifying the traditional disadvantages of the developing world, such as distant markets, under-invested basic infrastructure and under-utilized capacity.

The question is how realistic is this viewpoint. The majority of Internet hosts are in developed countries, suggesting that wealth and education are major factors driving Internet diffusion. So the issue is what the **barriers** are to Internet access in developing countries. The precise ranking of different obstacles differs, according to the level of economic and social development, but users around the world are unanimous in finding the **price of Internet access** to be a major constraint³⁰. Internet access prices for end users can be broken down into three components: *hardware/software*, *Internet access provision* and *telephone service charges*. In relative terms, the costs to get connected are much higher in developing countries. While prices may not differ drastically in absolute terms, there is a large gap between high and low income countries when costs relative to per capita income are considered.

A shortage of **infrastructure**, notably of telephone lines, is a further big obstacle to increasing Internet access in developing countries. Furthermore, availability of **content**, in an appropriate *language* also affects the diffusion of the Internet. According to research by the Internet Society³¹, more than 80 per cent of web pages are in English, though only 54 per cent of Internet users have English as their mother tongue.

4.5 Telecenters

To overcome the above-mentioned obstacles, solutions are being sought to increase access to ICTs and the Internet in low-income countries. One way to do this is through the so-called *telecenters*. While there is no single definition of telecenters, a common characteristic is a physical space that provides public access to ICTs for educational, personal, social, and economic development. Based on the general premise that not everyone in the world, especially in developing countries, has access to a telephone, much less a computer, fax service, Internet connection, or relevant information resources, telecenters are designed to provide a combination of ICT services. These range from basic e-mail to full Internet connectivity, with additional services that may include fax and word processing, to specialized information retrieval or applications such as telemedicine or distance education.

Beyond these common elements of public access and ICT services, there is great variety in the way that telecenters are funded, owned and operated, as well as in the way they serve different kinds of users, and

²⁹ ITU: www.itu.int/ITU-D/ict/publications/inet/1999/ExeSum.html

³⁰ ITU: www.itu.int/newsarchive/wtd/2001/ExecutiveSummary.html

³¹ Internet Society: www.isoc.org

utilize different technology to provide service. The International Development Research Centre (IDRC)³² identifies five types of telecenters.

Text box 4-2: Types of telecenters as identified by IDRC.

Basic Telecenter

The Basic Telecenter is generally located in rural or marginalized areas, where the population has limited access to services in general, and where there are high rates of illiteracy. They tend to be small operations funded by international agencies and implemented by NGOs or other non-profit groups, with a small number of computers using dial-up connections set up in a room or hut adapted for this use.

Telecenter Franchise

This is an establishment of a series of interconnected telecenters, which are centrally coordinated but independently owned and operated. This franchise model is usually supervised by a central local organization that facilitates their creation through technical and/or financial support. Each individual telecenter is run like a small business, eventually becoming independent both financially and technically. They generally feature a small number of computers for public access and dial-up connections to ISPs.

Civic Telecenter

This kind of telecenter is probably the most common. Here, public access to computers and the Internet are offered by a variety of public libraries, schools, universities, community organizations and other civic institutions.

Multipurpose Community Telecenter (MCT)

MCTs are being introduced as pilot projects in a number of countries. These telecenters offer more than basic public access to ICT services, focusing on specialized applications such as tele-medicine and tele-education. MCTs tend to establish Internet connections via leased lines or ISDN, with local area networks connecting a number of computers made available for public access. In addition, specialized equipment for applications such as videoconferencing or telemedicine is often available.

Internet Café

In recent years, there has been tremendous growth internationally in Internet cafés, especially in the tourist areas and wealthy neighbourhoods of cities all over the world. This phenomenon deserves greater attention. These independent operations follow a commercial model and target customers with disposable income, such as tourists and business people. However, Internet cafés can be used as social development tool as they can provide access for a larger group of users. Their commercial orientation might also be a solution to the financial viability problem which confronts non-commercial telecenter models. Although technological infrastructure and connectivity vary greatly from one Internet café to the next, generally a certain rate per hour is charged for offered services (mainly computer and Internet use), in addition to selling food and beverages.

The number of young people using these cafés has significantly increased over the past couple of years, starting a serious debate. In 2001, up to 15 percent of children in large cities in China, such as Beijing, Shanghai and Guangzhou are said to be using the cafés³³. The Chinese government started a campaign, where officials warn of the dangers of "online heroin", saying access to pornographic sites and illegal games in Internet cafés pose a threat to the country's younger generation.

Against this background, some argue that the existence of Internet cafés has become a necessary part of modern life, helping to bridge the gap in ICT diffusion. They admit that the cafés have some negative effects, but in stead of banning them, regulation should be improved. Furthermore, users should be made aware of other possibilities the Internet could have besides entertainment only.

³² International Development Research Centre (www.idrc.ca)

³³ BBC: news.bbc.co.uk/2/hi/world/monitoring/media_reports/1302309.stm

All in all, telecenters have the potential to help break down some of the largest barriers to development that are presently faced by low-income populations, particularly in rural areas. Establishing telecenters in urban areas or in rural areas with good connectivity does not present any great difficulties³⁴. However, the lack of broadband telecommunications infrastructure sufficient to connect to the Internet is a major challenge in rural areas. Other factors come into play that further raise investment and operating costs in rural areas (humidity, low skills of client population, lack of technical facilities and staff to maintain equipment). For further and useful readings on telecenters please refer to the IDRC website (www.idrc.ca/telecentre) and the IICD website (www.iicd.org).

4.6 Conclusions

ICTs are considered to be great means to enhance socio-economic development. What is more important are not the ICTs tools themselves, but in which way and for what purposes people decide to use them. ICT could play a role in areas such as *health, education, economic opportunity, empowerment and participation, and environment*. Nevertheless, ICT is not an isolated solution for the developing world's problems. **Socio-economic development depends on many factors, such as education and infrastructure, which should be addressed through an overall development strategy.** Moreover, all parties (government, community and private sector) should be involved.

There is a great gap in peoples' access and use of ICTs and the Internet between and within countries, which has started a worldwide debate. The existence of this digital divide can have dramatic consequences for poor countries if it is not addressed in time. For these countries, **the goal is to hasten the pace with which their economies can begin a convergent path regarding the leading countries in the networking revolution.** Remaining inactive will only extend the period of divergence.

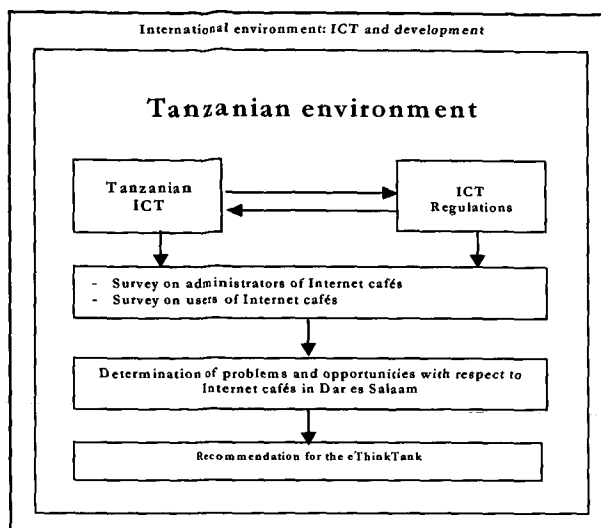
The Internet could have unlimited potential to bring people together from across the world, facilitating basic services, such as health and education. It could offer a relatively cheap and efficient way of communicating, and moreover, it could enhance the participation of backward economies in the global economy. Unfortunately, **in developing countries Internet access is very limited, due to obstacles such as high prices, poor infrastructures and irrelevant content.**

To overcome these barriers, **telecenters** are being set up, offering public access to ICT services. These centers **have the potential to break down the impediments to development that are presently faced by poor communities.** The outcomes are promising, but still many challenges have to be faced, such as the insufficient telecommunication infrastructure, illiteracy and funding. Moreover, there is a lack of **awareness regarding the use of ICT (notably the Internet), which obstructs a sustainable and beneficial use of this new medium.**

³⁴ Proenza, F. J., et al, *Telecenters for Socioeconomic and Rural Development in Latin America and the Caribbean*, FAO, ITU, LABD, Washington D.C., 2001.

5 Tanzanian environment

This chapter starts with an overview of some socio-economic issues stemming from the Tanzanian national environment. This is of relevance for this research to get an idea of the level of the socio-economic status in Tanzania. Subsequently, some major development statements by the government are addressed in this chapter. Next, the Tanzanian education system will be examined in more detail. Here the emphasis is placed on ICT-related education and training to assess the ICT human resource situation in Tanzania. Finally, some conclusions will be drawn.



5.1 Overview

Table 5-1: Basic indicators of Tanzania

Indicator	Tanzania
Capital	Dodoma
Main city	Dar es Salaam
Population (2000)	35 119 000
% of rural population (2000)	67.1
Major languages	Kiswahili, English
Currency (2002)	975 TSH = US\$ 1
GDP/capita (2000)	US\$ 268
Population below the poverty line (2000)	51%
Inflation (January 2001)	5.4%
Adult literacy rate (% age 15 and above, 2000)	74.7
Median age (years, 2000)	17.2
Life expectancy (years, 2000)	51.1
Infant mortality rate (per 1000, 2000)	72.7

Sources: Human Development Report 2001, United Nations Population Information Network (<http://www.un.org/popin>)



Figure 5-1: Map of Tanzania

Tanzania has a population of around 35 million and is one of the least urbanized African countries. It has also one of the highest literacy rates (74.7) in Africa. Nonetheless, with 51% of the population below the poverty line, a life expectancy of just 51 years, and HIV/AIDS incidence at about 8%³⁵, Tanzania still faces many challenges.

³⁵ Human Development Report 2001

Economic reforms, liberalization of the economy and substantial contribution of resources from donors gradually contributed to steady economic growth in the last five years, with a declining inflation rate. Tanzania is pursuing the goals of economic development and poverty alleviation more determinedly, and thoroughly following its donors' policy prescriptions. This resulted in a more than two billion dollars debt relief under the enhanced Highly Indebted Poor Countries scheme³⁶.

Nevertheless, Tanzania remains one of the poorest countries in the world with a per capita GDP of US\$ 268 in 2000³⁷. The most important sector in the Tanzanian economy remains agriculture, which still accounts for 45% of the GDP and is employing 80% of the population³⁸. Industry is underdeveloped with a share of only 16% of the GDP and 10% of the labour force. Services account for 39% of the GDP and employs 10% of the population. The major factors behind a limited industrial sector are the poor infrastructure, high input costs and excessive lending rates. Other factors are a poor banking system, low productivity, limited market access, lack of ancillary units, a bureaucratic structure, and an inadequate policy framework.

The health sector is still very poor in Tanzania. Access to health services is low due to limited facilities (infrastructure and equipment), low availability of essential drugs, and limited number of personnel. Furthermore, malnutrition is still common particularly in rural areas and urban areas other than Dar es Salaam.

5.2 Current policy statements

At present, there are two main development statements by the Tanzanian government. The first is the **Tanzania Development Vision 2025** published by the Tanzanian Planning Commission in 1999³⁹. It describes ways to graduate Tanzania from a least developed country to a middle income country by the year 2025 with a high level of human development. In addition, it calls for Tanzania to transform from a low productivity agricultural economy to a semi-industrialized one.

The second policy document is the **Poverty Reduction Strategy Paper⁴⁰** which contains the national guidelines directing government activities, such as budget allocations to relieve poverty and school mapping. Basically, all development activities in Tanzania are said to be guided by the principals provided in the two policy statements. For example, the Tanzania Development Vision 2025 document explicitly includes ICTs, and notes "*The new opportunities which the ICTs are opening up can be harnessed to meet the goals of the Vision*". **The development to design a national ICT policy, which is presented in chapter 7, therefore makes direct reference to the development objectives expounded in the two documents.**

³⁶ African National Congress: www.anc.org.za/anc/newsbrief/2002/news0717.txt

³⁷ The World Bank: www.worldbank.org

³⁸ International Labour Organization (ILO): www.ilo.org

³⁹ Tanzania Development Vision 2025: www.tanzania.go.tz/vision.htm

⁴⁰ Poverty Reduction Strategy Paper 2000/01: www.tanzania.go.tz/prsp.html

5.3 Education⁴¹

As noted above, **the different components of the education system will be discussed from an ICT point of view.** First, the passage of children from primary school through to tertiary education is considered. After that, training related to ICT, outside the formal education system, will be addressed.

5.3.1 *The state of primary education*

During the 1990s, the decline in the gross and net school enrolment ratios, the extremely low pass rates at primary school leaving level, the exceptionally low intake at secondary and university levels, the large number of unqualified teachers in classrooms, the appalling physical state of many schools and weaknesses in management and leadership in the sector have combined to create a genuine crisis in Tanzania's educational system.

School mapping surveys revealed that many schools do not have clean water, and hygiene was not taught. Parental participation was limited to disciplinary problems. Most of the schools had not switched to new curriculum adopted in 1992 as of July 1998. Absenteeism was high and 12 percent of the children walk more than 6 km a day to and from school. Textbooks were only available to a very small proportion of the children.

Almost all primary schools are public, of which only a very small proportion have electricity and fewer have telephones, and moreover, **there are almost no computers in Tanzanian schools.**

There has been a steady increase of pupils entering primary school, from about 480,000 in 1986 to 650,000 in 1998. The number completing standard 7 has, however remained about the same, at 370,000. 57% of school age children begin primary school education and only 38% complete it.

5.3.2 *The state of secondary education*

Secondary education suffers from problems of quantity, quality, access and participation. Of around 900 secondary schools in Tanzania 400 are privately run. There are two types of private schools; a few relatively well endowed near the big cities, and the majority quite poor and often in even worse shape than the public schools. The cost of tuition in the wealthy private schools is extremely high, with annual fees of several thousand US dollars per child.

Although secondary enrolment doubled from 1988 to 1998 (from 118,810 to 226,903), the gross enrolment rate⁴² of just 5% is very low compared to Kenya (26%), Zambia (28%) and Zimbabwe (44%). The transition rate from primary to secondary levels is 18% compared to 53% for Kenya and 29% for Uganda. This suggests that Tanzania is unable to enrol the great majority of primary school leavers. Gender inequities emerge at secondary school level. While male/female ratios are about 50/50 in primary school, there are around 47% females in form 1-4 (O-level) and 33% in form 5-6 (A-level).

⁴¹ Information in this section is mainly derived from the following sources:

- Economic and Social Research Foundation (ESRF): *The State of Tanzania's social sector in the development context*, 2001.
- ZEF Bonn (www.zef.de): *Information and Communication Technologies for Development, Present Situation, Perspectives and Potential Areas for German Technical Cooperation in Peru, Lao P.D.R., Vietnam, Tanzania and Uganda*, 2002.
- Miller, Esselaar & Associates, *A Country ICT Survey for Tanzania, Final Report*, SIDA, November 2001.
- LAMTRAC (www.lamtrac.se): *Survey of the Need for a Vocational Training Programme for ICT Professionals in Tanzania*, 2001.

⁴² Gross enrolment rate is based on the number of children, regardless of age, enrolled at a given level of education (in this case secondary education) divided by the total number of children in the general population that corresponds to the age group specified for that level of education.

Poor language instruction at primary level results in a much-reduced learning capacity among secondary school pupils, whose language of instruction switches from Swahili to English in form 1. The use of unqualified teachers also has a major impact on quality. Of 6,292 public secondary school teachers in 1998, only 13% were graduates while 23% of private secondary school teachers were graduates. In addition, school libraries lack even basic textbooks. Only 25% of public secondary schools have received any maintenance in the past 15 years. Also instructional materials are in short supply and the curriculum needs a thorough review. Not surprising, **the results of secondary education are disappointing and the majority of students who do not continue to tertiary level are ill equipped for the world of work.**

With regard to computers in schools, as noted above, their presence is minimal. What computer access there is, is confined mostly to the private/elite schools, thus worsening the inequities. However, a curriculum for computer training in secondary schools is developed, which basically comprises computer applications and Internet use. There is also an official secondary school Computer Studies syllabus for forms 1-4, which was developed in 1996 and issued in 1997. Essentially the syllabus describes a compulsory computer literacy course in forms 1 and 2 (file management, word-processing, data base and spreadsheets), and an optional course in basic programming in forms 3 and 4. However, only very few students have taken these courses so far.

5.3.3 The state of colleges and universities

Founded in 1961, **the University of Dar es Salaam (UDSM) is the major tertiary level institution in Tanzania.** Smaller, specialised universities and colleges exist in other parts of the country. Currently, UDSM has 12 faculties, 11 institutes, and two constituent colleges. The University has a total of 6,095 students, of which 24 percent are female, and a total of 747 academic staff, of which 15 percent are female.

UDSM is increasingly engaged in offering ICT-based education tools, with the **University Computing Centre (UCC)** providing connectivity and Internet access to all UDSM entities. It operates a fibre-optic backbone on the whole campus and connects outside institutes with microwave links to this backbone. UDSM is also an **African Virtual University (AVU)** node. There are around 1200 operating computers in the whole university. Students have access to computers at public access rooms at the faculty sites. There are also several computer labs used for computer literacy training and executive courses for government and private sector officials.

Specialized degrees in ICT are quite new at UDSM. UCC has been offering a Computer Science degree since 1990. Since 1999, the Faculty of Science has opened a Computer Science Department offering B.Sc. and M.Sc. degrees. The department has an up-to-date computer lab that is well used. The faculty graduated its first twenty-five computer science students in 1999.

UCC also offers ICT training. The training covers all popular business applications like word processor, spreadsheet, databases, presentations software, desktop publishing, project management, web design and similar other courses. Moreover, it recently became the Tanzanian provider of the "CISCO Networking Academy" that offers standardised network administration modules.

Another supplier of technology related degrees is the **Dar es Salaam Institute for Information Technology (DIT)**. DIT's vision is to become a centre of excellence in the fields of applied science and

technology. In addition to civil, electrical and mechanical engineering, DIT has a Department of Computing, a Department of Electronics and a Department of Telecommunications, offering degree and diploma courses in related subjects. Additionally, it offers professional training courses related to computer subjects.

Major telecommunication companies target DIT students. The first computer-engineering graduates have graduated this year. DIT has also a Department of Continuing Education that, among other courses, offers professional development programmes in computer repair, computer networking and end-user computing courses. **Nevertheless the supply of ICT graduates does not match the demand for qualified ICT personnel in Tanzania.**

5.3.4 Other training institutes

There are several ICT training centers outside the formal education system, most of them located in Dar es Salaam. Most of the training providers are small and have a limited number of courses and seats available. Training is generally available on a short-term basis targeting customers who are looking for basic ICT knowledge. **Apart from UDSM, there are only a limited number of private ICT training providers offering ICT career education and advanced further education for ICT professionals.**

As there are no international or national general standards for diploma courses, it is hard to judge the quality of the existing ICT training programmes. Nevertheless, some of the providers operate according to high international standards. Generally they have good standard of facilities and modern equipment. Some of the providers offer also fast Internet connections and have own power supply systems.

On the other hand, **the main impediments facing ICT training are lack of qualified instructors and lack of job practice.** For career courses and advanced user courses most teachers are expatriated, mainly from India, with short-term assignments. Since ICT is fully implemented in few working sites, the opportunities to conduct job practice are limited.

5.4 Conclusions

With a GDP per capita of only US\$ 268 in the year 2000, Tanzania is among the world's poorest countries. With 51% of the population below the poverty line, a life expectancy of just 51 years, and high incidence of diseases, Tanzania still faces many challenges. However, economic reforms, liberalization and external resources gradually contributed to steady economic growth in recent years. Agriculture remains the most important sector while industry is underdeveloped. The main causes are the poor infrastructure, high input costs and excessive lending rates.

At present, there are **two main development programmes** in Tanzania. The first is the **Tanzania Development Vision 2025** which describes ways to transform Tanzania from a least developed country to a middle income country by the year 2025. The second policy document is the **Poverty Reduction Strategy Paper** which contains the national guidelines to alleviate poverty.

The Tanzanian education system is in a crisis due to a decline in school enrolment ratios, extremely low pass rates, exceptionally low intake at secondary and university levels, large number of unqualified teachers in classrooms, poor physical state of many schools and weaknesses in management and

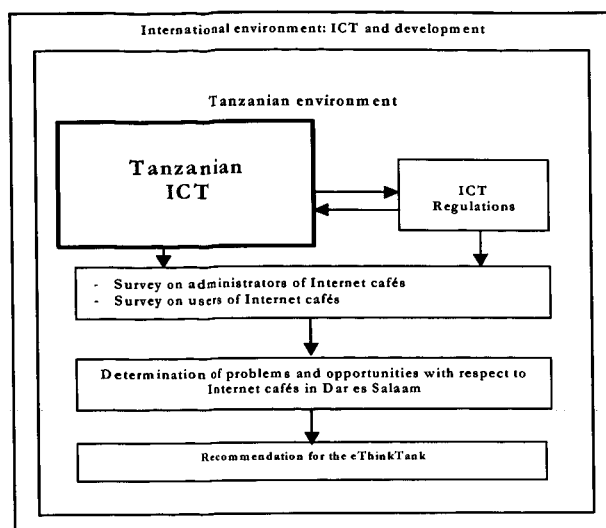
leadership in the sector. Moreover, **there are almost no computers in Tanzanian primary and secondary schools.**

At the tertiary level **UDSM is the major institution in Tanzania.** The university is increasingly engaged in offering ICT-based education tools, with UCC as a major player. B.Sc. and M.Sc. degrees are offered by the Computer Science Department which has a modern computer lab. Another supplier of technology related degrees is **DIT**, offering degree and diploma courses in applied science and technology. **Nevertheless the supply of ICT graduates does not match the demand for qualified ICT personnel in Tanzania.**

Outside the formal education system, there are several ICT training centers, most of them located in Dar es Salaam. With the exception of some well-established firms, **most of the training providers are small and have limited facilities. Furthermore, these training centers lack qualified instructors and job practice.**

6 Tanzanian ICT

This chapter provides an overview of the current status of ICT in Tanzania. It starts with an overview of some major developments concerning access and connectivity in the country. Additionally, the existing data market is addressed. Then, a special emphasis is given to accessibility of the Internet, Internet cafés, telecenters and local applications and content. Finally some conclusions will be drawn.



6.1 Access and connectivity

Liberalization of the Tanzanian telecommunication sector began in 1993. Since then modest progress has been made in the expansion and modernisation of this sector. Despite this, **substantial demand even for basic services remains unsatisfied and there is a disparity in the distribution of telecom facilities and services.** Access is still predominantly in urban areas particularly Dar es Salaam.

Telephone access is still very limited in Tanzania. Fixed line teledensity stood at 0.41% at end-2001, well below the average for neighbouring Kenya (1.01%), and far below the world average of 15.4%. In March of this year, mobile penetration was 0.79% and this number is increasing faster compared to fixed telephony⁴³. However, with low teledensity, huge waiting lists for main lines and high local connection rates, Tanzania faces a difficult task in developing and modernising its telecommunication sector.

6.1.1 Fixed telephony

Tanzania has two fixed line operators. But since ZANTEL is restricted to Zanzibar there is virtually a monopoly granted for the Tanzanian Telecommunication Company Ltd. (TTCL) until February 2005, when its four-year exclusivity period ends.

With a view to preparing the company for a competitive environment, TTCL embarked on a Telecommunication Restructuring Programme (TRP) over the period 1995 to 1999. The World Bank financed the US\$ 250 million for the programme. TTCL was finally partially privatized in early 2001, with the sale of a 35% stake to a German and Dutch Consortium Detecon/MSI. With privatization TTCL was granted licenses in basic telecommunication services, mobile telecommunications, paging services, data services and ISP services.

A condition of the privatization of TTCL is that at least 800,100 lines must be connected by the end of its exclusivity period, 30% of which must be installed in rural areas. By May 2002, it had only installed 21,000, far below the 41,000 target required for 2001⁴⁴. In 2002, it is required to implement 100,000 lines. Should it continue to fail these targets, its exclusivity may be revoked.

⁴³ Paul Budde Communication Pty Ltd (www.budde.com.au), *Tanzania Telecoms*, 2002.

⁴⁴ Ibid.

The TRP led to a 95% digitised network, using fibre optic, microwave and satellite-based links. However, **the network has still quality problems, particularly in rural areas, since its hardware was provided by a wide range of different suppliers**⁴⁵.

At end 2000, TTCL had 173,600 basic telephone subscribers, representing only 0.49% of the population⁴⁶. As noted earlier, the coverage of the network infrastructure is still limited to urban areas - 50% of the total connected lines are based in Dar es Salaam⁴⁷. **The lack of telecommunication infrastructure in rural areas remains a basic impediment to the provision of ICT services.** The figure below shows the fixed line growth over the period 1995 to 2001.

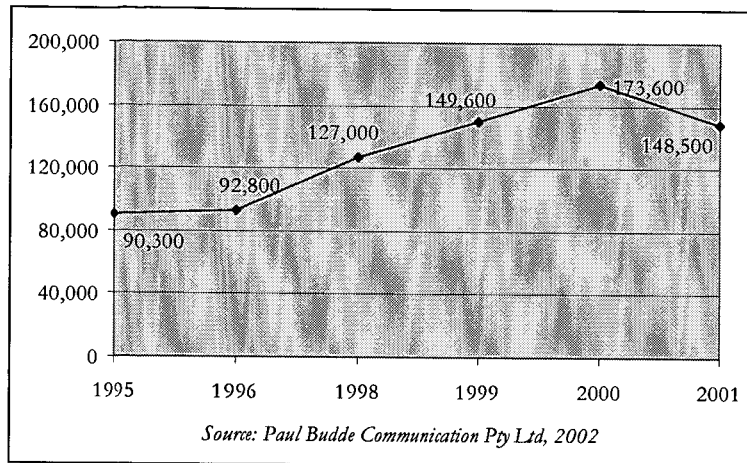


Figure 6-1: Fixed line growth (1995-2001)

Efforts are being made by TTCL to increase teledensity in Tanzania. An automatic telephone exchange system has been installed in the districts of Sengerema and Ukerewe and similar projects are underway in the districts of Misungwi and Kwimba. Furthermore, Wireless Local Loop (WLL) has been deployed to extend telecom services to Arusha, Kagera, Musom, Zanzibar and Morogoro.

From March of this year TTCL doubled its tariff for local calls, from US\$ 0.02 to US\$ 0.04 per minute, **which could have a negative impact on growth in Internet users in the country.**

6.1.2 Mobile telephony

The success story of Tanzanian connectivity is mobile telephony. It was first introduced in 1994 and has enjoyed strong growth since 1999. Currently, there are five mobile licensed operators: Vodacom, MIC Tanzania Ltd (operating as Mobitel), Tritel, Zantel and Celtel, as subsidiary of TTCL.

Growth in the mobile market picked up with the market entry of Vodacom in 2000 and the introduction of prepaid services. The cost of mobile services has fallen 60-70% since then⁴⁸. The operators are constantly rolling out their network to smaller towns and try to cover the major roads. The market is

⁴⁵ ZEF Bonn (www.zef.de): *Information and Communication Technologies for Development, Present Situation, Perspectives and Potential Areas for German Technical Cooperation in Peru, Lao P.D.R., Vietnam, Tanzania and Uganda*, 2002.

⁴⁶ Paul Budde Communication Pty Ltd (www.budde.com.au), *Tanzania Telecoms*, 2002.

⁴⁷ Digital Information Technology in Africa, *IT Vision, Issue 03*, December 2001.

⁴⁸ Paul Budde Communication Pty Ltd.

highly contested. By March 2002, there were 448,900 mobile subscribers in total compared to 170,200 in 2000. The following tables show the distribution of this total among the five operators.

Table 6-1: Mobile subscriber by operator (March 2002)

Operator	System	Launch	Subscribers
Vodacom	GSM-900/1800	2000	170,000
Mobitel	GSM-900	2000	118,000
	TACS ⁴⁹	1994	88,900
Celtel	GSM-900/1800	2001	40,000
Tritel	GSM-900	1995	22,400
Zantel	GSM-900/1800	1999	9,600
Total			448,900
<i>Source: Paul Budde Communication Pty Ltd, 2002</i>			

Though the competition is high in the mobile market, the current tariffs (around US\$ 0.30 per minute) are still too high for the majority of the population. This could slow down further growth in mobile telephony. Also the quality of service has to be improved both in urban and rural areas especially.

6.2 Data Market

6.2.1 Data Communication Services

There is growing competition in the area of public data networks. The Tanzania Communication Commission (TCC) has licensed ten companies to provide public data communication services⁵⁰. These companies are permitted to install infrastructure for data communication purposes but *not* for voice. The most active of these companies are Wilken Afsat Tanzania Ltd, Datel Tanzania Ltd and SimbaNET Tanzania Ltd⁵¹.

Very Small Aperture Terminals (VSAT) networks are becoming the preferred data communication alternative in Africa. The main users of VSAT are in the financial sector where real time data communication is critical to investment and policy. Wilken Afsat has been awarded service provider licenses in East Africa to install, commission and maintain VSAT networks including Tanzania. The system provides cost-effective transmission of data, voice and video communications to support a range of applications through their shared hub services.

6.2.2 Internet Service Providers (ISPs)

There are currently 22 licensed ISPs in Tanzania⁵², of which most of them are operating only in big cities such as Dar es Salaam, Arusha and Mwanza. The ISPs have an estimate subscriber base of 20,000 to 30,000⁵³. The main players (with subscriber estimates) are shown below.

⁴⁹ TACS is the traditional analogue mobile phone system, introduced in the 1980s by Vodafone and Cellnet at 900MHz.

⁵⁰ Tanzanian Communication Commission: http://www.tcc.go.tz/Licensed_Operator.htm

⁵¹ Miller, Esselaar & Associates, *A Country ICT Survey for Tanzania, Final Report*, SIDA, November 2001

⁵² Tanzanian Communication Commission: http://www.tcc.go.tz/Licensed_Operator.htm

⁵³ ZEF Bonn (www.zef.de): *Information and Communication Technologies for Development, Present Situation, Perspectives and Potential Areas for German Technical Cooperation in Peru, Lao P.D.R., Vietnam, Tanzania and Uganda*, 2002.

Table 6-2: Estimate of subscribers of major ISPs (2002)

ISP	Subscribers
Africa Online	2000
Raha.com	3000
Tele2 (Formerly Cyber Twiga)	1000
Cats-Net Ltd	2000-3000
Internet Africa	2200
Habari Net (Arusha)	450
Zanzinet	250
UCC	500

Source: www.balancingact-africa.com/news/back/balancing-act_125.html

There are probably only between 1,000 and 2,000 subscribers to ISPs outside Dar es Salaam. However, secondary access is developing. The large ISPs have dial-up points in one to three cities outside Dar es Salaam.

The cost for Internet access is expensive considering the standard of living in Tanzania. This is due to the scarce and extremely expensive Internet bandwidth, which is partially caused by a lack of agreement among ISPs on setting up a “neutral” national Internet Exchange Point (IXP). An IXP is the service that ISPs collectively establish to exchange local traffic from their respective backbone services without having to pass this traffic over costly, slower international links (in appendix B the importance of IXP for development of the Internet is discussed in more detail). Discussions date back to 1998, and though individual ISPs claim to be in favour of an IXP, little progress has been made on this front. Simunet, a wholly owned subsidiary of TTCL, is working to establish a national IP-backbone to all districts by the end of 2002. However, other ISPs, especially the smaller ones, are reluctant to become dependent and do not want to channel their traffic through Simunet.

As a result, **Tanzania lacks cheaper and high capacity connections to the global Internet** and the country continues to lose considerable foreign exchange through payment of local traffic, which goes through international gateways such as Europe and the United States⁵⁴. This is an inappropriate use of scarce and expensive resource that increases the cost of local Internet access for users.

6.3 Internet

Commercial Internet access was established in Tanzania in 1996. As mentioned earlier, there are between 20,000 to 30,000 Internet subscribers in the country, with more users through corporate LANs. However, the main means of Internet access are Internet cafés. Though accurate figures are not available, **the proliferation of Internet cafés indicates that there is a great and unsatisfied demand in the country for Internet access.**

Traditionally, the business environment in Tanzania has been suffering from unclear tax regimes, corruption and other administrative barriers. The use of ICT, particularly computers, has been very limited for a long time. High import duties on computers (and software) made it difficult to acquire equipment. In 2001, the regulatory and tax regimes were revised which has led to a growth in the use of ICT by the

⁵⁴ Mutagahywa, B., *Telecom Policy, Regulatory and Management Certificate for TRASA*, Dar es Salaam, November 2001.

private sector. Currently, many enterprises have set up websites and a couple of newspapers and other media are available on-line.

However, **the use of Internet by the private sector is in general still in the initial phase.** Employing the Internet for more advanced applications such as e-commerce is insignificant. Furthermore, the number of people using the Internet for matters related to education, business, government, health, etc is still very low.

Tanzania's Internet penetration was 0.83% in 2001 and the number of PCs was estimated to be 120,000 (i.e. a PC penetration of 0.33%)⁵⁵. The figure below gives a clear indication of the explosive growth in the number of Internet users over the last years.

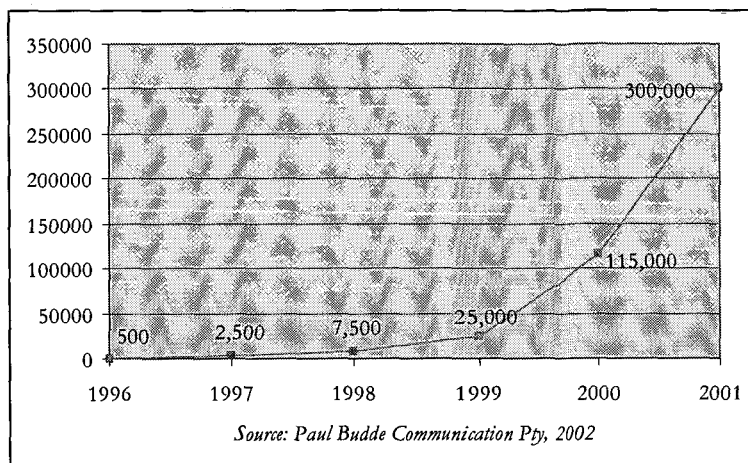


Figure 6-2: Number of Internet users (1996-2001)

6.3.1 Internet cafés

As noted earlier, increased demand for Internet access has resulted in growth of Internet cafés, especially in the major cities. Due to an absence of statistical records it is hard to find out the exact number of these cafés. Estimates vary widely from 15 to more than 1000 cafés. However, from revised lists and own observation **the most probable estimate is around 250 Internet cafés, 100 of which are located in Dar es Salaam.** Possibly this number has been higher in the past but the unsustainable business model has led to closing down of several Internet cafés⁵⁶.

The basic Internet café that is common in Dar es Salaam has rather standard features. It consists of premises stocked with several computers and simple furniture consisting of chairs and regular desks or tables on which the terminals sit. The basic service provided is the Internet but also other services such as copying, printing and drinks are sometimes offered. All Internet cafés visited during the survey in Dar es Salaam are privately owned, and most are situated in the city center and along main roads. In chapters 7 and 8 Internet cafés are examined in more detail.

6.3.2 Telecenters

In cooperation with its development partners, COSTECH established a pilot Multipurpose Community Telecenter (MCT) in the Sengerema district near Lake Victoria. Its development partners include ITU,

⁵⁵ Paul Budde Communication Pty Ltd (www.budde.com.au), *Tanzania Telecoms*, 2002.

⁵⁶ Miller, Esselaar & Associates, *A Country ICT Survey for Tanzania, Final Report*, SIDA, November 2001.

UNESCO, IDRC, Danish International Development Agency and TTCL. This project is one of the initiatives to bring basic ICTs (telephone, fax, computer, Internet, e-mail) for a specific community typically in a remote or rural area.

However, in recent years this approach has been exposed to criticism. **None of the funded MCTs have shown a model that is sustainable.** No major funded telecenter has been able to set aside money for depreciation of equipment, let alone generate money to repay the initial capital. Many of these sites are offering useful services in their communities, though most are so young that their impact is more anecdotal than demonstrable. Moreover, in most cases there have been greater technical problems than anticipated (power problems, computer crashes, theft and lightning strikes)⁵⁷.

The Sengerema MCT sets an example of the above. Though the project proposal dates back to 1997, the telecenter became operational not until the end 2000 in temporary premises using second-hand computers. ITU assisted the TTCL in acquiring a digital switch for Sengerema to connect the MCT to the telecommunication network. However, some unforeseen technical issues delayed the commissioning of the switch, which has been solved by the supplier and became fully operational in December 2001. **The MCT currently experiences problems with Internet access** because of the old analogue system and power fluctuations at Sengerema⁵⁸. As said before, TTCL is planning a new backbone, including a spur route to Sengerema, which it is hoped will be operational in late 2002.

Therefore, other views are emerging on how to increase ICT access in rural areas. The unsupported mushrooming growth of Internet cafés in Dar es Salaam during the last two years shows that there could be other alternatives when connectivity is available.

6.3.3 Local applications and content

There is no local manufacture of ICT equipment in Tanzania⁵⁹. Instead, computers are imported by local dealers who have opened up branches in the country. Few local companies are developing computer application packages. Most of the software used is imported at considerable cost. Overall, **the main constraints concerning local applications are the small size of the Tanzanian market and the small skilled capacity to support the ICT industry.**

However, **the ICT market is growing fast, and in line with this development local content in the Internet is mushrooming⁶⁰.** Most of the important information about the country, government, politics, tourism, news etc is easily available on-line. Some major local content providers are the media company IPP (www.ippmedia.com), Tanzania Yellow Pages (www.yellowpages.co.tz), the government (www.tanzania.go.tz), and the Bank of Tanzania (www.bot-tz.org). Besides other organisation, Tanzania Online (www.tzonline.org), funded by the UNDP, is a useful gateway to information on development issues in Tanzania. Another useful portal with updated information on Tanzanian websites can be found at www-sul.stanford.edu/depts/ssrg/africa/tanzan.html.

⁵⁷ CommUnity South Africa: www.communitysa.org.za/africaict/contypes.htm

⁵⁸ ITU: www.itu.int/itunews/issue/2002/05/sengerema.html

⁵⁹ Tanzania Ministry of Communication and Transport, *National ICT Policy of Tanzania – First Order Policy Draft*, 2002.

⁶⁰ ZEF Bonn (www.zef.de): *Information and Communication Technologies for Development, Present Situation, Perspectives and Potential Areas for German Technical Cooperation in Peru, Lao P.D.R., Vietnam, Tanzania and Uganda*, 2002.

Despite the innovation of some relatively few websites, the **Internet has yet to become a dominant medium for the Tanzanian society**, particularly because of the few websites available in Swahili.

6.4 Conclusions

The Tanzanian telecommunication market was liberalized in 1993. Since then some progress has been made to develop and modernize this sector. However, **with low teledensity, huge waiting lists for main lines and high local connection rates, Tanzania faces a difficult task to realize this.**

TTCL enjoys a four-year exclusivity for fixed telecommunication services on the mainland. But since TTCL's failure to meet agreed targets its exclusivity is currently at issue. **The network has quality problems, particularly in rural areas, which remains a basic impediment to the provision of ICT services in these areas.**

The success story of Tanzanian connectivity is mobile telephony. It enjoyed a strong growth in recent years, with five mobile licensed operators attracting more than 400,000 subscribers. However, **the current tariffs are still too high for the majority of the population.**

With 22 ISPs, there is growing competition in the data market area. The ISPs have an estimate subscriber base of 20,000 to 30,000. However, most of them are operating only in big cities such as Dar es Salaam, Arusha and Mwanza. Moreover, **Tanzania lacks cheaper and high capacity connections to the global Internet.** This is due to **the scarce and extremely expensive Internet bandwidth, which is partially caused by a lack of agreement among ISPs on setting up a national IXP.**

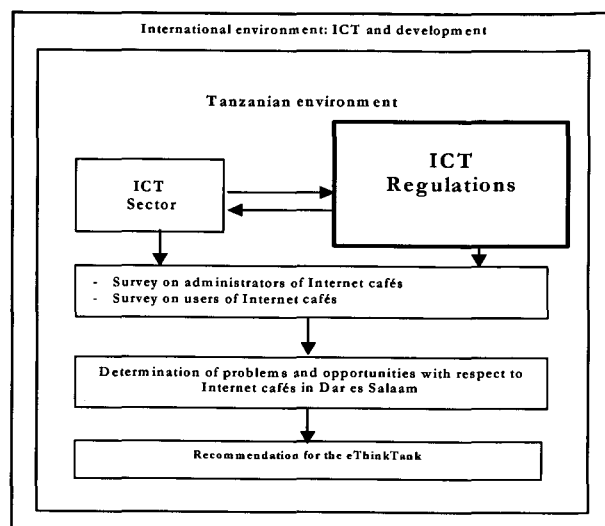
Efforts are being made to stimulate growth in the use of ICT by the private sector through the revision of the regulatory and tax regimes. Nevertheless, **the use of Internet by this sector is in general still in the initial phase.** Furthermore, **employing the Internet for matters related to education, business, government, health, etc is still very low.**

The main means of Internet access in Tanzania are the Internet cafés. The proliferation of these cafés, particularly in urban areas, indicates that there is a great and unsatisfied demand in the country for Internet access. There are around 250 Internet cafés in the country, 100 of which are located in Dar es Salaam. **The unsupported growth of Internet cafés shows that they could be a good alternative to the subsidized telecenters, which appear to be unsustainable.**

There is no local manufacture of ICT equipment in Tanzania. **The main constraints concerning local applications are the small size of the Tanzanian market and the small skilled capacity to support the ICT industry.** Nonetheless, the ICT market is growing fast, and in line with this development local content in the Internet is mushrooming. Despite this, **the Internet has yet to become a dominant medium for the Tanzanian society**, particularly because of the relatively few websites available in Swahili.

7 ICT regulations

This chapter deals with the current state of the ICT regulations in Tanzania. It sketches some background developments as seen by the ICT sector. Subsequently, the ICT regulator is examined in more detail, followed by some major developments and initiatives regarding ICT policymaking. After that the current situation of Internet cafés is addressed, after which some conclusions will be drawn.



7.1 Background

In Tanzania, just like in many other countries in the world, the reform and restructuring of the ICT sector started with the separation of regulatory functions from operational activities on one hand and the separation of postal services from telecommunications operations on the other. This process started with the Tanzania Communications Act in 1993⁶¹, during which the Tanzanian Posts and Telecommunications Corporation (TPTC) was dissolved. TPTC, formerly the exclusive provider of telecommunications and postal services and the regulator of the sector, was replaced by the Tanzanian Telecommunication Company Limited (TTCL), the Tanzanian Postal Corporation (TPC) and the Tanzania Communications Commission (TCC).

TCC was established as the postal and telecommunication regulator and manager of radio frequency spectrum in Tanzania. TTCL and TPC were established as commercial entities. Commercialization of TTCL, as well as the separation of postal and telecommunication operations, were considered as key initial steps in creating a competitive environment.

7.2 ICT Regulator

Since its establishment in 1994, **TCC has made efforts to achieve the country's objective of developing an appropriate telecommunication infrastructure and creating a conducive regulatory environment for investment and encouraging competition.** A number of licenses have been issued to telecommunication service providers in the country. They include basic telecom, mobile, data, Internet services and telecom equipment importers and installation. **All telecommunication services are provided competitively except for the basic fixed telephone services.**

The assessment of regulatory achievements in Tanzania is, however, ambiguous⁶². Compared to other East-African countries, regulation is functioning well. TCC has been existing for more than seven years. Mobile telephony and the Internet are booming. Privatization of TTCL is on its way. Nevertheless,

⁶¹ Tanzania Communication Commission: www.tcc.go.tz/Tanzania%20Communication%20Act.htm

⁶² ZEF Bonn (www.zef.de): *Information and Communication Technologies for Development, Present Situation, Perspectives and Potential Areas for German Technical Cooperation in Peru, Lao P.D.R., Vietnam, Tanzania and Uganda*, 2002.

a different picture appears when looking at absolute terms. **Many believe that the regulation of the ICT sector is problematic, if not the greatest problem for business.** Regulation is often inconsistent, and for some markets, e.g. the Internet, there is no clear direction.

The general feeling with the private sector is that the reason for the above is not conscious purpose, but simply incompetence⁶³. TCC considers itself as a licensing and fee collecting agency. **On the policy side it lacks the professionalism and toughness** that is required to provide an environment capable of ensuring a flourishing sector while dealing with the major, internationally backed players.

TCC is still not prepared to take on the regulatory challenges ahead. These are for example the enforcement of the licensing requirements of TTCL (see previous chapter) as well as dealing with the issues of VoIP and convergence (e.g. data service providers are permitted to install infrastructure for data communication purposes but not for voice). Furthermore, **TCC lacks trust with the private sector because of its composition.** All commissioners plus the director general of TCC are government appointees. Moreover, a number of these commissioners have close links with TTCL which makes the independence of the commission questionable. Therefore, **in future, a more transparent nomination system may ensure greater acceptance of TCC's role by the private sector.**

7.3 Current developments

7.3.1 New ICT policy

Tanzania is currently underway to develop its own national ICT policy. This development is initiated by eThinkTank (discussed later), a group mainly of industry representatives but also involving government officials and donor organizations. The drafting of the ICT policy is done by a task force inside the Ministry of Communications and Transport that similar to the eThinkTank, includes private sector, education, science and political representatives. The draft has been presented in May this year and submitted to the government for consideration and approval.

The policy's broad objectives are *to provide a national framework that will enable ICT to contribute towards achieving national development goals; and to transform Tanzania into a knowledgeable society through the application of ICT*⁶⁴. Furthermore, the draft states that *the ICT Policy is a reflection of national goals, objectives and aspirations as expressed in (Tanzania Development) Vision 2025, setting out digital opportunities that Tanzania can exploit towards meeting the vision.*

But the task force appointed to formulate the policy admits that transforming Tanzania into a knowledge society will not be a simple task because of a number of teething problems facing ICT development in Tanzania⁶⁵. **Major impediments for ICT services are a poor infrastructure, lack of policies and limited human resources.** This combination has resulted into inadequate access to affordable telephones, broadcasting, and the Internet.

Other obstacles facing ICT development in Tanzania include lack of adequate financing and underdeveloped local industries to manufacture components and parts for ICT hardware and

⁶³ Ibid.

⁶⁴ Tanzania Ministry of Communication and Transport, *National ICT Policy of Tanzania – First Order Policy Draft*, 2002.

⁶⁵ Digital Information Technology in Africa, *IT Vision, Issue 08, page 20*, May/June 2002

infrastructure. Therefore, the country should promptly address a number of gaps to appropriately position itself in the new information age, the draft ICT policy urges. Areas that must be tackled immediately include the issue of Internet accessibility, ICT education and training, matters related to e-society, digitized production, and the legal and regulatory aspect.

Also in the area of e-commerce, the draft recognizes a number of limitations. **E-commerce services are constrained by the lack of a national payment system, local credit cards, and a legislative framework appropriate for e-business** that needs to be updated urgently. Most significantly, the legal framework does not provide adequate safeguards to create an environment of trust for e-business transactions to be established.

Though the development of this policy document is unique, in the sense that is the first time that not only the government but also the private sector is involved in formulating a new policy, there is some criticism. As one member of the eThinkTank commented: *"Taking cognisance of our current economic condition (poor), the current state of ICT in Tanzania (very backward) and the pace on change brought about by the internet (speed of light), we understood that we needed to formulate strategies that take into consideration internal and external factors as we understand them today, thus resulting in a policy document that is Tanzania-specific, clear, effective and flexible or future-proof. Going through the document, I do not see this specificity, clarity, efficiency or flexibility. Instead there is a lot of generic statements albeit good ones, many references to universal concepts and statements of intent such as "increase the size and quality of ICT-skilled human resource base in Tanzania" without realistic, matching strategies on how this can be achieved and sustained"*⁶⁶.

7.3.2 e-government

In line with its realization of the importance of ICT for development, the Tanzanian government launched a **national website** (www.tanzania.go.tz) in December 2001. *"Through the website, the government would increase transparency in its activities and facilitate availability of Tanzania's information on the Internet,"* president Mkapa remarked during the launch of the website⁶⁷. The main objective of the website is to promote the country's potentials with a view of enhancing investment promotion, trade, tourism, cultural exchanges etc taking advantage of state-of-the-art in ICTs⁶⁸.

The national website provides information about Tanzania in both Kiswahili and English about the country, the government and related policies. **However, this website does not provide interactive features.** The hub of ICT activities within the government is the Civil Service Department in the Prime Minister's Office⁶⁹. Up to now, the administration's attitude towards e-government has been rather realistic, i.e. **efforts are aimed at efficiency within the government rather than at outside relations.** Building up a functioning information system inside the government and acquiring experience in the use of new technologies is considered the prerequisite to providing services to the general public.

⁶⁶ eThinkTank, *Comments on 1st order Draft of National ICT policy*, 19 May 2002.

⁶⁷ Digital Information Technology in Africa, *IT Vision, Issue 04, page 16*, January 2002.

⁶⁸ Tanzania National Website: www.tanzania.go.tz/national_websitef.html

⁶⁹ ZEF Bonn (www.zef.de): *Information and Communication Technologies for Development, Present Situation, Perspectives and Potential Areas for German Technical Cooperation in Peru, Lao P.D.R., Vietnam, Tanzania and Uganda*, 2002.

7.4 eThinkTank

The need and opportunity to develop a policy that addresses the ICT sector as a whole has been identified in Tanzania, and various initiatives are presently underway. **The most prominent one is the eThinkTank (www.eThinkTanktz.org), a discussion forum on the Internet supported by UNDP.** Currently the forum has more than 200 members, mostly senior executives and managers from a wide range of public and private organisations. The mission of the eThinkTank is to *offer ICT leadership by catalyzing policy changes and by supporting related developments aimed at enabling Tanzanians to participate effectively in the modern Internet-based global economy, benefiting their Nation and partners*⁷⁰.

The eThinkTank is being seen as a very useful initiative for Tanzania's ICT development, and is rapidly becoming an influential focal point for ICT-related issues in the country. The following key obstacles in Tanzania's ICT environment have been observed by the eThinkTank:

Text box 7-1: Key obstacles observed by the eThinkTank⁷¹

- a) **Public educational institutions in Tanzania lack computers**, let alone access to the Internet. Because we are not preparing our younger generations to participate fully in the new Internet-based global society, we are compromising their future, and that of the nation at large.
- b) **Tanzania has been lacking leadership in, and has no focal point for ICT**, and as a result the country is missing opportunities and remaining fully exposed to vulnerabilities induced by rapid globalisation and emergent technologies.
- c) **Inappropriate policies, regulations and laws** prevent Tanzanian institutions from benefiting fully from developments in ICT. There is over-regulation of Communications, yet there is under-regulation in Information Technology. Equally, incentives for investing in ICT in Tanzania are inadequate, whereby ICT initiatives here are aimed at maximising quick direct profits instead of enhancing sustainability and spin-offs.
- d) There are many valuable ICT projects in Tanzania, but these are neither harmonised with, nor aligned to, each other resulting in **duplication of efforts, loss of economies of scale, inappropriately deployed expertise**, and other immeasurable inefficiencies.
- e) **Tanzania's ICT policies and regulations are not harmonised** with her neighbours – for example countries in the East African Community and the Southern African Development Community – resulting in cross-border inefficiencies.
- f) **Tanzania's basic ICT infrastructure is poor** in many areas as witnessed by the low penetration of telephones and the long waiting time for connection in most areas. This limits opportunities for poverty alleviation in disadvantaged areas, thus contributing to rural–urban migration.
- g) **Many commercial ICT initiatives are not viable in Tanzania** at present for reasons that include out of date institutional frameworks, poor transport infrastructure, ineffective national payments system, inadequate postal services, lack of street names for home delivery, absence of credit infrastructure, etc. Therefore the private sector is unable to implement initiatives – notably e-procurement services – that could benefit everyone.
- h) **The 20-year prohibition on importing computers to Tanzania – 1974 to 1993 – has impacted workers' ICT skills adversely.** As a consequence, short-term needs drive ICT skill development rather than long-term strategy. Therefore people in Tanzania with appropriate ICT skill mix are all too often expatriate workers. If there is no comprehensive long-term plan to change this we will continue to lose the experience that these workers gain from working amongst us.
- i) **Tanzania does not participate in developing and propagating Internet content that is directly relevant and of benefit to its citizens** in their local languages. This reduced interest in the Networked World means the demand for the Internet is too low to attract investment for commercially viable Internet businesses. The reasons for this might include too few people with the appropriate mix of skills, and the lack of an encouragement to build the skills mix needed.

⁷⁰ eThinkTank: *Information Document*, 2000.

⁷¹ eSecretariat (www.tzonline.org/pdf/ICTpolicy.pdf), *proposal for Tanzania's ICT Policy Formulation Framework – Final Version*, 2001.

- j) **Tanzania's education system needs to embrace the Knowledge World** focusing on the progression from "data collection" through "information processing" to "knowledge management".
- k) **The Government of Tanzania is losing out on opportunities to provide information and other services to the public by deploying ICT productively** and in accordance with best practice.
- l) **Tanzania does not have a policy, legal, and regulatory environment that stimulates investing in ICTs for development.** Clearly this raises obstacles to the opportunities for Tanzania benefiting from ICT, obstructs her citizenry from fostering regional co-operation to harmonise regulation, increase competition, and rationalise usage of scarce bandwidth to the better good.
- m) **Government in addressing the need to utilise ICT for development does not sufficiently disseminate information on what is possible, drawing on best practices.** Additionally there is a need to create a better enabling environment including for rural telecommunications.

7.5 Policies regarding Internet cafés

As noted earlier, Tanzania has experienced a very rapid growth in Internet cafés. However, **government policy has been slow to encourage further investment. Existing telecommunication policies and TTCL's monopoly are undermining the development of the Internet in Tanzania.** Furthermore, **the lack of reliable power supply and the expensive equipment are making costs of opening or maintaining Internet cafés very high.**

Another impeding factor is the overcrowding of the Tanzanian Internet café market. As mentioned before, there are around 250 in total of which 100 are located in Dar es Salaam. Too many Internet cafés are trying to attract customers by offering unsustainable access rates, which leads to a closing down of some of them. Café operators who want to survive now have to look to providing something other than low price Internet access.

Reliable bandwidth is also a considerable problem as the cafés struggle to survive. But worse still are the periods of connectivity down-time. Some Internet cafés suffer hours and sometimes even days without an Internet connection. This without any realizable service obligations on their electricity company or ISP to refund the café for periods of down-time. **In these circumstances, more Internet cafés will close down in the future.**

One of the objectives of the new ICT document is *to encourage cyber-café owners to diversify their enterprises in order to build multiple revenue streams, allowing them to frequently upgrade their capital stock and release locally adapted and professionally maintained second-hand equipment to the markets*⁷².

However, **it remains to be seen how this objective will be translated into clear, realistic and sustainable measures to encourage further development of Internet cafés,** which are the main means of Internet access in Tanzania.

⁷² Tanzania Ministry of Communication and Transport, *National ICT Policy of Tanzania – First Order Policy Draft*, 2002.

7.6 Conclusions

Since its establishment in 1993, TCC has made efforts to develop an appropriate telecommunication infrastructure and to create a conducive regulatory environment for investment and encouraging competition. **However, TCC's achievements are ambiguous. With inconsistent regulations and its lack of professionalism and trust, regulation is believed to be the greatest problem for business.**

Tanzania is currently underway to develop its own national ICT policy. The main objectives of this policy document are to provide a national framework that will enable ICT to contribute towards achieving national development goals, and to transform Tanzania into a knowledgeable society through the application of ICT. **The draft also recognizes a number of impediments: a poor infrastructure, lack of policies, limited human resources, lack of adequate financing and underdeveloped local industries**

However, the draft policy document lacks specificity and clarity and furthermore, it does not present realistic and matching strategies on how to achieve its objectives.

At the end of last year, the Tanzanian government launched a **national website**, containing information about the country, the government and its policies. However, **this website lacks interactivity.**

The most prominent initiative to develop a comprehensive ICT policy is the eThinkTank. It consists of a group mainly of industry representatives but also involving government officials and donor organizations. **The eThinkTank is being seen as a very useful initiative for Tanzania's ICT development, and is rapidly becoming an influential focal point for ICT-related issues in the country.**

Tanzania has experienced a very rapid growth in Internet cafés. However, **government policy has been slow to encourage further investment. Existing telecommunication policies and TTCL's monopoly are undermining further development. Furthermore, the lack of reliable power supply and the expensive equipment are making costs of opening or maintaining Internet cafés very high. Other problems are the overcrowding of the Tanzanian Internet café market, and the absence of reliable bandwidth.**

But worse are the periods of connectivity down-time, without any realizable service obligations on their electricity company or ISP to refund the café for periods of down-time. These circumstances will result in the closing down of Internet cafés in the future.

Though the new policy document explicitly notes that Internet café owners should be encouraged, **it remains to be seen how this objective will be translated into clear, realistic and sustainable measures to encourage further development of Internet cafés.**

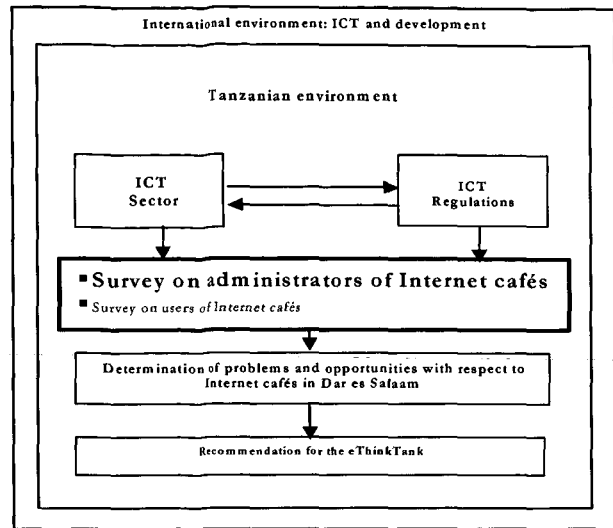
Part II-B

RESULTS OF FIELD STUDIES

8 Results of survey on administrators of Internet cafés in Dar es Salaam

In this chapter the results of the survey on administrators of Internet cafés in Dar es Salaam are presented. The objectives for this survey were:

- to identify the basic characteristics of administrators of Internet cafés,
- to obtain general information about the Internet cafés,
- to identify the basic economic situation of Internet cafés,
- to identify purposes for which the Internet cafés are used,
- to identify the administrators' perception of the quality of service provided by ISPs, and
- to identify the administrators' perception of the Tanzanian ICT, policies and other related issues.



An overview of all statistical tables is given in appendix D.

8.1 Basic characteristic of administrators

The survey indicates that out of 45 respondents 45% are female and 55% male. The average age is quite young (27.8 years), and the main age category is 20-30 (81%). Most of the administrators are single (59%) and 39% are married. 52% are salaried workers and 32% self-employed. The latter group (32%) are mainly the owners of Internet cafés. Out of the remaining administrators 48% are employees and 20% system administrators.

In general, the surveyed administrators are relatively well-educated. Thirty eight percent of the respondents had a technical secondary education as highest level of education received. 27% had vocational training, 23% secondary education, 7% bachelor degree while the remaining 5% didn't get further than the primary school. Figure 8-1 shows this distribution.

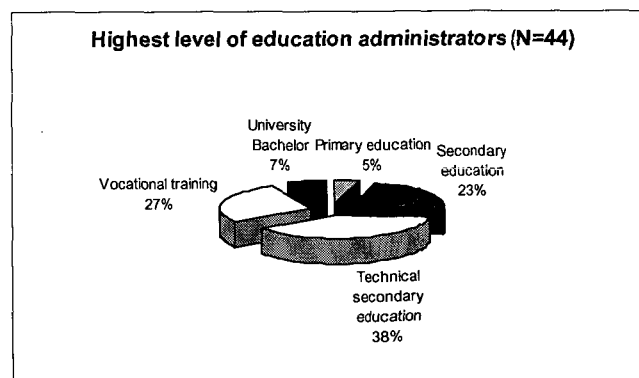


Figure 8-1: Education distribution among administrators

A large proportion (96%) of the administrators responded to have a command of English. Of this group 42% think their command of English is good, 30% very good, 21% moderate and the remaining 7% either poor or very poor.

Regarding the income of the respondents, the major income category is TSH 40,000-100,000 per month (56%), which is a *much* higher than the average in Tanzania⁷³. 19% have an income of between TSH 10,000 and 40,000 and 12% between TSH 400,000 and 600,000 per month. In figure 8-2 this distribution is shown.

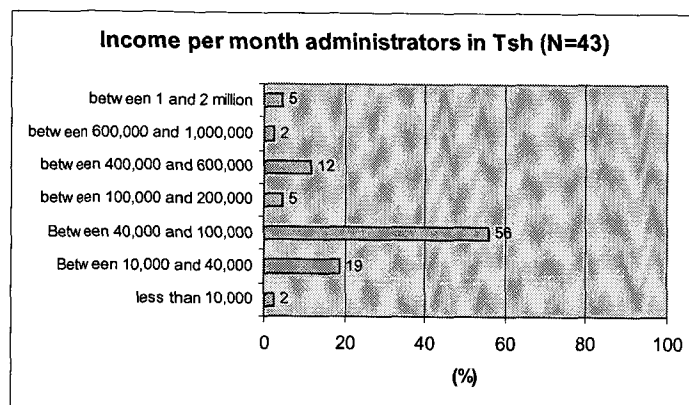


Figure 8-2: Income distribution administrators

8.2 General information about Internet cafés

The Internet café phenomenon in Dar es Salaam is quite new. Of the sampled cafés, 34% have been operating for six months to a year, 23% for less than six months, another 23% for one to two years and the left 20% have been operational for two to four years.

A large proportion of the surveyed Internet cafés had six to ten operating computers (68%). 16% have eleven to fifteen, 9% less than five, whereas only 7% have sixteen to twenty computers. In almost all cafés all computers are connected to the Internet. Most (79%) Internet cafés are connected through Wireless Local Loop (WLL) to their Internet Service Providers (ISPs). 12% have a dial-up connection while the remaining cafés were connected through leased lines (see figure 8-3). None of the surveyed cafés had a VSAT connection.

The elimination of all taxes and duties on computer equipment since 2001 seems to have resulted in lower computers prices in Tanzania. Apparently, this gave Internet cafés a chance to acquire better equipment, which is shown by their computer types. 37% of the computers are Pentium 3 or higher, 34% Pentium 2 and 15% Pentium 1.

⁷³ According to the World Bank the GDP per capita is US\$ 268 (≈TSH 260,000) which is around TSH 22,000 per month. When leaving extreme cases aside, the roughly calculated average income of administrators comes to TSH 120,000 per month.

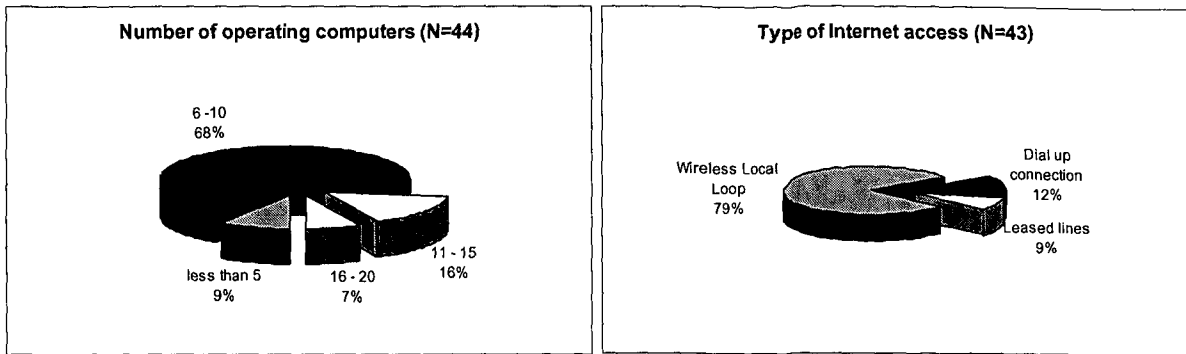


Figure 8-3: Number of computers and type of Internet access

8.3 Basic economic situation of Internet cafés

When asked to an estimate of the number of customers per week 23% responded to have between 150 to 200, 16% more than 400, 14% less than 30 and another 14% have between 60 to 100 customers per week. When combining these figures **the weighted average number of users per Internet café comes at roughly 200 per week. The cost of surfing per hour is TSH 500 (≈US\$ 0.5) for the majority (81%) of surveyed cafés.** The rest of the cafés charge TSH 600 or more per hour (see figure 8-4). From **this we could make out that the average income only through Internet sales is around TSH 400,000 per month** (see appendix F).

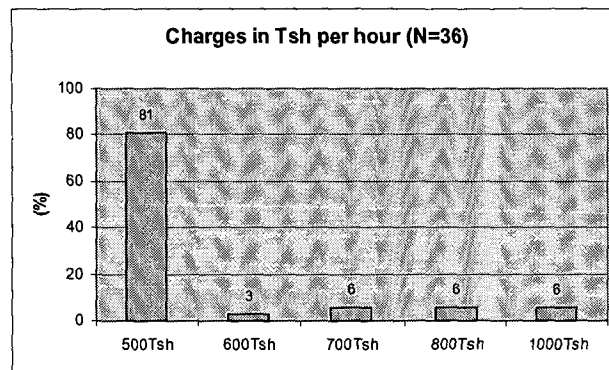


Figure 8-4: Charges per hour

Computer and Internet use are for the majority (91%) of cafés the main sources of income. Other main sources of income are equipment rental (7%) and money change (2%). Additional services are drinks and snacks (37%), training and courses (21%) and Internet telephony (14%). See figure 8-5. **The fee paid to the ISP for Internet access measures between US\$ 200 to 500 per month for the largest part of survey Internet cafés (75%).**

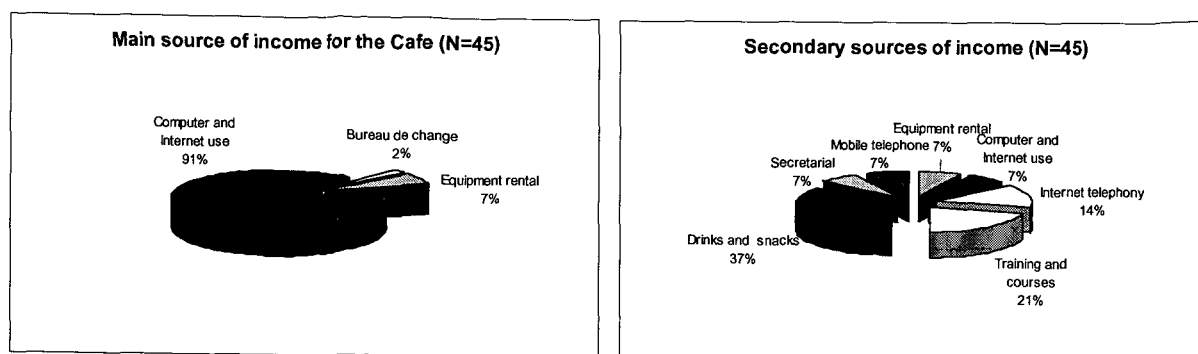


Figure 8-5: Sources of income for Internet cafes

A country ICT survey performed by Sida⁷⁴ included an investigation on the viability of Internet cafés in Tanzania. A basic analysis of the business model of a successful Internet café in Dar es Salaam showed that for this café the income only through Internet sales was much less than the monthly costs to run the business. Despite this fact, this café was profitable because they have a secured income from an IICD⁷⁵ project and also because they offer other services.

Furthermore, this study indicated that most Internet cafés have not made an adequate analysis of their cash-flow requirements and did not take aspects such as depreciation into account. Competition has driven the cost for Internet access to a very low rate of TSH 500 per hour, which is not a realistic charge to operate on a profitable level. This could explain why many Internet cafés rely on income from other services such as drinks and snacks, equipment rental and in some cases the illegal provision of Internet telephony (see next section).

The above estimated average income per month, compared to fees paid to ISP and other operating costs, indicates that many Internet cafés are struggling to make ends meet. Therefore, **it could be concluded that the existing business model is not sustainable which will eventually lead to a closure of a number of Internet cafés in Dar es Salaam.**

8.4 Purposes for using Internet cafés

In all Internet cafés computers are provided. The majority (91%) are equipped with a printer, 62% with a scanner and 42% with a photocopier. 33% have a fax, 31% a telephone and 9% rent out equipment (see figure 8-6).

⁷⁴ Miller, Esselaar & Associates, *A Country ICT Survey for Tanzania, Final Report*, SIDA, November 2001.

⁷⁵ IICD: www.iicd-tanzania.org

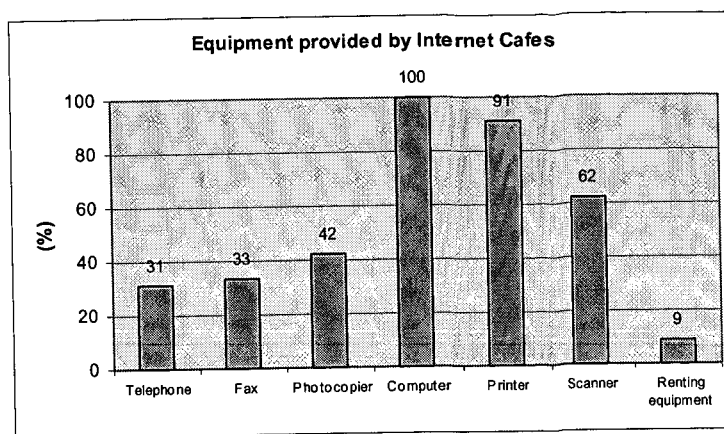


Figure 8-6: Equipment provided by Internet cafes

Regarding services offered by Internet cafés, 98% of all Internet cafés offer surfing, 96% e-mail, 93% chat, 73% Internet games and in 73% of all cafés applications and software for word processing, drawing and games are available. **Only a small minority (13%) provide webpage design and 16% offer courses in the use of computers, Internet and applications** (see figure 8-7).

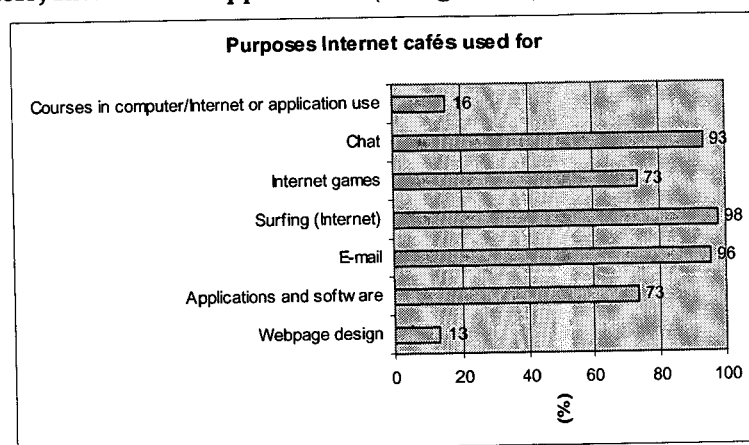


Figure 8-7: Purposes Internet cafés used for

Administrators were asked about the provision of VoIP in their Internet cafés, which, as mentioned before, is prohibited by the regulator in Tanzania. VoIP is a new technology to transmit voice signals using the Internet protocol and dramatically reduces the cost of telephone calls, especially the international ones. **Provision of VoIP serves as an extra income for some cafés in order to meet their operating costs.** 9 of 45 interviewed administrators responded VoIP is used in their café. However, when asked how often it was used 11 administrators replied on this question. Of these 11, eight said it was used one or two times a day. Only 22% of all respondents were not aware of the fact that Internet telephony is illegal in Tanzania. **The majority (84%) believe that VoIP should be allowed by the regulator.**

The administrators were also asked for which purposes the Internet was used by their customers. 96% indicated that the Internet was used for “chat” and “to keep in touch with friends or family”. 82% gave to know the Internet was used for “business matters” and “study related assignments”. Other purposes are “computer games” (76%), “pornography” (71%), “music” (64%), “buying and

identifying products” (64%) and “job search” (64%). Figure 8-8 represents the purposes the Internet used for as indicated by the administrators.

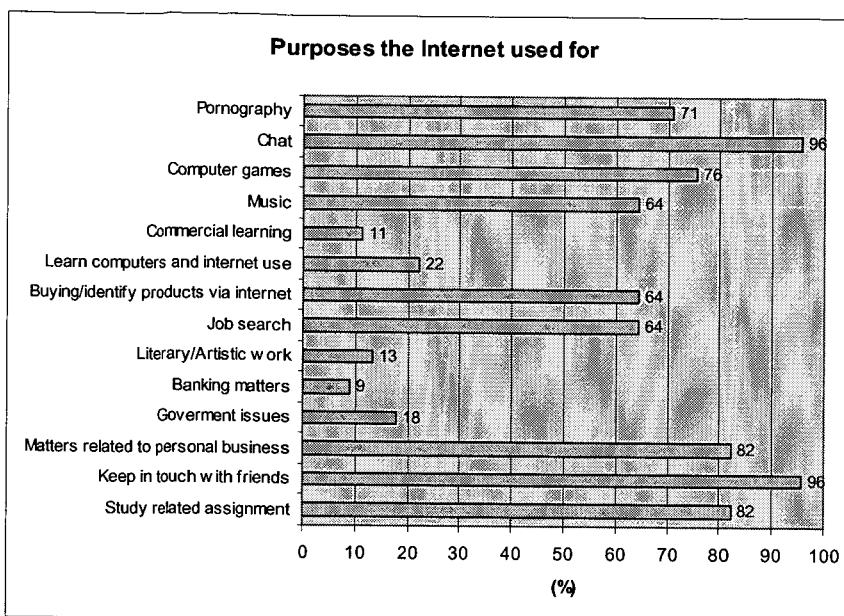


Figure 8-8: Purposes the Internet used for

8.5 Administrators’ perception of the quality of service provided by ISPs

The majority of interviewed administrators were satisfied with their Internet connection. 60% gave to know that they were either satisfied or very satisfied, 29% were somewhat satisfied while the left 11% were either unsatisfied or very unsatisfied.

Considering fees paid for Internet access, only 29% were either satisfied or very satisfied, 26% somewhat satisfied and 45% were either unsatisfied or very unsatisfied (see figure 8-9). Regarding the general satisfaction with their ISP, 67% said they are satisfied or very satisfied, 18% somewhat satisfied, and 15% either unsatisfied or very unsatisfied.

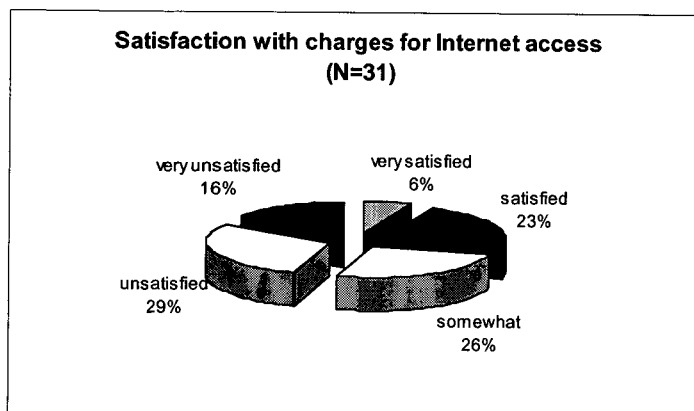


Figure 8-9: Satisfaction with charges paid for Internet access

The above shows that, with the exception of the cost paid for Internet access, administrators are in general satisfied with their ISP. However, during the interviews a couple of Internet cafés were found

out of use which was caused by either an electricity or Internet failure. Despite the fact that these Internet cafés were missing income no compensation was arranged with the electricity company or ISP for suffered losses. Furthermore, as mentioned earlier, because of an absence of a national IXP Tanzania lacks cheaper and high capacity connections to the global Internet. **The high cost of Internet bandwidth is passed on to the end users, in this case the Internet cafés.**

8.6 Administrators' perception of the Tanzanian ICT, policies and related issues

All administrators think ICT is important for development. 91% were of opinion that ICT could be used to improve education, business and service sector (73%) and healthcare (71%). Other areas that could be improved by ICT are transports and communication, industry, tourism and agriculture. The majority (74%) of the administrators gave education the first priority for improvement. Considering the quality of the Tanzanian ICT infrastructure, 52% of the administrators believe the quality is good or very good. 27% think it is moderate whereas the remaining 21% think it is either poor or very poor.

On the question whether the government has a clear vision on ICT, 39% answered either yes or strongly yes, 40% somehow, and 21% either no or strongly no. Whether measures taken by the government encourage ICT development 33% replied either yes or strongly yes, 52% somehow and the left 15% either no or strongly no (see figure 8-10). Consequently, **it could be said that in general administrators are to some extent satisfied with the available ICT infrastructure and with role the government is playing in it.**

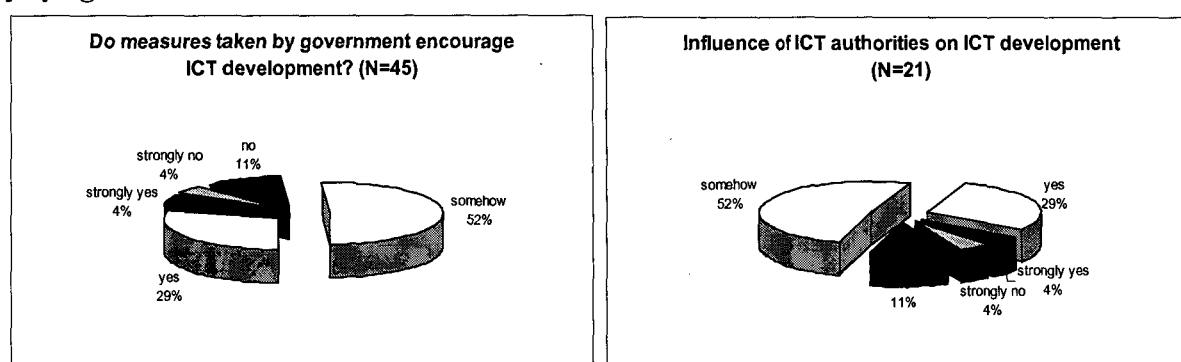


Figure 8-10: Role of government in ICT development

Administrators were also asked about whether they know any authorities concerned with ICT. **Surprisingly, only 7% gave TCC as an answer.** Sixty four percent of the respondents were familiar with the Tanzanian official website. Of these 64%, about 60% said they visit this website either occasionally or frequently and about 40% never visit this site.

The largest proportion (76%) of the administrators believes the Internet has either a positive or very positive impact on the Tanzanian culture. 20% think the impact is somewhat positive and 4% think it is negative. On the question whether more Swahili websites should be designed 63% replied either yes or strongly yes, 22% somehow, and 15% replied either no or strongly no.

Finally the respondents were asked whether the Internet café has a license to operate, as there were some suspicions that some cafés were operating without one. All said they do.

8.7 Conclusions

The survey indicates that most cafés are run by young (major age category is 20-30) and relatively well-educated people. With a major income category of TSH 40,000-100,000 per month, the administrators have a higher income than the average in Tanzania.

Most Internet cafés have been operating for less than one year. A large proportion of the surveyed Internet cafés have six to ten relatively new computers, connected through WLL to the Internet. The elimination of all taxes and duties on computer equipment since 2001 seems to have resulted in lower computers prices in Tanzania, which apparently gave Internet cafés a chance to acquire better equipment.

The average number of users is 200 per week and the cost of surfing per hour is TSH 500 for the majority surveyed cafés. **Computer and Internet use are for the majority the main sources of income.** A rough calculation indicates that the average income only through Internet sales is almost equivalent to the fee paid to ISP for Internet access. High competition has driven the cost for Internet access to an unrealistic charge to operate on a profitable level. **This could explain why many Internet cafés rely on income from other services such as drinks and snacks, equipment rental and in some cases the illegal provision of Internet telephony, which should be allowed according to the majority.** Therefore, it could be concluded that the existing business model is not sustainable which will results in the closing down of Internet cafés in Dar es Salaam.

Services offered by Internet cafés are Internet surfing, e-mail, chat, Internet games and common applications and software. Only a small minority provide webpage design and ICT courses. **The Internet is mainly used for communication (e.g. e-mail and chat).** The Internet is also used for business matters, study related assignments, computer games, pornography, music, buying and identifying products and job search.

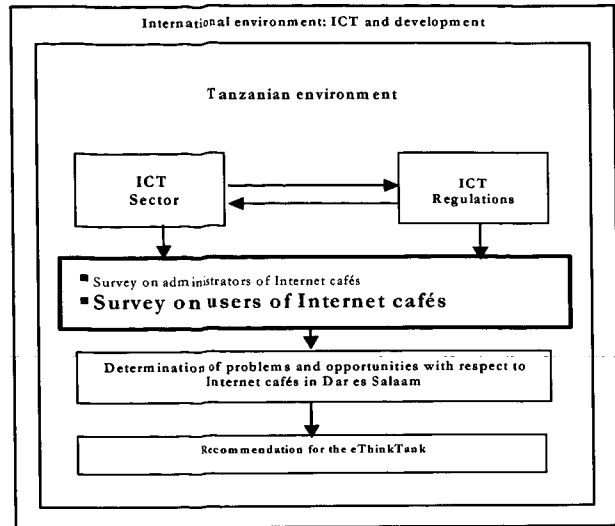
With the exception of the cost paid for Internet access, administrators are in general satisfied with their ISP. However, **there are no realizable service obligations on the electricity company or ISP to refund Internet cafés for periods of connectivity down-time.** Furthermore, **because of an absence of national IXP, Tanzania lacks cheaper and high capacity connections to the global Internet.** The high costs are eventually passed on to the end users, in this case the Internet cafés.

All administrators are aware of the importance of ICT for development, and its special significance for improving education. Administrators are to a certain extent satisfied with the available ICT infrastructure and with role the government is playing in. However, **very few know about the existence of ICT authorities such as TCC.** On the other hand, the Tanzanian official website is quite popular. The Internet is believed to have a positive impact on the Tanzanian culture, and the majority thinks more Swahili websites should be designed.

9 Results of survey on users of Internet cafés in Dar es Salaam

This chapter presents the results of the survey on 346 users of Internet cafés. For this survey the objectives were:

- to identify the basic characteristics of users of Internet cafés,
- to identify purposes for which the Internet cafés are used,
- to identify the use of computers and Internet by users,
- to identify the users' perception of the quality of service provided by Internet cafés, and
- to identify the users' perception of the Tanzanian ICT, policies and other related issues.



Please refer to appendix E for an overview of all statistical tables.

9.1 Basic characteristics of users

The survey on users of Internet cafés indicates Internet café usage is predominantly male (63% male and 37% female). The average age of the users is 25.0 and the major age category is 15-25 (61%). See figure 9-1. Most of the users (67%) are single and 31% are married.

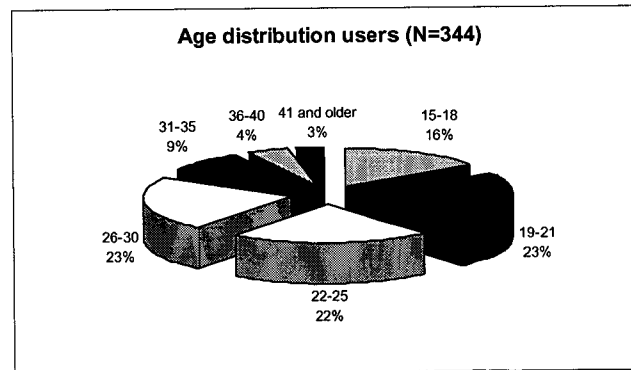


Figure 9-1: Age distribution of users

45% of the interviewees are students (45%), 13% unemployed and 12% public employees. Other occupations include professional (6%), merchant or business owner (6%), housework for others (5%), teacher (4%) and salaried worker (3%).

In general, the surveyed users are relatively well-educated. Most (51%) have secondary education as highest level of education received. For 17% it is technical secondary education, 13% bachelor degree, 8% vocational training, 7% primary education and 3% are postgraduates (see figure 9-2). The command of the English language is either good or very good for fifty five percent of the users. For 40% it is moderate, whereas for the remaining 5% it is either poor or very poor.

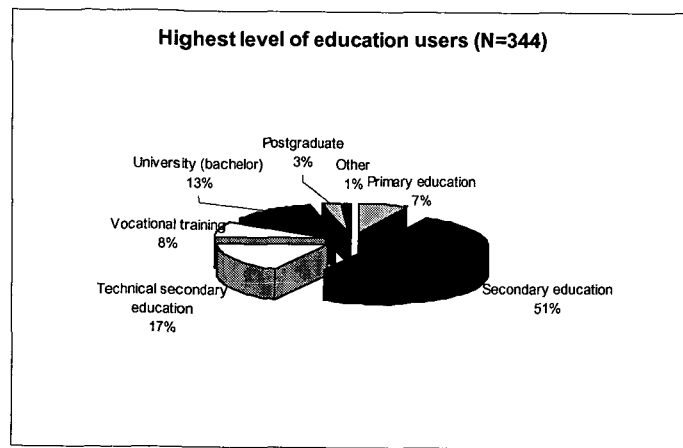


Figure 9-2: Highest level of education received by users.

Twenty two percent of the users have an income of between TSH 40,000 and 100,000 per month. 19% earn between TSH 20,000 and 40,000 and 12% between TSH 10,000 and 20,000 per month. **For the users the average income is also much higher than the average in Tanzania⁷⁶.**

9.2 Purposes for using Internet cafés

For the majority of users an Internet café is nearby. For 61% the distance is less than one kilometer, for 31% one to five kilometers, and for only 6% the distance is more than five kilometers. The frequency of use of Internet cafés is two or three times a week for 39% of the users, one day a week for 30%, four or more times a week for 29% and just 2% of the users visit Internet cafés for one to three times per month. Forty eight percent of the users spend an average of one to two hours in Internet cafés on each visit and 46% spend less than one hour (see figure 9-3). **When combining these data it can be said that Internet cafés are generally used at least once a week and users spend on average about one hour in the café.**

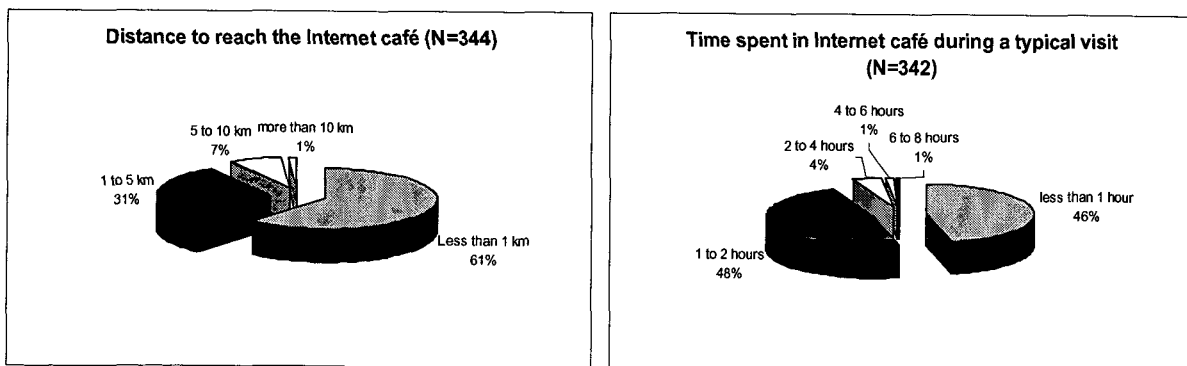


Figure 9-3: Frequency of using Internet café and time spent during a typical visit

The purposes for using Internet cafés indicated by the users are more or less in line with those indicated by the administrators. **The main purpose for 90% of the respondents is “to keep in touch with**

⁷⁶ The roughly calculated average income is TSH 108,000, which is higher than the average income in Tanzania (TSH 22,000 according to the World Bank).

friends and family”. Only for 5% the main purpose is to carry out “study related assignments” (see figure 9-4).

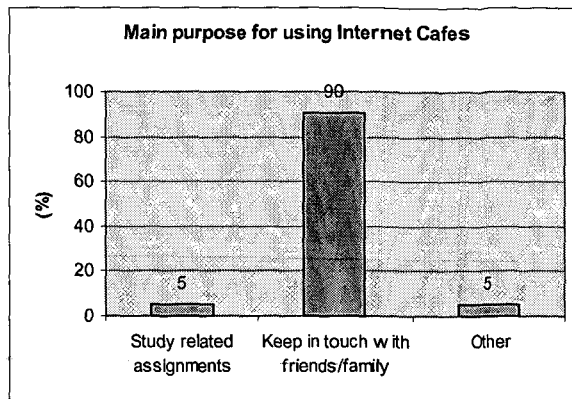


Figure 9-4: Main purpose for using Internet cafés

Other secondary purposes are “chat” (58%), “music” (45%), “computer games” (34%), “government issues” (31%), “matters related to personal business” (31%), and “pornography” (22%). See figure 9-5).

Regarding purposes related to education and learning, only 21% of surveyed users use Internet cafés to “learn computers and Internet” and 17% for “study related assignments”. Just 7% have “academic learning” as a purpose, 4% “commercial learning” and just a few for “literary or artistic work” (3%).

On the subject of e-commerce, no more than 6% of interviewed users responded they use Internet cafés to “identify or to buy products via the Internet” and simply 3% for “banking matters”. Goals associated with employment comprise “work related matters” (15%) and “job search” (9%).

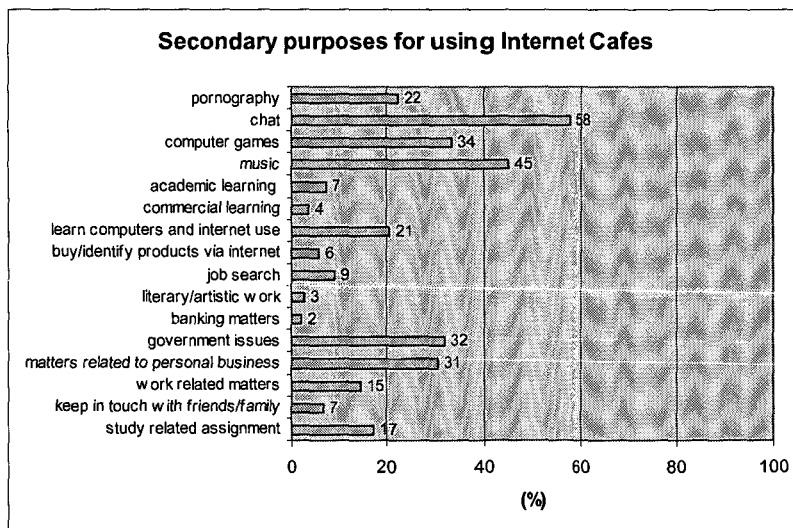


Figure 9-5: Secondary purposes for using Internet cafés.

The hardware “frequently” used by the largest proportion of the users is the computer (69%), the photocopier (6%), the printer (5%), the telephone (4%) and the scanners (2%). See figure 9-6.

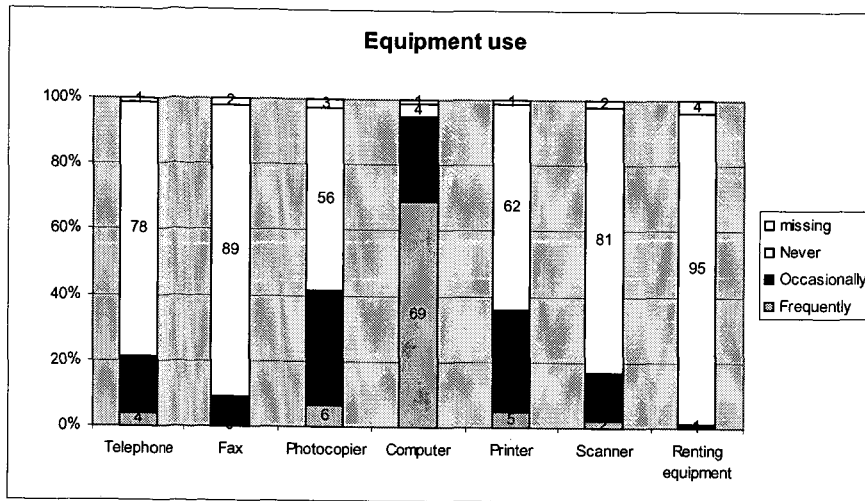


Figure 9-6: Use of Internet café equipment by users

The frequently used services are e-mail (98%), surfing (71%), chat (54%) and games (30%). See figure 9-7. Only 7% of the respondents take frequently courses offered by Internet cafés and 12% do that occasionally.

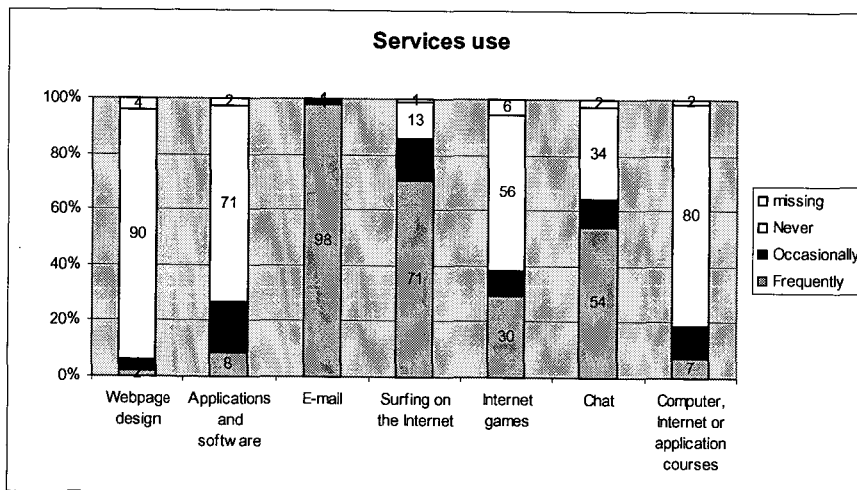


Figure 9-7: Use of Internet café services by users

The priorities assigned by the respondents to the equipment and services are in keeping with the use frequencies. The computer has first priority (94%), whereas a significant number of users regard the photocopier as of second priority. The service most frequently mentioned as first priority is e-mail (95%). Second priority services mentioned frequently by the users are surfing (86%), chat (14%) and games (11%).

The users were also asked whether and how often they use Internet telephony. 27% replied they do. Of these, 53% use it one to two times per month, 32% two to four times, 4% four to eight times and the remaining 11% more than eight times per month. Only half of all respondents are aware of the fact that Internet telephony is prohibited in Tanzania. Like the administrators, the majority (86%) of the users want the prohibition of Internet telephony abolished.

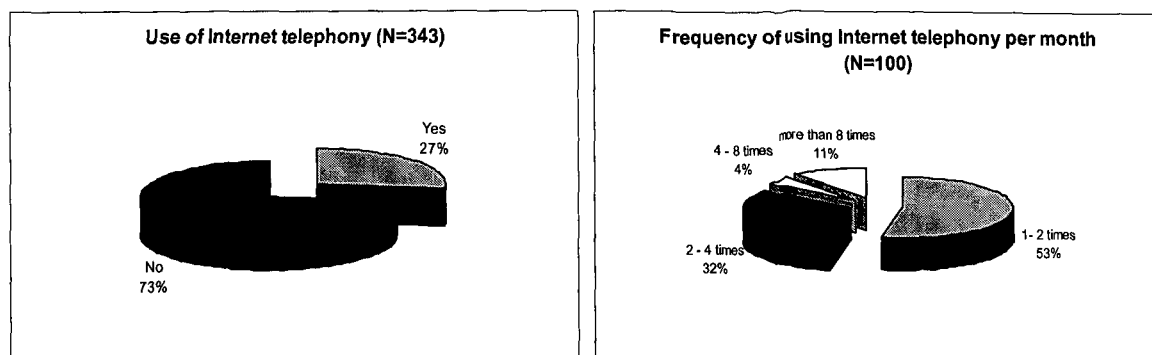


Figure 9-8: Use and frequency of use of Internet telephony

9.3 Use of computers and the Internet

A big majority of the surveyed users have neither a computer nor an Internet connection. Only 17% have a computer at home and just 1% an Internet connection. **The most common place for using the Internet for most (98%) users is the Internet café.** Only 7% have access to the Internet at school or university and six percent at the office.

For the most part, surveyed users felt satisfied with the effect of using Internet cafés on their skills in the use of computers and the Internet. Eighty two percent considered that their skills had either advanced greatly (35%) or improved somewhat (47%).

Over half (58%) of surveyed users have been using Internet cafés for more than one year. 20% have been using them for six months to a year, 19% for less than six months and for 3% it was the first time they use Internet cafés.

Only 75% of all respondents browse the Internet. For this group the content of interest varies widely (see figure 9-9). Note that most missing cases in this figure are those respondents who said they never use the Internet for browsing. Users are interested in a diverse range of subjects on the Internet. These subjects are divided into five main areas: *education and learning, e-commerce, general information, employment and recreation.*

Education and learning

Only 27% of surveyed users are very interested in education content and 25% is somewhat interested. Technical information is considered as very or somewhat interesting by 12 % and 15% respectively. Academic research content is very interesting for 16% and somewhat interesting for 15% of users. These figures, together with the above-mentioned statistics on purposes for using Internet cafés, indicate that **for the major part of users the Internet does *not* serve as a means for educational or learning goals.**

E-commerce

Barely 9% of the users are either very or somewhat interested in buying and selling over the Internet, and just 13% use the Internet for commercial transactions. Combining these data to the data gathered on purposes for using Internet cafés points out that **these cafés are hardly being used for e-commerce related matters.**

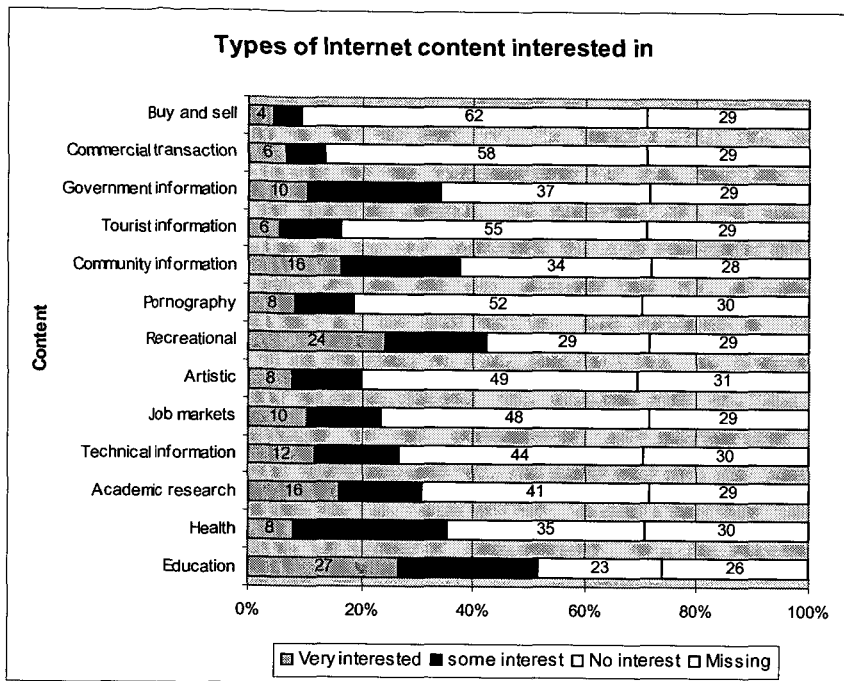


Figure 9-9: Content of interest for users

General information

Interest in general information is low. 34% of the surveyed users say they are either very or somewhat interested in government information, 17% in tourist information, 37% in community information, 20% in artistic events, and 36% in health topics.

Employment

No more than 23% percent of all users are either very or somewhat interested in content on job markets. This information combined with indicated goals for using Internet cafés illustrate that **the Internet is not exploited for employment related issues.**

Recreation

42% percent of all users gave to know they are either very or somewhat interested in recreational content such as games, movies and music. 18% responded they are either very or somewhat interested in pornography content. **Though the interest in the latter content seems to be little, it turned out from own, friends', colleagues' and even administrators' experience that watching pornography is one of the major pastimes for most young and male users.** This was also



Very few Tanzanians use the internet for e-commerce

illustrated by this cartoon in the Guardian in September 2002.

All in all, it can be concluded that the interest in educational, commercial, social and political contents is low. The use of the Internet reflects rather the interests of young people in Western popular contents.

9.4 Users' perception of the quality of service provided by Internet cafés

In general, users are satisfied with the quality of services offered by Internet cafés (see figure 9-10). Dissatisfaction is only seen in relation to courses and training, which 16% of the users rate as "poor".

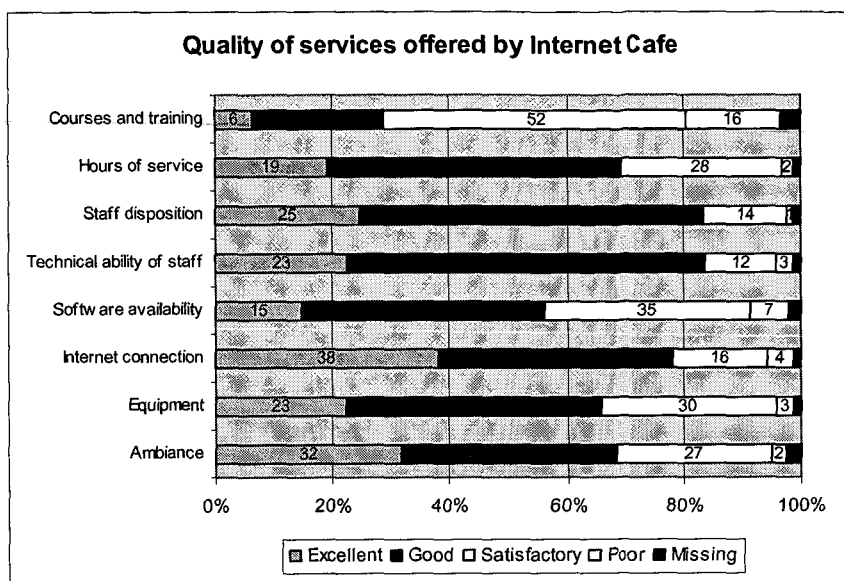


Figure 9-10: Satisfaction of users with Internet café services.

Users were also given the opportunity to suggest ways to improve Internet café services. The principle suggestions were for improving the atmosphere (13%), reducing charges (11%), increasing the number of computers (11%) and increasing Internet speed or bandwidth (9%).

The largest proportion (81%) of users sees the price they pay for Internet café services as "about right". Only 16% think the price is either high or too high. Eighty eight percent of all users pay the full price themselves and just 11% do that partially. However, **though the cost of surfing is not seen as an obstacle, which could be explained by the relatively high incomes of the users, the general price of TSH 500 per hour could hinder a particular group with limited financial means from using Internet café services⁷⁷.**

9.5 Users' perception of the Tanzanian ICT, policies and related issues

The majority (92%) of the surveyed users think that ICT is important for development. Ninety five percent think ICT could be used to improve education, healthcare (84%), transport and communication (80%), and business and service sector. Other areas mentioned are tourism (66%), agriculture (58%) and industry (49%). **The largest proportion (72%) of users considers education as of first priority for improvement.**

⁷⁷ Considering the average monthly income of TSH 22,000 (World Bank) the average daily income comes at TSH 667 per day. So, for an average person an hour surfing could cost almost a whole daily income.

A big majority of users (68%) are of opinion that the quality of the Tanzanian ICT infrastructure is either good or very good. 25% think it is moderate whereas the remaining 7% see the quality as either poor or very poor.

Whether the government has a clear vision on ICT, 64% of the users replied either yes or strongly yes, 21% somehow, while 15% gave no or strongly no as an answer. Measures taken by the government to encourage ICT development are seen by sixty nine percent as effective, 17% somewhat, and 14% as not effective. Similar to administrators, **users are in general contented with existing ICT infrastructure and with the role of the government.**

Despite the above, **only 9% know TCC and just 15% are familiar with the Tanzanian national website.** Of those latter, only 15% visit it frequently, 53% occasionally and 32% never do. **The unfamiliarity with a central telecom supervisor and the national website demonstrates that there is still a large gap between users and regulators.**

The majority (64%) of the users think the Internet has either a positive or strongly positive impact on the Tanzanian culture. 29% think it is somewhat positive, whereas 7% think the impact is either negative or strongly negative. **On the question whether more Swahili websites should be design a big majority (80%) replied either yes or strongly yes , 9% somehow and 11% either no or strongly no.**

Finally the users were asked to give an estimate of the number of Internet cafés in Dar es Salaam. 23% think the number is between 15 and 100, 14% between 100 and 400, 31% between 400 and 1000 and remarkably, 33% of the users think the number is more than 1000.

9.6 Conclusions

Users are predominantly male, young and relatively well-educated with an average income much higher than the average in Tanzania. In general, Internet cafés are used once a week and users spend about one hour in the café. **A big majority of the users have neither a computer nor an Internet connection at home,** which leaves the Internet café to be the most common place for using the Internet.

Internet cafés are mainly used for communication. Computer is the most used equipment and e-mail and chat the most used services. Furthermore, Internet telephony is used and only half of the users are aware that it is prohibited in Tanzania. Like the administrators, **the majority of the users want the prohibition of Internet telephony abolished.**

Assessment of the interests in various contents on the Internet shows that **the Internet does not serve as a means for educational or learning goals.** Furthermore, **the Internet is hardly used for matters related to e-commerce, employment, government etc.** In addition, many believe that watching pornography is one of the major pastimes for most young and male users. **It appears that in general increased access to the Internet is not in line with increased awareness in terms of using the Internet for educational, commercial, social or political purposes.** The increased interest reflects rather the interests of young people in Western popular contents.

In general, users are satisfied with the quality of services offered by Internet cafés. Some suggestions were made for improving the atmosphere, reducing charges, increasing the number of computers and increasing Internet speed. **Though the price paid for surfing was not seen as an obstacle by most users, which could be explained by their relatively high incomes, it could obstruct a certain group with limited financial means from using Internet cafés.**

The majority of users think that ICT is important for development and consider education as of first priority for improvement. Furthermore, users are in general quite positive about the Tanzanian ICT and have confidence in the government. On the other hand, **only 9% know TCC and just 15% are familiar with the Tanzanian national website. This unfamiliarity demonstrates that there is still a large gap between users and regulators.**

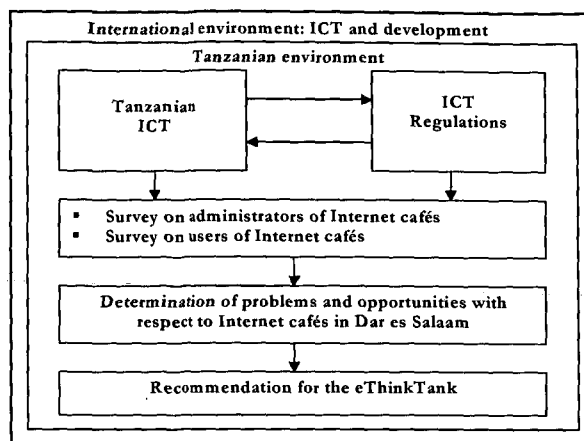
Most users think that the Internet has a positive impact on the Tanzanian culture and **that more Swahili websites should be designed.**

PART III

CONCLUSIONS & RECOMMENDATIONS

10 Conclusions and recommendations

As mentioned in chapter 2, the main goal of this research is to *determine the problems and opportunities with respect to Internet cafés in Dar es Salaam and to suggest recommendations for the eThinkTank*. In order to achieve this goal, a research problem was identified that was translated into a number of research questions. These questions were classified in six sub studies. Furthermore, a research framework was formulated and designed and has been displayed repeatedly at the beginning of each chapter.



The chapters 4 to 9 each discussed a concept of the framework, while each part of the framework was derived from the defined sub studies. First this chapter provides a summary of conclusions of the chapters 4 to 9. Subsequently, the research problem will be answered by the determination of the problems and opportunities with respect to Internet cafés in Dar es Salaam. On basis of this, recommendations are suggested in the last section of this chapter.

10.1 Summary of conclusions

Six sub studies have been carried out for this research. Below a summary of conclusions for each study is provided.

Sub study 1. ICT and development

ICT can be a great means to enhance socio-economic development. However, it should be noted that **ICT is not an isolated solution for the developing world's problems. Socio-economic development depends on many factors that should be addressed through an overall development strategy.**

The Internet could have unlimited potential to bring people together from across the world, facilitating basic services, such as health and education. It could also offer a relatively cheap and efficient way of communicating, and moreover, it could enhance the participation of backward economies in the global economy. Unfortunately, **in developing countries Internet access is very limited, due to obstacles such as high prices, poor infrastructures and irrelevant content.**

To overcome these obstacles, **telecenters** are being set up, offering public access to ICT services. But still many challenges have to be faced, such as the insufficient telecommunication infrastructure, illiteracy and funding. Moreover, there is a lack of awareness regarding the use of ICT, notably the Internet, which obstructs a sustainable and beneficial use of this new medium.

Sub study 2. Tanzanian environment

With a GDP per capita of only US\$ 268 in the year 2000 and 51% of the population below the poverty line, Tanzania is among the world's poorest countries. Moreover, the Tanzanian education

system is in a crisis and there are almost no computers in Tanzanian primary and secondary schools.

The University of Dar es Salaam and the Dar es Salaam Institute for Information Technology are the major institutions at the tertiary level which offer ICT-based education. Outside the formal education system there are several ICT training centers. Nevertheless, **there is a lack of qualified instructors and job practice and moreover, the supply of ICT graduates does not match the demand for qualified ICT personnel in Tanzania.**

Sub study 3. Tanzanian ICT

With low teledensity, huge waiting lists for main lines and high local connection rates, Tanzania faces a huge task to modernize its ICT sector. The incumbent's network has still quality problems, which remains a basic impediment to the provision of ICT, particularly in rural areas. On the other hand, mobile telephony enjoys a strong growth, but the current tariffs are still too high for the majority of the population.

There is a growing competition in the data market area, but most of the operators are only active in big cities. Moreover, **Tanzania lacks cheaper and high capacity connections to the global Internet.** This is partially caused by a lack of agreement among ISPs on setting up a national IXP.

The main constraints concerning local applications are the small size of the Tanzanian market and the small skilled capacity to support the ICT industry. In addition, the use of Internet by the private sector in Tanzania is still in the initial phase. **The Internet has yet to become a dominant medium for the Tanzanian society, particularly because of the relatively few websites available in Swahili.**

The main means of Internet access are the Internet cafés. The proliferation of these cafés indicates that there is a great and unsatisfied demand in the country for Internet access. There are around 250 Internet cafés in the country, 100 of which are located in Dar es Salaam. **The unsupported growth of Internet cafés shows that they could be a good alternative to the subsidized telecenters.**

Sub study 4. ICT regulations

TCC is the postal and telecommunication regulator and manager of radio spectrum in Tanzania. However, TCC's achievements are ambiguous. **With inconsistent regulations and its lack of professionalism and trust, regulation is believed to be the greatest problem for business.**

Tanzania is currently underway to develop its own **national ICT policy.** On the other hand, **the document lacks specificity and clarity and furthermore, it does not present realistic and matching strategies on how to achieve its objectives.**

The most prominent initiative to develop a comprehensive national ICT framework is the **eThinkTank**, which consists of industry representatives, government officials and donor organizations. The eThinkTank is being seen as a **very useful initiative for Tanzania's ICT development**, and is rapidly becoming **an influential focal point for ICT-related issues in the country.**

Though Tanzania has experienced a very rapid growth in Internet cafés, the government has been slow to encourage further investment. **Existing ICT policies and TTCL's monopoly are undermining**

further development. Furthermore, the **lack of reliable power supply and the expensive bandwidth** are making costs of opening or maintaining Internet cafés very high. But **worse still are the periods of connectivity down-time, without any realizable service obligations on their electricity company or ISP to refund the café for periods of down-time. This will result in the closing down of Internet cafés in the future.**

Sub study 5. Survey on administrators of Internet cafés in Dar es Salaam

The survey on administrators shows that **most Internet cafés are run by young and relatively well-educated people, with a much higher income than the average in Tanzania.**

In general, computer and Internet use are the main sources of income and for these services TSH 500 per hour is charged. Rough calculations indicate that **this charge, compared to what is being paid to ISPs, is unrealistic to operate on a profitable level.** For this reason many Internet cafés rely on income from other services such as drinks and snacks, equipment rental and in some cases the illegal provision of **Internet telephony, which should be allowed according to the administrators. For most Internet cafés the existing business model is unsustainable** which, as noted above, will lead to a closure of a number of cafés.

Services offered by Internet cafés are Internet surfing, e-mail, chat, Internet games and common applications and software. Of these services **e-mail and chat are mainly used. Only very few Internet cafés provide webpage design and courses in computer and Internet use.**

With the exception of the cost paid for Internet access, administrators are in general satisfied with their ISP. However, as mentioned above, **there is a lack of compensation for suffered losses in case of electricity or Internet connection failure.** Also due to an absence of a national IXP, Internet bandwidth is scarce and very expensive which explains the high cost for Internet access charged by ISPs.

All administrators are aware of the importance of ICT for development, and its special significance for improving education. Though administrators said to be quite satisfied with the available ICT and with role the government is playing in it, **very few know about the existence of the ICT regulator TCC.** The Internet is believed to have a positive impact on the Tanzanian culture, and that **more Swahili websites should be designed.**

Sub study 6. Survey on users of Internet cafés in Dar es Salaam

Results indicate that **users are predominantly male, young and relatively well-educated with an average income much higher than the average in Tanzania.** Also it turns out that **most users have neither a computer nor an Internet connection at home.**

Most users use Internet cafés primarily for communication. Computer is the most used equipment and e-mail and chat the most used services. Furthermore, Internet telephony is used and like the administrators, **most users want the prohibition of Internet telephony abolished.**

Assessment of the interests in various contents on the Internet shows that in **general increased access to the Internet is not in line with increased awareness in terms of using the Internet for educational, commercial, social or political purposes.** The increased interest reflects rather the interests of young people in Western popular contents.

Users are generally satisfied with the quality of services offered by Internet cafés. Some suggestions were made for improving the atmosphere, reducing charges, increasing the number of computers and increasing Internet speed. **Though the price paid for surfing was not seen as an obstacle by most users, which could be explained by their relatively high incomes, it could obstruct a certain group with limited financial means from using Internet cafés.**

Like the administrators, most users think that ICT is important for development and consider education as of first priority for improvement. Users are also quite positive about the Tanzanian ICT and have confidence in the government. On the other hand, **hardly anyone knows TCC and only few are familiar with the national website. This demonstrates that there is still a large gap between users and policymakers.** Similar to administrators, users think that the Internet has a positive impact on the Tanzanian culture and that **more Swahili websites should be designed.**

10.2 Final conclusions

The research problem in chapter 2 was formulated as follows:

What are the problems and opportunities with respect to Internet cafés in Dar es Salaam?

Based on the performed studies and surveys the following problems and opportunities with respect to Internet cafés in Dar es Salaam are identified:

- Since Internet cafés are the main access to the Internet in Tanzania, they could **provide basic access to services such as health and education.** Moreover, they could **provide relatively cheap and efficient way of communicating,** considering the limited purchasing power and poor infrastructure in Tanzania. Nevertheless, **increased interest in the Internet is not in line with increased awareness** in terms of using the Internet for educational, commercial, social or political purposes.
- **The existing business model of most Internet cafés is unsustainable and uneconomic.** This is due to the unrealistic charges for offered services, lack of reliable power supply, expensive bandwidth, connectivity down-time and high competition. **This will result in the closing down of Internet cafés** in the future.
- The current **provision of courses and training by Internet cafés in the use of computers and the Internet is very limited.** Considering the limited ICT personnel in Tanzania, these **cafés could be appropriate training centers** as they are already equipped with the necessary ICT facilities. Also **in the field of education Internet cafés could play a major part,** given the absence of computers in Tanzanian schools. Furthermore, **Internet cafés could be a good alternative to the subsidized telecenters** when connectivity is provided.
- Due to an absence of a national IXP **Tanzania lacks cheap and high capacity connections to the global Internet.** The high cost of Internet bandwidth is passed on to the Internet cafés. Even **though the price charged by these cafés for offered services is not extremely high, it could**

obstruct a certain group with limited financial means from using Internet cafés, hindering the further diffusion of the Internet.

- The inconsistent ICT policies, the monopoly in fixed-line services and the lack of compensation for suffered losses are undermining further development of Internet cafés. This is also to the detriment of growth of the local ICT market.

10.3 Recommendations

Based on the final conclusions recommendations are suggested. These recommendations are primarily for the eThinkTank. Additionally, since the eThinkTank consists of members of various backgrounds, the recommendations are directed to the party best able to act on the problem or opportunity. These parties include:

- A. Internet café owners,
- B. Internet café users,
- C. ICT regulator,
- D. Government officials,
- E. Donors/NGOs,
- F. Schools,
- G. ISPs,
- H. Electricity companies, and
- I. Other companies.

Table 10-1: Recommendations

Recommendation	A	B	C	D	E	F	G	H	I
1. Since the existing business model is unsustainable and uneconomic Internet café owners should rethink their strategy and reshape their business model. Other parties could play a role here by supporting and providing information and training for Internet café owners on how to run their business in a profit-making and sustainable way in order to survive in the long run.	x		x	x	x		x		
2. Internet users should be made aware of the potentials the Internet could have. It is not for communication and entertainment only. Instead, it is a powerful and cheap resource that can be used for learning, education, research, commerce, employment, discussions, exploring the world and other cultures and above all, to make oneself heard. Concerned parties should think of ways to increase the awareness among users in order to get the most out of the Internet.	x	x	x	x	x	x	x		
3. Very few know about the existence of the telecom regulator TCC and the Tanzania national website. For that reason, the regulator should propagate itself more strongly to the general public in order to build trust and to create an atmosphere of transparency and responsibility. By doing so, the gap between policymakers and the community could be reduced, which could initiate better and more efficient policymaking.	x	x	x	x		x			
4. The regulator should intervene and impose a strict deadline for all ISPs to set up a national IXP. By doing so, local Internet bandwidth could be increased and can be offered much cheaper. These major benefits could provide and improve			x	x	x		x		

Recommendation	A	B	C	D	E	F	G	H	I
access to the Internet for reasonable costs, which could mean lower prices will be paid by Internet cafés for Internet access and eventually users will be charged less for surfing. <i>As a result the Internet could be used more frequently and moreover, more people could access it.</i>									
5. More websites with Swahili and local relevant content should be designed <i>as it might be an essential medium for the Tanzanian society to communicate.</i> Furthermore, it could be an efficient and cheap way for governments, NGOs, institutions, companies etc. to provide information on relevant topics such as health, poverty, education, politics, culture, and business.	x	x	x	x	x	x	x	x	x
6. Internet cafés should join their forces and form a pressure group or representative who looks after their interests. Negotiations could be opened with the regulator, the electricity company, ISPs and others about certain arrangements and compensation in case of, for example, suffered losses due to an electricity or Internet connection failure.	x		x	x			x	x	
7. Since there is a shortage of ICT facilities at schools, it might be an opportunity for these schools to cooperate closely with Internet cafés since the latter already have the necessary facilities. Schools, Internet cafés and other concerned parties should discuss arrangements and develop methods on how to utilize these cafés for educational purposes. For example, students might be given assignments which they carry out in Internet cafés. By doing so, students will not only get familiar with the Internet but also with its practical use such as for educational purposes.	x		x	x	x	x			
8. Since there is a shortage of IT-skilled people and training centers in Tanzania, Internet cafés should be stimulated and encouraged to offer courses in the use of computers, applications and the Internet. <i>This will also improve their financial situation.</i> Funds and resources must be sought in order to finance the necessary requirements.	x	x	x	x	x				
9. Internet cafés, policymakers and other concerned parties should start discussions and share ideas and views about existing laws and policies regarding certain technologies, such as Internet telephony.	x		x	x				x	
10. Users as well as administrator of Internet cafés should be encouraged and stimulated to start up a discussion forum on the Internet where they could express their concerns, share and discuss ideas about certain topics such as the Internet, policies, moral values, ethical issues and received services. In addition, <i>this forum could serve as an important medium to keep policymakers notified about current developments and views within the community.</i> Also, it might be used by policymakers themselves to inform the community about specific matters.	x	x	x	x	x				

These recommendations are represented in diagram form in order to clarify their role and importance. Note that each recommendation is represented by its number as given in the table above. This diagram is based on the author's perception and is therefore subjective and open to criticism and discussion.

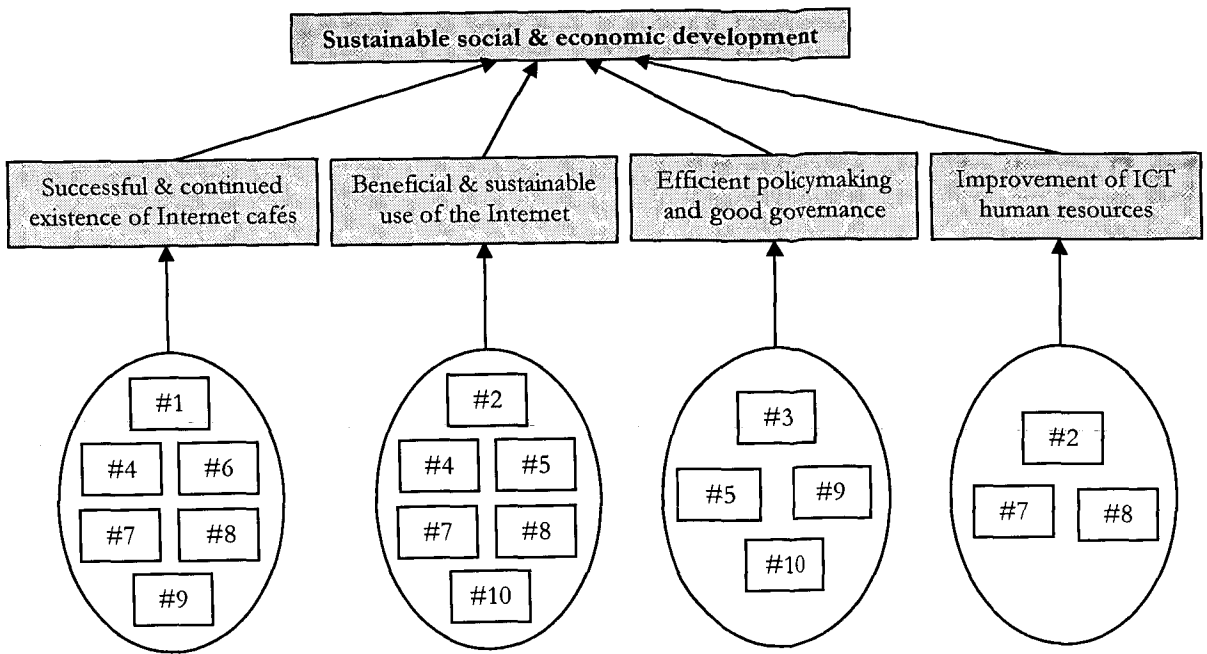


Figure 10-1: Role and importance of suggested recommendations

References

Books and papers:

Asian Development Bank: *Toward E-Development in Asia and the Pacific- A Strategic Approach for Information and Communication Technology*, 2001.

Benjamin, P., *Does 'Telecentre' Mean The Centre is Far Away? Telecentre Development In South Africa And Around The World*, LINK Centre, South Africa, 2000.

Boyd, G., *An Overview of Private Sector Participation in the Dar es Salaam Water and Sewerage Authority (DAWASA)*, June 2001.

Constantinides, G., *Final Draft Report – Cost Benefit Case Studies, GPA Strategic Action Plan on Sewage*, October 2000.

COSTECH, *Preliminary Results of Internet Café Survey in Tanzania*, infoDev Dar es Salaam, January 2002.

Digital Information Technology in Africa, *IT Vision, Issue 03*, December 2001; *IT Vision, Issue 04*, page 16, January 2002; *IT Vision, Issue 08*, page 20, May/June 2002.

Digital Opportunity Initiative, *Creating a Dynamic Development*, 2001.

Economic and Social Research Foundation (ESRF): *The State of Tanzania's social sector in the development context*, 2001.

eSecretariat, *proposal for Tanzania's ICT Policy Formulation Framework – Final Version*, 2001.

eThinkTank, *Comments on 1st order Draft of National ICT policy*, 19 May 2002; Information Document, 2000.

Gaillard, H., Dal, A., *Technology and innovation in global perspective*, Eindhoven University of Technology, 2000.

IICD, *ICTs in developing countries: Booklet I - The importance for sustainable development*, 1998.

LAMTRAC, *Survey of the Need for a Vocational Training Programme for ICT Professionals in Tanzania*, 2001.

McLaughlin, A., *Internet Exchange Points, Their Importance to Development of the Internet and Strategies for their Deployment – The African Example*, Berkman Center for Internet & Society at Harvard Law School, June 2002.

Miller, Esselaar & Associates, *A Country ICT Survey for Tanzania, Final Report*, SIDA, November 2001.

Mutagahywa, B., *Telecom Policy, Regulatory and Management Certificate for TRASA*, Dar es Salaam, November 2001.

OECD, *Understanding the digital divide*, 2001

Paul Budde Communication Pty Ltd, *Tanzania Telecoms*, 2002.

Proenza, F. J. et al, *Telecenters for Socioeconomic and Rural Development in Latin America and the Caribbean*, FAO, ITU, IADB, Washington D.C., 2001.

Tanzania Ministry of Communication and Transport, *National ICT Policy of Tanzania – First Order Policy Draft*, 2002.

UNDP, *Human Development Report 2001*, New York Oxford, Oxford University Press, 2001.

ZEF Bonn (www.zef.de): *Information and Communication Technologies for Development, Present Situation, Perspectives and Potential Areas for German Technical Cooperation in Peru, Lao P.D.R., Vietnam, Tanzania and Uganda*, 2002.

Internet-based references:

- African Connection: www.africanconnection.org/docs/telecomms/moreabout.html
- African National Congress: www.anc.org.za/anc/newsbrief/2002/news0717.txt
- Asian Development Bank: www.adb.org/Documents/Policies/ICT/ICT.pdf
- Balancing Act Africa: www.balancingact-africa.com;
www.balancingact-africa.com/news/back/balancing-act_125.html
- BBC: news.bbc.co.uk/2/hi/world/monitoring/media_reports/1302309.stm
- CommUnity South Africa: www.communitysa.org.za/africaict/contypes.htm
- Computer Industry Almanac Inc.: www.c-i-a.com
- Digital Opportunity Initiative (DOI): www.opt-init.org/framework/pages/contents.html
- Eindhoven University of Technology: www.tue.nl
- eSecretariat: www.tzonline.org/pdf/ICTpolicy.pdf
- eThinkTank: www.ethinktanktz.org
- Federal Communications Commission: www.fcc.gov/connectglobe/sec9.html
- IICD: www.iicd.org; www.iicd-tanzania.org
- Intermediate Technology Development Group (ITDG): www.itdg.org.
- International Development Research Centre: www.idrc.ca, www.idrc.ca/telecentre
- International Labour Organization (ILO): www.ilo.org
- Internet Society: www.isoc.org
- ITU: www.itu.int/ITU-D/ict/publications/inet/1999/ExeSum.html;
www.itu.int/newsarchive/wtd/2001/ExecutiveSummary.html;
www.itu.int/itunews/issue/2002/05/sengerema.html
- Poverty Reduction Strategy Paper 2000/01: www.tanzania.go.tz/prsp.html
- Tanzania Development Vision 2025: www.tanzania.go.tz/vision.htm
- Tanzania National Website: www.tanzania.go.tz/national_websitef.html
- TCC: <http://www.tcc.go.tz/Tanzania%20Communication%20Act.htm>;
www.tcc.go.tz/Regulator%20News.pdf; www.tcc.go.tz/Licensed_Operator.htm

- TechTarget Network: whatis.techtarget.com
- Telecommunication Development Bureau: www.apectelwg.org/apecdata/telwg/ICAIS/ProInfrI.pdf
- UNDP: www.undp.org.al/download/pdf/ict4d.pdf
- United Nations Population Information Network: www.un.org/popin
- United Nations: www.un.org/millennium/
- University Computing Center: www.ucc.co.tz
- University of Dar es Salaam: www.udsm.ac.tz
- World Bank: www.worldbank.org

Experts and key-persons

Most information from experts was obtained from the discussion forum eThinkTank Tanzania (www.ethinktanktz.org). It is a voluntary association of more than 200 experts of various background with an interest in the development of ICT in Tanzania. Further I would like to thank the following persons:

Allard Lamain

WorLD Pilot Tanzania
 TuDelft
 E-mail: allard@lamain.nl

Prof. Beda Mutagahywa

Director University Computing Center
 Dar es Salaam, Tanzania
 E-mail: bmutag@udsm.ac.tz

Claire Mercer

Department of Geography
 University of Leicester
 E-mail: ccm2@leicester.ac.uk

Enock Yonazi

COSTECH
 Dar es Salaam, Tanzania
 E-mail: eyonazi@yahoo.com

Nicolaas P. Moens

Programme manager IICD
 The Hague, The Netherlands
 E-mail: nmoens@iicd.org

Olaf Nielinger

Researcher, Institute of African Affairs
 Hamburg, Germany
 E-mail: nielinger@duei.de

List of appendices

Appendix A. Checklist	<i>i</i>
Appendix B. Internet Exchange Points, Their Importance to Development of the Internet and Strategies for their Deployment—The African Example	<i>iv</i>
Appendix C. Glossary of ICT terms	<i>x</i>
Appendix D. Results of survey on administrators	<i>xii</i>
Appendix E. Results of survey on users	<i>xx</i>
Appendix F. Rough calculation of income of surveyed Internet cafés	<i>xxxiv</i>
Appendix G. Questionnaire Administrators	<i>xxxv</i>
Appendix H. Questionnaire Users	<i>xxxx</i>

Appendix A. Checklist

Concept	Aspect	Indicator
ICT and Development	ICT	<ul style="list-style-type: none"> ⌘ Definition ⌘ Technologies and applications
	ICT for development	<ul style="list-style-type: none"> ⌘ Availability ⌘ Application/benefits ⌘ Risks/barriers ⌘ Theories
	Internet	<ul style="list-style-type: none"> ⌘ Definition ⌘ Technologies and application ⌘ Diffusion ⌘ Application/benefits ⌘ Risks/barriers
	Telecenters	<ul style="list-style-type: none"> ⌘ Functions ⌘ Types ⌘ Benefits/risks
Tanzanian environment	Social situation	<ul style="list-style-type: none"> ⌘ Population ⌘ Life expectancy ⌘ Literacy ⌘ Mortality
	Economic situation	<ul style="list-style-type: none"> ⌘ GDP per capita ⌘ Growth rates ⌘ Inflation ⌘ Developments ⌘ Contribution per sector ⌘ Employment
	Education	<ul style="list-style-type: none"> ⌘ Structure ⌘ Enrolment rates ⌘ Facilities ⌘ Colleges/universities ⌘ ICT education and training ⌘ Obstacles
Tanzanian ICT	Fixed telephony	<ul style="list-style-type: none"> ⌘ Number of providers ⌘ Number of telephone lines ⌘ Teledensity ⌘ Tariffs
	Mobile telephony	<ul style="list-style-type: none"> ⌘ Number of providers ⌘ Number of mobile subscribers ⌘ Teledensity ⌘ Tariffs
	Data Communication Services	<ul style="list-style-type: none"> ⌘ Number of providers ⌘ Functions
	Internet Service Providers	<ul style="list-style-type: none"> ⌘ Number of providers ⌘ Number of subscribers ⌘ Costs
	Internet penetration	<ul style="list-style-type: none"> ⌘ Number of Internet subscribers ⌘ Internet purposes

		<ul style="list-style-type: none"> ☒ Number of PCs ☒ Number of host computers
	Internet cafés	<ul style="list-style-type: none"> ☒ Origin ☒ Number of Internet cafés ☒ Features
	Telecenters	<ul style="list-style-type: none"> ☒ Origin ☒ Number of Telecenters ☒ Problems/opportunities
	Local applications and content	<ul style="list-style-type: none"> ☒ ICT manufactories ☒ Dealers ☒ Content providers
Tanzanian ICT regulatory environment	Regulator	<ul style="list-style-type: none"> ☒ Origin ☒ Functions ☒ Problems
	ICT Policies	<ul style="list-style-type: none"> ☒ Objectives ☒ Obstacles/criticism
	e-Government	<ul style="list-style-type: none"> ☒ Initiatives
	eThinkTank	<ul style="list-style-type: none"> ☒ Origin ☒ Functions ☒ Observed obstacles
	Internet cafés	<ul style="list-style-type: none"> ☒ Obstacles ☒ Policies
	Basic characteristic of administrators of Internet cafés	<ul style="list-style-type: none"> ☒ Sex ☒ Age ☒ Marital status ☒ Occupation ☒ Education ☒ Knowledge of English ☒ Income ☒ Position in Internet café
	General information about the Internet cafés	<ul style="list-style-type: none"> ☒ Age of Internet café ☒ Number of operating PCs ☒ Computer types ☒ Number of Internet connected PCs ☒ Type of Internet access ☒ ISP ☒ Operating license ☒ Email address
	Basic economic situation of the Internet cafés	<ul style="list-style-type: none"> ☒ Costs of Internet access ☒ Charges for surfing ☒ Number of users per week ☒ Sources of income
	Purposes for using Internet cafés	<ul style="list-style-type: none"> ☒ Equipment ☒ Services ☒ Purposes the Internet used for ☒ Purposes Internet café used for ☒ Courses ☒ Use of VoIP
Administrators' perception of the quality of service provide by the ISPs	<ul style="list-style-type: none"> ☒ Satisfaction with speed of Internet access ☒ Satisfaction with charges for Internet access ☒ Satisfaction with ISP 	
Administrators' perception of the Tanzanian telecommunications,	<ul style="list-style-type: none"> ☒ View regarding VoIP ☒ View regarding ICT ☒ View regarding relevance of ICT 	

	policies and other related issues	<ul style="list-style-type: none"> ☒ View regarding Tanzanian ICT ☒ View regarding involvement of government in ICT ☒ View regarding measures taken by government w.r.t. ICT ☒ Names of authorities concerned with ICT ☒ Perception of the influence of these authorities ☒ Names of official Tanzanian websites ☒ Frequency of visiting these websites ☒ Perception of impact of the Internet on Tanzanian culture ☒ View regarding Swahili websites ☒ Names of neighbouring Internet cafés
Survey on users of Internet cafés in Dar es Salaam	Basic characteristics of users of Internet cafés	<ul style="list-style-type: none"> ☒ Sex ☒ Age ☒ Marital status ☒ Occupation ☒ Education ☒ Knowledge of English ☒ Income ☒ Distance to Internet café ☒ Email address
	Purposes for using Internet cafés	<ul style="list-style-type: none"> ☒ Distance to Internet café ☒ Frequency of using Internet café ☒ Time spent in Internet café ☒ Purposes for using Internet cafés ☒ Use of equipment and services ☒ Use of VoIP
	Use of computers and Internet	<ul style="list-style-type: none"> ☒ Possession of computer ☒ Means of access to the Internet ☒ Purposes for using the Internet ☒ Interest in different types of Internet content
	Users' perception of the quality of service provided by Internet cafés Users' perception of the Tanzanian telecommunications, policies and other related issues	<ul style="list-style-type: none"> ☒ Improvement of ability to use computer and Internet ☒ Period of using Internet cafés ☒ View regarding quality of service of Internet café ☒ View regarding charges for surfing ☒ Proposed changes ☒ View regarding VoIP ☒ View regarding ICT ☒ View regarding relevance of ICT ☒ View regarding Tanzanian ICT ☒ View regarding involvement of government in ICT ☒ View regarding measures taken by government w.r.t. ICT ☒ Names of authorities concerned with ICT ☒ Perception of the influence of these authorities ☒ Names of official Tanzanian websites ☒ Frequency of visiting these websites ☒ Perception of impact of the Internet on Tanzanian culture ☒ View regarding Swahili websites ☒ Estimate of the number of Internet cafés in Dar es Salaam

Appendix B. Internet Exchange Points, Their Importance to Development of the Internet and Strategies for their Deployment – The African Example¹

What Is an Internet Exchange Point?

An IXP is a facility operated by a single entity to facilitate the exchange of Internet traffic between three or more ISPs. An IXP is characterized by neutrality among all user/subscriber ISPs; often, it will be administered by a non-profit ISP association.

Typically, the IXP owns and operates the switching platforms used to interconnect the various users/subscribers. That is, the IXP consists of a shared switch fabric, where users arrange peering via bilateral agreements and then establish sessions between their routers to exchange routes and traffic.

Why Do IXPs Matter?

IXPs are among the most critical elements in the infrastructure of the Internet. The Internet is a network of interconnected networks; IXPs are the points at which multiple networks interconnect. Without IXPs, there would be no Internet, as we have come to know it. In more concrete terms, IXPs generate two primary advantages for member ISPs and their customers: lower costs and improved quality of service.

✍ Cost Advantages

Currently, nearly all developing countries lack IXPs, meaning that all inter-ISP traffic (both domestic- and foreign-bound) must be exchanged through exchanges outside the country. Absent a domestic IXP, then, an ISP must send all outbound traffic through its international links, most commonly satellite and occasionally submarine fiber.

International links entail both upstream and downstream packet traffic, the costs of which must be borne by either the sending or the receiving ISP. Here, we observe a troubling imbalance: Unlike in the telephony world, where ITU-mandated rules require that the costs of international calls be shared 50/50 between telecom operators, international Internet connectivity operates according to the peering/transit dichotomy. ISPs are not subject to the ITU's cost-sharing rules; rather, connectivity costs are allocated according to bilateral contracts, which can generally be classified as either *peering* or *transit* agreements. (It should be noted that this dichotomy is a vast oversimplification: ISPs have developed a vast range of varying interconnection agreements, involving often highly sophisticated settlement regimes; however, for purposes of analyzing developing country connectivity costs and options, the basic models cover most situations.)

The distinction is significant:

A *peering* agreement is a bilateral business and technical arrangement in which two connectivity providers agree to accept traffic from one another (and from one another's customers, and their customers' customers). In a peering agreement, there is no obligation for the peer to carry traffic to third parties. There are no cash payments involved – rather, it is more like barter, with each ISP trading direct connectivity to its customers in exchange for connectivity to the ISP's customers.

¹ Information in this appendix is derived from the paper that was prepared by Andrew McLaughlin of the Berkman Center for Internet & Society at Harvard Law School in June 2002. See: www.gipiproject.org/practices/ixp.pdf

A *transit* agreement is also a bilateral business and technical arrangement, but one in which the transit provider agrees to carry traffic from the customer to third parties, and from third parties to the customer. The customer ISP is thus regarded as an end point for the traffic; the transit provider serves as a conduit to the global Internet. Generally, the transit provider will undertake to carry traffic not only to/from its other customers but to/from every destination on the Internet. Transit agreements typically involve a defined price for access to the entire Internet.

For virtually all developing country ISPs, the only option for connectivity to the global Internet is a transit agreement. That is, a given developing country ISP has such a small customer base that the international Tier-1 and Tier-2 providers have no business incentive to enter a shared-cost peering agreement with it. Instead, the developing country ISP must sign a transit agreement with its upstream provider.

The result (to oversimplify slightly) is that developing country ISPs must pay 100% of both outbound and inbound traffic; under the terms of the transit agreement, the ISP on the other end of the international link does not share the cost of exchanged traffic. This means that the developing country ISP must pay 100% of the international transit costs for all packet traffic (email, web pages, file transfers, etc.) that originates with its customers and that terminates with its customers. In other words, if the customer of a Mozambican ISP sends an email to a friend in the United States, the Mozambican ISP bears the full cost of the packets' outbound transmission over its international link. Neither the recipient's ISP nor intermediate upstream carriers bear any of the transit cost. If the friend in the United States sends an email reply back to Mozambique, the Mozambican ISP must again bear the full cost of inbound transmission over its international link.

☞ **Quality of Service Advantages**

Due to the lack of fiber optic links, most developing country ISPs use VSAT satellite circuits for international connectivity to upstream ISPs. Satellite connections introduce significant latency (delay) in the network. More problematic is the reality that, without an IXP, even domestic traffic must be exchanged internationally, entailing at least two satellite hops. (Indeed, even were hard fiber connections available, the length of transatlantic cables introduces needless (though much smaller) latency in the connection.)

Significant network latency translates into extremely slow connections for users, putting a tremendous range of Internet services out of practical reach. Local Internet enterprises find themselves at an inherent disadvantage if they attempt to serve international customers. Ironically, they find themselves at a double disadvantage in serving domestic customers, whose queries must traverse at least two satellite hops to reach them, and another two satellite hops to receive the response. Forcing local ISPs to interconnect in another country thus places a major obstacle to the development of domestic Internet-based business. Indeed, many and perhaps most developing country Internet services are hosted on servers in the United States or Europe, to eliminate at least one satellite hop out of each transaction (including domestic).

Making the problem worse, nearly every developing country is experiencing rapidly growing demand for Internet connectivity, with ISPs offering faster local connections and users requiring greater volumes and more bandwidth-intensive types of Internet services. The growth in demand places ever-increasing burdens on the transmission capabilities of ISPs, whose provisioning of bandwidth must keep pace. In many cases, ISPs use their transmission lines at 100% of capacity, resulting in dropped transmission of

packets of data, re-transmissions of dropped packets, and a resulting compounded latency for completing Internet transactions.

An IXP slashes network latency by eliminating the need for any satellite hops in the routing of domestic-bound traffic. The result is that more customers use domestic Internet services, increasing local demand for bandwidth and prompting a cycle in which ever more bandwidth is dedicated to local interconnection. Since domestic bandwidth is always cheaper than international bandwidth, the business cases for domestic Internet enterprises improve dramatically – not just for ISPs, but for online banking, e-commerce sites, online government, enterprise VPNs, content hosting, web services, etc.

Regardless of the medium, then, a closer connection will be cheaper, faster, and more efficient. Put another way, the localization of packet traffic – keeping the physical path traversed by packets as short as possible – produces measurable improvements in service cost, performance, and efficiency.

The Case of Kenya

The experience of the Kenyan ISPs in attempting to organize and launch an IXP provides a object lesson in the practical barriers that confront the deployment of IXPs in Africa.

Prior to Kenya's, there was no IXP on the African continent between Morocco and South Africa. In early 2000, the association of Kenya's competitive ISPs (i.e., those other than Telkom Kenya, the state-owned monopoly telecom), called TESPOK, undertook to organize an neutral, non-profit IXP for its members. After nearly a year of preparatory work, including the design and implementation of a capable technical operation, funding model, and legal framework, the KIXP was launched in late November 2000, located in Nairobi. Almost immediately, Telkom Kenya filed a complaint with the Communications Commission of Kenya (CCK) arguing that the KIXP violated Telkom Kenya's exclusive monopoly on the carriage of international traffic. Within two weeks, the CCK concluded that the KIXP required a license, and ordered that it be shut down as an illegal telecommunications facility.

Telkom Kenya's legal monopoly does, in fact, extend to all fixed network infrastructure, including local, national, international, and leased lines. In Kenya, ISP services are open to competition, but ISPs rely on Telkom Kenya for underlying infrastructure. In addition, Telkom Kenya has the exclusive right to operate a national backbone for purposes of carrying international traffic.

Until KIXP, all Internet traffic in Kenya was exchanged internationally. According to TESPOK, roughly 30% of upstream traffic was to a domestic destination. During the two weeks of KIXP's operation, measurements indicated that latency was reduced from an average of 1200- 2000 milliseconds (via satellite) to 60-80 milliseconds (via KIXP). Likewise, monthly bandwidth costs for a 64 kbit/s circuit dropped from US\$ 3375 to US\$200, and for a 512 kbit/s circuit from US\$9546 to US\$650.

In response to the CCK's closure order, the Kenyan ISPs argued that the KIXP was a closed user group, and therefore would be legal under the Kenyan Telecommunications Act. Also, they noted that the local exchange of domestic Internet traffic does not contravene Telkom Kenya's international monopoly, as all international traffic would continue to flow over its international links. Telkom Kenya's opposition to KIXP was fierce, fed by the fear of losing a significant portion of its international leased line revenues.

After nearly a year of intensive efforts, including public pressure, threats of litigation, and private diplomacy, TESPOK finally received the approval of CCK in the form of a license, granted in November 2001. The commission's licensing order represented a fairly dramatic turn-around in the CCK's thinking, stating: "An IXP is not an international gateway but a peering facility that enables ISPs to exchange local traffic. The Internet is expanding very fast and since Telkom Kenya has demonstrated that it has some apparently insurmountable difficulty in rolling out Internet facilities, it would be in the best interest of the market to allow other companies to offer IXP services in the country." Nevertheless, the CCK requested TESPOK to partner with Telkom Kenya, and the ISPs accordingly approached the company with a proposal to cooperate. By February 2002, however, TESPOK had received no response and elected to re-launch KIXP on their own. Since its facilities went live in mid-February, KIXP has actively interconnected 5 Kenyan ISPs, with 8 others in the process.

The Case of Bangladesh

Bangladesh presents a somewhat different angle on the same problem. Bangladesh has no IXP. A central reason, according to BTTB (Bangladesh Telegraph and Telephone Board), the state-owned monopoly telecom operator, is that the company has been unable to secure funding from the government. As a government-ordained monopoly over telecommunications infrastructure, BTTB needs regulatory approval (and budgeting) for any new services. Thus far, the case for an IXP has not been convincing, even though it would save BTTB money, lower costs for users, and improve quality of service.

The absurdity of Bangladesh's situation (and that of similarly IXP-less developing countries) can be seen in the results of a recent traceroute from one Bangladeshi ISP to another: the packets traveled from Bangladesh via satellite to Hong Kong, via satellite to the US, then to Canada, back to Hong Kong, and finally to their destination back in Bangladesh. Not surprisingly, the majority of Bangladeshi web sites are hosts in the United States.

The Successful Example of Mongolia

In contrast to the experiences of Kenya and Bangladesh, the case of Mongolia demonstrates that a combination of ISP cooperation and at least tacit support from governmental authorities can lead to the rapid and successful establishment of an IXP in a developing country.

In January 2001, a group of leading Mongolian IXPs met in Ulaanbaatar to explore the creation of a national IXP. At the time, all Mongolian ISPs were interconnected via Tier-1 and Tier-2 providers in the United States or Hong Kong. As a consequence, satellite latencies amounted to a minimum of 650 milliseconds (or over half a second) for each packet of data in each direction. Costs were needlessly high and, not surprisingly, few Mongolian Internet business services were hosted within Mongolia.

Without interference from the Mongolian government, Mongolia's three leading ISPs were able to complete planning for an independent exchange within 3 months. The Mongolian Internet Exchange (MIX) was launched in April 2001 with three ISP members. By March 2002, the MIX had six ISP members, with steadily increasing traffic between them. Today, local latency is less than 10 milliseconds per transaction (compared with a minimum of 1300 milliseconds in the pre-MIX days), and an average of 377 gigabytes of data are transferred domestically each day among MIX's members. Moreover, each domestically-exchanged transaction effectively frees up an equal amount of international bandwidth, improving connection speeds and reducing latency over Mongolia's international links.

Obstacles to IXP Deployment

The goal, then, is to enable the domestic exchange of domestic Internet traffic in developing countries. The means is the organization and deployment of neutral, local Internet exchange points. The obstacles to achieving this objective will vary from country to country, but some common themes emerge.

First, we see strong resistance by the current providers of international leased-line, submarine cable, or regulated VSAT connectivity. In most cases, this means a state-owned monopoly telecom operator. A monopoly telecom can be expected to seek monopoly rents, and leverage its legal exclusivity over international links. In addition to the fear of effective competition, the telecom will generally fail to appreciate that reducing the cost of Internet connectivity for domestic consumers will generate vastly greater investment, more users, and actually greater international leased line revenues. Indeed, a strong case can be made that greater domestic use of the Internet generates a better-connected populace in the broad sense, leading to even greater use of international direct-dial telephony to foster commercial and personal international relationships.

Second, government regulators often side with the telecom, and their alarm is understandable. The governments of developing countries are often heavily dependent on revenues from the monopoly telecom operator; facing massive budget pressures already, they are reluctant to sanction activities which might squeeze those revenues. For a variety of reasons (ranging from close personal relationships to outright corruption), the telecom's views often carry great weight with regulatory authorities. Often, statutory or other licensing requirements exist which can arguably be applied to IXPs. In most cases, the regulatory authority is, at least initially, quite unfamiliar with the technical and economic aspects of Internet facilities and ISP traffic exchange.

Third, we regularly see resistance from the competitive ISPs themselves. Those that feel secure in their market position fear the effects of making connectivity cheaper for their competitors. Moreover, an IXP essentially allows any interested domestic ISP in a developing country to peer with its domestic competitors. This requires a degree of trust among competing ISPs that is quite common in the developing world, but fairly unusual in Africa. Anecdotal experience indicates that even small competitors are reluctant to band together, reflecting an exaggerated sense of competitiveness.

How to Assist IXP Deployment

The case for IXPs is compelling, and the obstacles relatively clear and well-understood. In order to achieve wider IXP deployment in Africa (and elsewhere in the developing world), what is (1) regulatory reform and liberalization, (2) the overcoming of monopoly telecom resistance, and (3) the organization of competitive ISPs into associations capable of neutrally administering shared facilities on behalf of their members. Regulators and competitors alike need to be convinced of the overwhelming benefits of domestic Internet traffic exchange, and of the broader proposition that communication in a developing economy is not a zero-sum game – lower costs for competitors can lead to greater revenues for all, stronger investment from abroad, and lower-cost, higher-quality services for all users.

Current IXP Efforts in Africa

Currently, IXP-organizing efforts are taking place in some African countries. The Ugandan IXP is at an advanced stage of development, with technical operations under construction and the active support of the Ugandan Communications Commission, which has already granted a license.

Less advanced efforts exist in Tanzania, Mozambique, and Ghana.

A number of African ISPs, led by the South Africans and Kenyans, have launched an ISP association (AfrISPA) with the primary goals of organizing non-profit, neutral ISP associations in each African country, and supporting the deployment of IXPs wherever possible. In the longer term, AfrISPA intends to pursue the goal of direct fiber optic connectivity to every African country. The increasingly widespread use of VSAT links is troubling – through they may be cheaper in the near term than fiber optic cabling, making permanent the latency of satellite connections would permanently condemn Africa to second-class international Internet connectivity.

One interesting project under consideration by AfrISPA is the creation of a Pan African Virtual Internet Exchange (PAVIX), which would be a latticed network of interconnected IXPs, for the purpose of reducing the cost of regionally-bound traffic. The PAVIX would consist of bilateral satellite links between individual national IXPs. In a sense, it would be the first step toward a continental backbone for Africa. Compared to a national IXP, PAVIX presents an even larger and more daunting basket of legal/policy obstacles, because it would entail international, rather than purely domestic, exchange of traffic. For obvious reasons, the opposition of monopoly telecom operators would be intense. However, the cost and quality of service benefits for African connectivity would be significant.

Other Significant Legal/Policy Issues

In addition, it is worth noting a few of the other key legal and policy issues that affect the deployment of the Internet in the developing world:

- Tax treatment of Internet infrastructure equipment and services
- Telephone tariffs
 - Problem: High per-minute charges, and need for long-distance call to reach POP
 - One solution: Local call charges for Internet, regardless of distance to POP
 - * Special area code
 - * 18 countries have so far adopted
 - Even better: In Seychelles, 50% lower tariff for Internet calls.
- Liberalization of international links
 - Two-way satellite-based Internet services using very small aperture terminals (VSAT) to connect directly the US or Europe have been quickly adopted where ever regulations allow (DR Congo, Ghana, Mozambique, Nigeria, Tanzania, Uganda and Zambia)
 - Result: ISPs that are not dependent on the monopoly telecom operator for their international bandwidth.
 - Pricing: \$700-\$900 for two-way KU-band VSAT equipment providing 'better than dialup' speeds (i.e 56Kbps outgoing and 200-400Kbps incoming).

Appendix C. Glossary of ICT terms

Dial-Up connection	A Dial-Up connection refers to an Internet connection over a phone line where one must dial the phone number of an ISP. Each dial-up customer shares the ISP's bank of modems with all of the ISP's other dial-up customers, which is a more efficient use of the ISP's resources. When one customer disconnects from the ISP, the IP address temporarily assigned to that customer becomes available for the next caller. For this reason, a dial-up line is often called a switched-line or a non-dedicated line.
Integrated Services Digital Network (ISDN)	ISDN is a set of standards for digital transmission over ordinary telephone copper wire as well as over other media. In concept ISDN is the integration of both analog or voice data together with digital data over the same network.
Internet Protocol (IP)	IP is the method or protocol by which data is sent from one computer to another on the Internet. Each computer (known as a host) on the Internet has at least one IP address that uniquely identifies it from all other computers on the Internet. When data is sent or received, the message gets divided into little chunks called packets. Each of these packets contains both the sender's Internet address and the receiver's address. Any packet is sent first to a gateway computer that understands a small part of the Internet. The gateway computer reads the destination address and forwards the packet to an adjacent gateway that in turn reads the destination address and so forth across the Internet until one gateway recognizes the packet as belonging to a computer within its immediate neighbourhood or domain. That gateway then forwards the packet directly to the computer whose address is specified.
Internet Service Provider (ISP)	An ISP Internet Service Provider is a company that provides individuals and other companies access to the Internet and other related services such as website building and virtual hosting. An ISP has the equipment and the telecommunication line access required to have a point-of-presence (an access point to the Internet) on the Internet for the geographic area served.
Leased line	A leased line is a permanent connection made between 2 locations. In effect it is a telephone line that is open all of the time, but rather than paying for it by the minute and second as one would for a normal telephone or ISDN connection, a leased line is rented by the month or year.
Local Area Network (LAN)	A LAN is a group of computers and associated devices that share a common communications line and typically share the resources of a single processor or server within a small geographic area (for example, within an office building). Usually, the server has applications and data storage that are shared in common by multiple computer users. A local area network may serve as few as two or three users or many as thousands of users.
Modem	A modem modulates outgoing digital signals from a computer or other digital device to analog signals for a conventional copper twisted pair telephone line and demodulates the incoming analog signal and converts it to a digital signal for the

	digital device.
Network Access Point (NAP)	A NAP is one of several major Internet interconnection points that serve to tie all the ISPs together.
Network Service Provider (NSP)	An NSP is a company that provides backbone services to an ISP. A backbone is larger transmission line that carries data gathered from smaller lines that interconnect with it.
Router	A router is a device or, in some cases, software in a computer, that determines the next network point to which a packet (data) should be forwarded toward its destination. The router is connected to at least two networks and decides which way to send each information packet based on its current understanding of the state of the networks it is connected to.
Server	In general, a server is a computer program that provides services to other computer programs in the same or other computers.
Transmission Control Protocol (TCP)	TCP is a set of rules (protocol) used along with IP to send data in the form of message units between computers over the Internet. While IP takes care of handling the actual delivery of the data, TCP takes care of keeping track of the individual units of data (called packets) that a message is divided into for efficient routing through the Internet. TCP is known as a connection-oriented protocol, which means that a connection is established and maintained until such time as the message or messages to be exchanged by the application programs at each end have been exchanged. TCP is responsible for ensuring that a message is divided into the packets that IP manages and for reassembling the packets back into the complete message at the other end.
Very Small Aperture Terminals (VSAT)	VSAT is a satellite communications system that serves home and business users. A VSAT end user needs a box that interfaces between the user's computer and an outside antenna with a transceiver. The transceiver receives or sends a signal to a satellite transponder in the sky. The satellite sends and receives signals from an earth station computer that acts as a hub for the system. Each end user is interconnected with the hub station via the satellite in a star topology. For one end user to communicate with another, each transmission has to first go to the hub station which retransmits it via the satellite to the other end user's VSAT. VSAT handles data, voice, and video signals.
Voice over IP (VoIP)	VoIP is a for a set of facilities for managing the delivery of voice information using IP. In general, this means sending voice information in digital form in discrete packets rather than in the traditional circuit. A major advantage of VoIP is that it avoids the tolls charged by ordinary telephone service.
Wireless Local Loop (WLL)	In a telephone network, a WLL is a generic term for an access system that uses a wireless link to connect subscribers to their local exchange in place of conventional copper cable. Using a wireless link shortens the construction period and also reduces installation and operating costs.
World Wide Web (WWW)	The technical definition of the World Wide Web is all the resources and users on the Internet that are using the Hypertext Transfer Protocol (HTTP). HTTP is the set of rules for exchanging files like text, graphic images, sound, video, and other multimedia files.

Appendix D. Results of survey on administrators

Basic characteristics of administrators

Sex					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	24	53.3	54.5	54.5
	Female	20	44.4	45.5	100.0
	Total	44	97.8	100.0	
Missing	99.00	1	2.2		
Total		45	100.0		

Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20	2	4.4	4.7	4.7
	21	4	8.9	9.3	14.0
	22	1	2.2	2.3	16.3
	23	3	6.7	7.0	23.3
	24	4	8.9	9.3	32.6
	25	5	11.1	11.6	44.2
	26	6	13.3	14.0	58.1
	27	4	8.9	9.3	67.4
	28	5	11.1	11.6	79.1
	29	1	2.2	2.3	81.4
	32	1	2.2	2.3	83.7
	34	1	2.2	2.3	86.0
	38	2	4.4	4.7	90.7
	42	1	2.2	2.3	93.0
	45	1	2.2	2.3	95.3
47	1	2.2	2.3	97.7	
52	1	2.2	2.3	100.0	
Total		43	95.6	100.0	
Missing	99.00	2	4.4		
Total		45	100.0		

Marital status					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	single	26	57.8	59.1	59.1
	married	17	37.8	38.6	97.7
	living together	1	2.2	2.3	100.0
	Total	44	97.8	100.0	
Missing	99.00	1	2.2		
Total		45	100.0		

Occupation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	student	2	4.4	4.5	4.5
	salaried worker	23	51.1	52.3	56.8
	self employed	14	31.1	31.8	88.6
Missing	99.00	1	2.2		
Total		45	100.0		

Valid	professional	2	4.4	4.5	93.2
	merchant/ business	1	2.2	2.3	95.5
	unemployed	1	2.2	2.3	97.7
	Computer programmer	1	2.2	2.3	100.0
Total		44	97.8	100.0	
Missing	99.00	1	2.2		
Total		45	100.0		

Level of Education						
		Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	primary education	2	4.4	4.5	4.5	
	ordinal level	7	15.6	15.9	20.5	
	advanced level	3	6.7	6.8	27.3	
	technical ordinary level	2	4.4	4.5	31.8	
	technical colleges	5	11.1	11.4	43.2	
	advanced diploma level	10	22.2	22.7	65.9	
	vocational training	12	26.7	27.3	93.2	
	university bachelor	3	6.7	6.8	100.0	
	Total		44	97.8	100.0	
	Missing	99.00	1	2.2		
Total		45	100.0			

Knowledge of Language: Kiswahili					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Kiswahili	44	97.8	100.0	100.0
Missing	99.00	1	2.2		
Total		45	100.0		

Knowledge of Language: English					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	English	43	95.6	100.0	100.0
Missing	99.00	2	4.4		
Total		45	100.0		

knowledge of English					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	1	2.2	2.3	2.3
	poor	2	4.4	4.7	7.0
	moderate	9	20.0	20.9	27.9
	Good	18	40.0	41.9	69.8
	very good	13	28.9	30.2	100.0
Missing	99.00	1	2.2		
Total		45	100.0		

	Total	43	95.6	100.0
Missing	99.00	2	4.4	
Total		45	100.0	

Income per month					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 10,000	1	2.2	2.3	2.3
	Between 10,000 and 40,000	8	17.8	18.6	20.9
	Between 40,000 and 100,000	24	53.3	55.8	76.7
	between 100,000 and 200,000	2	4.4	4.7	81.4
	between 400,000 and 600,000	5	11.1	11.6	93.0
	between 600,000 and 1,000,000	1	2.2	2.3	95.3
	between 1 and 2	2	4.4	4.7	100.0
Missing	99.00				
Total		45	100.0		

	million			
	Total	43	95.6	100.0
Missing	99.00	2	4.4	
Total		45	100.0	

Position					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	owner/Manager	14	31.1	31.8	31.8
	system administrator	9	20.0	20.5	52.3
	employee	21	46.7	47.7	100.0
	Total	44	97.8	100.0	
Missing	99.00				
Total		45	100.0		

General information about Internet cafés

How long has the café been opened?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 6 months	10	22.2	22.7	22.7
	6 months to a year	15	33.3	34.1	56.8
	1 to 2 years	10	22.2	22.7	79.5
	2 to 4 year	9	20.0	20.5	100.0
	Total	44	97.8	100.0	
Missing	99.00	1	2.2		
Total		45	100.0		

	don't know	3	6.7	7.5	97.5
	Celeron	1	2.2	2.5	100.0
	Total	40	88.9	100.0	
Missing	99.00	5	11.1		
Total		45	100.0		

Number of operating computers					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 5	4	8.9	9.1	9.1
	6 -10	30	66.7	68.2	77.3
	11 - 15	7	15.6	15.9	93.2
	16 - 20	3	6.7	6.8	100.0
	Total	44	97.8	100.0	
Missing	99.00	1	2.2		
Total		45	100.0		

Number of computers connected to Internet					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 5	6	13.3	14.0	14.0
	6-10	28	62.2	65.1	79.1
	11 - 15	6	13.3	14.0	93.0
	16 - 20	3	6.7	7.0	100.0
	Total	43	95.6	100.0	
Missing	99.00	2	4.4		
Total		45	100.0		

Type of computers					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	486 and lower	1	2.2	2.5	2.5
	Pentium/MMX/Pro	6	13.3	15.0	17.5
	Pentium II	14	31.1	35.0	52.5
	Pentium III and higher	15	33.3	37.5	90.0
Missing	99.00				
Total		45	100.0		

Type of Internet access					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Wireless local loop	34	75.6	79.1	79.1
	Dial up connection	5	11.1	11.6	90.7
	Leased lines	4	8.9	9.3	100.0
	Total	43	95.6	100.0	
Missing	99.00	2	4.4		
Total		45	100.0		

Basic economic situation of Internet cafés

Charges for Internet access per month

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 - 30 US\$	1	2.2	3.6
	30 - 100 US\$	1	2.2	3.6
	100 - 200 US\$	2	4.4	7.1
	200 - 500 US\$	21	46.7	75.0
	500 - 1000 US\$	2	4.4	7.1
	2000 US\$ or more	1	2.2	3.6
	Total	28	62.2	100.0
Missing	99.00	17	37.8	
Total	45	100.0		

Estimate number of users per week

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 30	6	13.3	14.0
	30 to 60	3	6.7	7.0
	60 to 100	6	13.3	14.0
	100 to 150	3	6.7	7.0
	150 to 200	10	22.2	23.3
	200 to 300	4	8.9	9.3
	300 to 400	4	8.9	9.3
	more than 400	7	15.6	16.3
	Total	43	95.6	100.0
Missing	99.00	2	4.4	
Total	45	100.0		

How much do you charge in TSH per hour

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	500.00	29	64.4	80.6
	600.00	1	2.2	2.8
	700.00	2	4.4	5.6
	800.00	2	4.4	5.6
	1000.00	2	4.4	5.6
	Total	36	80.0	100.0
Missing	99.00	9	20.0	
Total	45	100.0		

Main source of income for the café

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Equipment rental	3	6.7	6.7
	Computer and Internet use	41	91.1	97.8
	Bureau de	1	2.2	2.2
Missing	99.00			
Total	45	100.0		

change		Frequency	Percent	Valid Percent	Cumulative Percent
Total		45	100.0	100.0	

Secondary source of income: Equipment rental

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Equipment rental	1	2.2	100.0
	Missing	99.00	44	97.8
Total	45	100.0		

Secondary source of income: Computers and internet use

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Computer and Internet use	1	2.2	100.0
	Missing	99.00	44	97.8
Total	45	100.0		

Secondary source of income: Internet telephony

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Internet telephony	2	4.4	100.0
	Missing	99.00	43	95.6
Total	45	100.0		

Secondary source of income: Training and courses

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Training and courses	3	6.7	100.0
	Missing	99.00	42	93.3
Total	45	100.0		

Secondary source of income: Drinks and snacks

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Drinks and snacks	5	11.1	100.0
	Missing	99.00	40	88.9
Total	45	100.0		

Secondary source of income: other

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Secretarial	1	2.2	50.0
	mobile telephone	1	2.2	50.0
	Total	2	4.4	100.0
Missing	99.00	43	95.6	
Total	45	100.0		

Purposes for using Internet cafés

Equipment provided: Telephone					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Telephone	14	31.1	100.0	100.0
Missing	99.00	31	68.9		
Total		45	100.0		

Equipment provided: Fax					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fax	15	33.3	100.0	100.0
Missing	99.00	30	66.7		
Total		45	100.0		

Equipment provided: Photocopier					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Photocopier	19	42.2	100.0	100.0
Missing	99.00	26	57.8		
Total		45	100.0		

Equipment provided: Computer					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Computer	45	100.0	100.0	100.0
Total		45	100.0		

Equipment provided: Printer					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Printer	41	91.1	100.0	100.0
Missing	99.00	4	8.9		
Total		45	100.0		

Equipment provided: Scanner					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Scanner	28	62.2	100.0	100.0
Missing	99.00	17	37.8		
Total		45	100.0		

Equipment provided: Renting Equipment					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Renting Equipment	4	8.9	100.0	100.0
Missing	99.00	41	91.1		
Total		45	100.0		

Services provided: Webpage design					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Webpage Design	6	13.3	100.0	100.0
Missing	99.00	39	86.7		
Total		45	100.0		

Services provided: Application and software					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Application and software	33	73.3	100.0	100.0
Missing	99.00	12	26.7		
Total		45	100.0		

Services provided: E-mail					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	E-mail	43	95.6	100.0	100.0
Missing	99.00	2	4.4		
Total		45	100.0		

Services provided: Surfing on the Internet					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Surfing the internet	44	97.8	100.0	100.0
Missing	99.00	1	2.2		
Total		45	100.0		

Services provided: Internet games					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	internet games	33	73.3	100.0	100.0
Missing	99.00	12	26.7		
Total		45	100.0		

Services provided: Chat					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	chat	42	93.3	100.0	100.0
Missing	99.00	3	6.7		
Total		45	100.0		

Courses provided: Computer, Internet or applications					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Computer, internet or application	7	15.6	100.0	100.0
Missing	99.00	38	84.4		
Total		45	100.0		

Courses provided: Commercial courses					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	commercial courses	2	4.4	100.0	100.0
Missing	99.00	43	95.6		
Total		45	100.0		

Other services provided: no 1					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Drinks	2	4.4	100.0	100.0
Total		2	4.4		

Missing	99.00	43	95.6		
Total		45	100.0		

Purposes café used for: study related assignments

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	study related assignment	37	82.2	100.0	100.0
Missing	99.00	8	17.8		
Total		45	100.0		

Purposes café used for: keep in touch with friends/family

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Keep in touch with friends	43	95.6	100.0	100.0
Missing	99.00	2	4.4		
Total		45	100.0		

Purposes café used for: matters related to personal business

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Matters related to personal business	37	82.2	100.0	100.0
Missing	99.00	8	17.8		
Total		45	100.0		

Purposes café used for: Government issues

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Government issues	8	17.8	100.0	100.0
Missing	99.00	37	82.2		
Total		45	100.0		

Purposes café used for: Banking matters

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Banking matters	4	8.9	100.0	100.0
Missing	99.00	41	91.1		
Total		45	100.0		

Purposes café used for: Literary/Artistic work

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Literary/Artistic work	6	13.3	100.0	100.0
Missing	99.00	39	86.7		
Total		45	100.0		

Purposes café used for: Job search

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	job search	29	64.4	100.0	100.0
Missing	99.00	16	35.6		
Total		45	100.0		

Purposes café used for: buying/identify products via

Internet

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Buying/identify products via internet	29	64.4	100.0	100.0
Missing	99.00	16	35.6		
Total		45	100.0		

Purposes café used for: Learn computers and Internet use

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	learn computers and internet use	10	22.2	100.0	100.0
Missing	99.00	35	77.8		
Total		45	100.0		

Purposes café used for: commercial learning

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	commercial learning	5	11.1	100.0	100.0
Missing	99.00	40	88.9		
Total		45	100.0		

Purposes café used for: music

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	music	29	64.4	100.0	100.0
Missing	99.00	16	35.6		
Total		45	100.0		

Purposes café used for: computers games

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	computer games	34	75.6	100.0	100.0
Missing	99.00	11	24.4		
Total		45	100.0		

Purposes café used for: chat

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	chat	43	95.6	100.0	100.0
Missing	99.00	2	4.4		
Total		45	100.0		

Purposes café used for: pornography

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	pornography	32	71.1	100.0	100.0
Missing	99.00	13	28.9		
Total		45	100.0		

Use of Internet telephony in the café

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	9	20.0	20.0	20.0
	no	36	80.0	80.0	100.0
	Total	45	100.0	100.0	

Frequency of use of Internet telephony per day					
	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	1- 2 times	8	17.8	72.7	72.7
	2- 5 times	1	2.2	9.1	81.8
	10-15 times	1	2.2	9.1	90.9
	15- 25 times	1	2.2	9.1	100.0
	Total	11	24.4	100.0	
Missing	99.00	34	75.6		
Total		45	100.0		

Awareness of illegality of Internet telephony					
	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	yes	35	77.8	77.8	77.8
	no	10	22.2	22.2	100.0
	Total	45	100.0	100.0	
Advocate of legalizing Internet telephony					
	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	yes	38	84.4	84.4	84.4
	no	7	15.6	15.6	100.0
	Total	45	100.0	100.0	

Administrators' perception of the quality of service provided by ISPs

Satisfaction with the Internet speed					
	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	very satisfied	4	8.9	8.9	8.9
	satisfied	23	51.1	51.1	60.0
	somewhat	13	28.9	28.9	88.9
	unsatisfied	2	4.4	4.4	93.3
	very unsatisfied	3	6.7	6.7	100.0
	Total	45	100.0	100.0	
Missing	99.00				
Total		45	100.0		

Satisfaction with the charges					
	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	very satisfied	2	4.4	6.5	6.5
	satisfied	7	15.6	22.6	29.0
	somewhat	8	17.8	25.8	54.8
	unsatisfied	9	20.0	29.0	83.9
	very unsatisfied	5	11.1	16.1	100.0
	Total	31	68.9	100.0	
Missing	99.00	14	31.1		
Total		45	100.0		

Internet Service Provider (ISP)				
	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	University computing Centre	7	15.6	15.6	15.6
	Raha.com	6	13.3	13.3	28.9
	Wilken	2	4.4	4.4	33.3
	Cat-Net	11	24.4	24.4	57.8
	InternetAfrica	4	8.9	8.9	66.7
	Simbanet	3	6.7	6.7	73.3
	Cyber twiga	2	4.4	4.4	77.8
	TTCL	4	8.9	8.9	86.7
	Costech	1	2.2	2.2	88.9
	Africaonline	2	4.4	4.4	93.3
	SIMNET	1	2.2	2.2	95.6
	Newafrica	2	4.4	4.4	100.0
	Total	45	100.0	100.0	

Satisfaction with ISP					
	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	very satisfied	7	15.6	15.6	15.6
	satisfied	23	51.1	51.1	66.7
	somewhat	8	17.8	17.8	84.4
	unsatisfied	2	4.4	4.4	88.9
	very unsatisfied	5	11.1	11.1	100.0
	Total	45	100.0	100.0	

Administrators' perception of the Tanzanian ICT, policies and related issues

ICT is important for socio-economic development					
	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	somewhat	3	6.7	6.7	6.7
	agree	22	48.9	48.9	55.6
	strongly agree	20	44.4	44.4	100.0
	Total	45	100.0	100.0	

Area could be improved by use of ICT: Agriculture				
	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Agriculture	18	40.0	100.0	100.0
Missing	99.00	27	60.0		
Total		45	100.0		

Area could be improved by use of ICT: Education					
	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	Education	41	91.1	100.0	100.0
Missing	99.00	4	8.9		
Total		45	100.0		

Area could be improved by use of ICT: Industry					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Industry	23	51.1	100.0	100.0
Missing	99.00	22	48.9		
Total		45	100.0		

Area could be improved by use of ICT: Healthcare					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Healthcare	32	71.1	100.0	100.0
Missing	99.00	13	28.9		
Total		45	100.0		

Area could be improved by use of ICT: Tourism					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Tourism	20	44.4	100.0	100.0
Missing	99.00	25	55.6		
Total		45	100.0		

Area could be improved by use of ICT: Business/Services					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Business/Services	33	73.3	100.0	100.0
Missing	99.00	12	26.7		
Total		45	100.0		

Area could be improved by use of ICT: Transport and communication					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Transport and communication	23	51.1	100.0	100.0
Missing	99.00	22	48.9		
Total		45	100.0		

Area that should get first priority					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agriculture	1	2.2	2.3	2.3
	Education	32	71.1	72.7	75.0
	Industry	1	2.2	2.3	77.3
	Healthcare	4	8.9	9.1	86.4
	Business/Services	5	11.1	11.4	97.7
	Transport and communication	1	2.2	2.3	100.0
	Total	44	97.8	100.0	
	Missing	99.00	1	2.2	
Total		45	100.0		

Area that should get second priority					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agriculture	3	6.7	6.7	6.7
	Education	6	13.3	13.3	20.0
	Industry	7	15.6	15.6	35.6
	Healthcare	8	17.8	17.8	53.3

Tourism	5	11.1	11.1	64.4
Business/Services	8	17.8	17.8	82.2
Transport and communication	8	17.8	17.8	100.0
Total	45	100.0	100.0	

Area that should get third priority					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agriculture	4	8.9	9.3	9.3
	Education	4	8.9	9.3	18.6
	Industry	4	8.9	9.3	27.9
	Healthcare	9	20.0	20.9	48.8
	Tourism	4	8.9	9.3	58.1
	Business/Services	14	31.1	32.6	90.7
	Transport and communication	4	8.9	9.3	100.0
	Total	43	95.6	100.0	
Missing	99.00	2	4.4		
Total		45	100.0		

Quality of Tanzania ICT infrastructure					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	3	6.7	6.8	6.8
	poor	6	13.3	13.6	20.5
	moderate	12	26.7	27.3	47.7
	good	20	44.4	45.5	93.2
	very good	3	6.7	6.8	100.0
	Total	44	97.8	100.0	
Missing	99.00	1	2.2		
Total		45	100.0		

Does government have clear vision on ICT?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly no	2	4.4	4.5	4.5
	no	7	15.6	15.9	20.5
	somehow	18	40.0	40.9	61.4
	yes	15	33.3	34.1	95.5
	strongly yes	2	4.4	4.5	100.0
	Total	44	97.8	100.0	
Missing	99.00	1	2.2		
Total		45	100.0		

Do measures taken by government encourage ICT development?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly no	2	4.4	4.4	4.4
	no	5	11.1	11.1	15.6
	somehow	23	51.1	51.1	66.7
	yes	13	28.9	28.9	95.6
	strongly yes	2	4.4	4.4	100.0
	Total	45	100.0	100.0	

Can you name Authorities that are concerned with ICT					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	25	55.6	59.5	59.5
	Yes	17	37.8	40.5	100.0
	Total	42	93.3	100.0	
Missing	99.00	3	6.7		
Total		45	100.0		

Authorities that are concerned with ICT: Tanzania Communication commission					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Tanzania Communication Commission	3	6.7	100.0	100.0
Missing	99.00	42	93.3		
Total		45	100.0		

Influence of these authorities on ICT development					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly negative	2	4.4	9.5	9.5
	Negative	2	4.4	9.5	19.0
	somewhat	10	22.2	47.6	66.7
	positive	6	13.3	28.6	95.2
	strongly positive	1	2.2	4.8	100.0
	Total		21	46.7	100.0
Missing	99.00	24	53.3		
Total		45	100.0		

Can you name some official Tanzanian national websites?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	11	24.4	28.2	28.2
	Yes	28	62.2	71.8	100.0
	Total	39	86.7	100.0	
Missing	99.00	6	13.3		
Total		45	100.0		

Names of official Tanzania Website: Tanzania.go.tz					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	tanzania.go.tz	29	64.4	100.0	100.0
Missing	99.00	16	35.6		
Total		45	100.0		

How often do you visit these websites?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	frequently	6	13.3	19.4	19.4
	occasionally	13	28.9	41.9	61.3
	never	12	26.7	38.7	100.0
	Total	31	68.9	100.0	
Missing	99.00	14	31.1		
Total		45	100.0		

Perception of the impact of the internet on Tanzanian culture					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	negative	2	4.4	4.4	4.4
	somewhat	9	20.0	20.0	24.4
	positive	19	42.2	42.2	66.7
	strongly positive	15	33.3	33.3	100.0
	Total		45	100.0	100.0

Do you think more Swahili website should be designed?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly no	1	2.2	2.2	2.2
	no	6	13.3	13.3	15.6
	somehow	10	22.2	22.2	37.8
	yes	13	28.9	28.9	66.7
	strongly yes	15	33.3	33.3	100.0
	Total		45	100.0	100.0

License to operate the Internet café					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	45	100.0	100.0	100.0

Appendix E. Results of survey on users of Internet cafés

Basic characteristics of users

Sex					
	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	male	218	63.0	63.2	63.2
	female	127	36.7	36.8	100.0
	Total	345	99.7	100.0	
Missing	99.00	1	3		
Total		346	100.0		

age					
	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	15	1	.3	.3	.3
	16	10	2.9	2.9	3.2
	17	17	4.9	4.9	8.1
	18	26	7.5	7.6	15.7
	19	25	7.2	7.3	23.0
	20	40	11.6	11.6	34.6
	21	16	4.6	4.7	39.2
	22	17	4.9	4.9	44.2
	23	19	5.5	5.5	49.7
	24	20	5.8	5.8	55.5
	25	19	5.5	5.5	61.0
	26	19	5.5	5.5	66.6
	27	11	3.2	3.2	69.8
	28	5	1.4	1.5	71.2
	29	3	.9	.9	72.1
	30	41	11.8	11.9	84.0
	31	7	2.0	2.0	86.0
	32	9	2.6	2.6	88.7
	33	4	1.2	1.2	89.8
	34	3	.9	.9	90.7
	35	7	2.0	2.0	92.7
	38	1	.3	.3	93.0
	40	14	4.0	4.1	97.1
	41	1	.3	.3	97.4
	42	2	.6	.6	98.0
	44	1	.3	.3	98.3
	45	3	.9	.9	99.1
49	1	.3	.3	99.4	
50	1	.3	.3	99.7	
55	1	.3	.3	100.0	
Total	344	99.4	100.0		
Missing	99	2	.6		
Total		346	100.0		

marital status				
	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	single	221	63.9	67.0	67.0
	married	101	29.2	30.6	97.6
	living together	8	2.3	2.4	100.0
	Total	330	95.4	100.0	
Missing	99.00	16	4.6		
Total		346	100.0		

Occupation					
	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	student	153	44.2	44.5	44.5
	salaried worker	11	3.2	3.2	47.7
	teacher	15	4.3	4.4	52.0
	public employee	41	11.8	11.9	64.0
	Retired	2	.6	.6	64.5
	professional	27	7.8	7.8	72.4
	part-time job	6	1.7	1.7	74.1
	merchant/ business	21	6.1	6.1	80.2
	unemployed	44	12.7	12.8	93.0
	house work	3	.9	.9	93.9
	housework(for others)	18	5.2	5.2	99.1
	self-employed	3	.9	.9	100.0
	Total	344	99.4	100.0	
	Missing	99.00	2	.6	
Total		346	100.0		

Level of education					
	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	none	1	.3	.3	.3
	primary	25	7.2	7.3	7.6
	ordinal level	104	30.1	30.2	37.8
	Advanced level	70	20.2	20.3	58.1
	Tech ordinary level	4	1.2	1.2	59.3
	Technical colleges	17	4.9	4.9	64.2
	advanced diploma level	39	11.3	11.3	75.6
	vocational training	29	8.4	8.4	84.0
	post primary training	1	.3	.3	84.3
	university Bachelor	44	12.7	12.8	97.1
	postgraduate	10	2.9	2.9	100.0
Total	344	99.4	100.0		
Missing	99.00	2	.6		
Total		346	100.0		

Knowledge of language: Kiswahili					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Kiswahili	339	98.0	100.0	100.0
Missing	99.00	7	2.0		
Total		346	100.0		

Knowledge of language: English					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	English	335	96.8	100.0	100.0
Missing	99.00	11	3.2		
Total		346	100.0		

knowledge of English					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	4	1.2	1.2	1.2
	poor	13	3.8	3.8	4.9
	moderate	136	39.3	39.4	44.3
	good	132	38.2	38.3	82.6
	very good	60	17.3	17.4	100.0
	Total	345	99.7	100.0	
Missing	99.00	1	.3		

Total	346	100.0		
-------	-----	-------	--	--

Income per month (in TSH)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 2000	27	7.8	8.0	8.0
	Between 2,000 and 5,000	20	5.8	5.9	13.9
	Between 5,000 and 10,000	20	5.8	5.9	19.9
	between 10,000 and 20,000	24	6.9	7.1	27.0
	between 20,000 and 40,000	65	18.8	19.3	46.3
	between 40,000 and 100,000	73	21.1	21.7	68.0
	between 100,000 and 200,000	41	11.8	12.2	80.1
	between 200,000 and 400,000	34	9.8	10.1	90.2
	between 400,000 and 600,000	23	6.6	6.8	97.0
	between 600,000 and 1 million	10	2.9	3.0	100.0
Total	337	97.4	100.0		
Missing	99.00	9	2.6		
Total		346	100.0		

Purposes for using Internet cafés

Distance to reach the Internet café					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 1 km	209	60.4	60.8	60.8
	1 to 5 km	106	30.6	30.8	91.6
	5 to 10 km	25	7.2	7.3	98.8
	More than 10 km	4	1.2	1.2	100.0
	Total	344	99.4	100.0	
Missing	99.00	2	.6		
Total		346	100.0		

times a month					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than twice a year	1	.3	.3	100.0
	Total	345	99.7	100.0	
	Missing	99.00	1	.3	
Total		346	100.0		

Frequency of use Internet café					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4 or more days a week	101	29.2	29.3	29.3
	2 or 3 days a week	132	38.2	38.3	67.5
	1 day a week	104	30.1	30.1	97.7
	1 to 3	7	2.0	2.0	99.7

How long do you spend in the café?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 1 hour	158	45.7	46.2	46.2
	1 to 2 hours	163	47.1	47.7	93.9
	2 to 4 hours	15	4.3	4.4	98.2
	4 to 6 hours	4	1.2	1.2	99.4
	6 to 8 hours	2	.6	.6	100.0
	Total	342	98.8	100.0	
Missing	99.00	4	1.2		
Total		346	100.0		

Purpose for using Internet café: Main Use					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	study related assignment	18	5.2	5.3	5.3
	Keep in touch with friends/family	306	88.4	90.3	95.6
	Employment related matters	1	.3	.3	95.9
	matters related to personal business	2	.6	.6	96.5
	Government issues	1	.3	.3	96.8
	Banking matters	1	.3	.3	97.1
	job search	1	.3	.3	97.3
	Buy/identify products via internet	1	.3	.3	97.6
	Learn computers and internet use	2	.6	.6	98.2
	Academic learning (math, language)	1	.3	.3	98.5
	Chat	3	.9	.9	99.4
	Pornography	1	.3	.3	99.7
	News	1	.3	.3	100.0
Total	339	98.0	100.0		
Missing	99.00	7	2.0		
Total		346	100.0		

Secondary Use: study related assignments					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	study related assignment	59	17.1	100.0	100.0
Missing	99.00	287	82.9		
Total		346	100.0		

Secondary Use: keep in touch with friends/family					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Keep in touch with friends/family	23	6.6	100.0	100.0
Missing	99.00	323	93.4		
Total		346	100.0		

Secondary Use: employment related matters					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Work	50	14.5	100.0	100.0

		Frequency	Percent	Valid Percent	Cumulative Percent
Missing	related matters	296	85.5		
Total		346	100.0		

Secondary Use: matters related to personal business					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	matters related to personal business	106	30.6	100.0	100.0
Missing	99.00	240	69.4		
Total		346	100.0		

Secondary Use: government issues					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Government issues	111	32.1	100.0	100.0
Missing	99.00	235	67.9		
Total		346	100.0		

Secondary Use: banking matters					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Banking matters	7	2.0	100.0	100.0
Missing	99.00	339	98.0		
Total		346	100.0		

Secondary Use: literary/artistic work					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Literary/artistic work	9	2.6	100.0	100.0
Missing	99.00	337	97.4		
Total		346	100.0		

Secondary Use: job search					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	job search	31	9.0	100.0	100.0
Missing	99.00	315	91.0		
Total		346	100.0		

Secondary Use: buy/identify product via Internet use					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Buy/identify products via internet	20	5.8	100.0	100.0
Missing	99.00	326	94.2		
Total		346	100.0		

Secondary Use: learn computers and Internet use					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Learn computers and internet use	71	20.5	100.0	100.0
Missing	99.00	275	79.5		
Total		346	100.0		

Secondary Use: commercial learning					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Commercial learning(management, secretary, accounting)	12	3.5	100.0	100.0
Missing	99.00	334	96.5		
Total		346	100.0		

Secondary Use: academic learning					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Academic learning (math, language)	25	7.2	100.0	100.0
Missing	99.00	321	92.8		
Total		346	100.0		

Secondary Use: music					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	music	155	44.8	100.0	100.0
Missing	99.00	191	55.2		
Total		346	100.0		

Secondary Use: computer games					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	computer games	116	33.5	100.0	100.0
Missing	99.00	230	66.5		
Total		346	100.0		

Secondary Use: chat					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Chat	199	57.5	100.0	100.0
Missing	99.00	147	42.5		
Total		346	100.0		

Secondary Use: pornography					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Pornography	77	22.3	100.0	100.0

Missing	99.00	269	77.7		
Total		346	100.0		

Equipment Used: Telephone					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Frequently	13	3.8	3.8	3.8
	Occasionally	61	17.6	17.8	21.6
	Never	268	77.5	78.4	100.0
	Total	342	98.8	100.0	
Missing	99.00	4	1.2		
Total		346	100.0		

Equipment Used: Fax					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Frequently	1	.3	.3	.3
	Occasionally	30	8.7	8.8	9.1
	Never	308	89.0	90.9	100.0
	Total	339	98.0	100.0	
Missing	99.00	7	2.0		
Total		346	100.0		

Equipment Used: Photocopier					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Frequently	22	6.4	6.5	6.5
	Occasionally	121	35.0	35.9	42.4
	Never	194	56.1	57.6	100.0
	Total	337	97.4	100.0	
Missing	99.00	9	2.6		
Total		346	100.0		

Equipment Used: Computer					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Frequently	239	69.1	69.9	69.9
	Occasionally	90	26.0	26.3	96.2
	Never	13	3.8	3.8	100.0
	Total	342	98.8	100.0	
Missing	99.00	4	1.2		
Total		346	100.0		

Equipment Used: Printer					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Frequently	17	4.9	5.0	5.0
	Occasionally	108	31.2	31.7	36.7
	Never	216	62.4	63.3	100.0
	Total	341	98.6	100.0	
Missing	99.00	5	1.4		
Total		346	100.0		

Equipment Used: Scanner					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Frequently	7	2.0	2.1	2.1
	Occasionally	52	15.0	15.3	17.4
	Never	280	80.9	82.6	100.0
	Total	339	98.0	100.0	
Missing	99.00	7	2.0		
Total		346	100.0		

Equipment Used: Renting Equipment					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Frequently	2	.6	.6	.6
	Occasionally	2	.6	.6	1.2
	Never	328	94.8	98.8	100.0
	Total	332	96.0	100.0	
Missing	99.00	14	4.0		
Total		346	100.0		

Priority of equipment used: First					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Telephone	3	.9	.9	.9
	Photocopier	12	3.5	3.7	4.7
	Computer	304	87.9	94.7	99.4
	Printer	2	.6	.6	100.0
	Total	321	92.8	100.0	
Missing	99.00	25	7.2		
Total		346	100.0		

Priority of equipment used: Second					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Telephone	26	7.5	14.5	14.5
	Fax	9	2.6	5.0	19.6
	Photocopier	79	22.8	44.1	63.7
	Computer	12	3.5	6.7	70.4
	Printer	50	14.5	27.9	98.3
	Scanner	3	.9	1.7	100.0
	Total	179	51.7	100.0	
Missing	99.00	167	48.3		
Total		346	100.0		

Priority of equipment used: Third					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Telephone	17	4.9	15.3	15.3
	Fax	5	1.4	4.5	19.8
	Photocopier	32	9.2	28.8	48.6
	Printer	42	12.1	37.8	86.5

	Scanner	15	4.3	13.5	100.0
	Total	111	32.1	100.0	
Missing	99.00	235	67.9		
Total		346	100.0		

Computer use and/or Internet for: webpage design					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Frequently	7	2.0	2.1	2.1
	Occasionally	14	4.0	4.2	6.3
	Never	311	89.9	93.7	100.0
	Total	332	96.0	100.0	
Missing	99.00	14	4.0		
Total		346	100.0		

Computer use and/or Internet for: Application and software					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Frequently	29	8.4	8.6	8.6
	Occasionally	63	18.2	18.6	27.2
	Never	246	71.1	72.8	100.0
	Total	338	97.7	100.0	
Missing	99.00	8	2.3		
Total		346	100.0		

Computer use and/or Internet for: Email					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Frequently	339	98.0	98.5	98.5
	Occasionally	3	.9	.9	99.4
	Never	2	.6	.6	100.0
	Total	344	99.4	100.0	
Missing	99.00	2	.6		
Total		346	100.0		

Computer use and/or Internet for: Surfing on the Internet					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Frequently	245	70.8	71.4	71.4
	Occasionally	52	15.0	15.2	86.6
	Never	46	13.3	13.4	100.0
	Total	343	99.1	100.0	
Missing	99.00	3	.9		
Total		346	100.0		

Computer use and/or Internet for: Internet games					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Frequently	102	29.5	31.3	31.3
	Occasionally	31	9.0	9.5	40.8
	Never	193	55.8	59.2	100.0
	Total	326	94.2	100.0	

Missing	99.00	20	5.8		
Total		346	100.0		

Computer use and/or Internet for: Chat

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Frequently	187	54.0	55.3	55.3
	Occasionally	35	10.1	10.4	65.7
	Never	116	33.5	34.3	100.0
	Total	338	97.7	100.0	
Missing	99.00	8	2.3		
Total		346	100.0		

Priority of computer/Internet use: First

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Webpage design	1	.3	.3	.3
	Applications and software	3	.9	.9	1.2
	E-mail	314	90.8	94.9	96.1
	Surfing on the Internet	10	2.9	3.0	99.1
	Chat	3	.9	.9	100.0
	Total	331	95.7	100.0	
Missing	99.00	15	4.3		
Total		346	100.0		

Priority of computer/Internet use: Second

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Webpage design	1	.3	.3	.3
	Applications and software	11	3.2	3.6	3.9
	E-mail	10	2.9	3.2	7.1
	Surfing on the Internet	209	60.4	67.9	75.0
	Internet games	35	10.1	11.4	86.4
	Chat	42	12.1	13.6	100.0
	Total	308	89.0	100.0	
Missing	99.00	38	11.0		
Total		346	100.0		

Priority of computer/Internet use: Third

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Webpage design	3	.9	1.3	1.3
	Applications and software	22	6.4	9.2	10.4
	E-mail	9	2.6	3.8	14.2
Missing	99.00				
Total					

	Surfing on the Internet	32	9.2	13.3	27.5
	Internet games	29	8.4	12.1	39.6
	Chat	145	41.9	60.4	100.0
	Total	240	69.4	100.0	
Missing	99.00	106	30.6		
Total		346	100.0		

Courses offered by the café: computer, internet or application

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Frequently	25	7.2	7.4	7.4
	Occasionally	40	11.6	11.8	19.1
	Never	275	79.5	80.9	100.0
	Total	340	98.3	100.0	
Missing	99.00	6	1.7		
Total		346	100.0		

Courses offered by the café: commercial courses

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Frequently	1	.3	.3	.3
	Occasionally	6	1.7	1.7	2.0
	Never	336	97.1	98.0	100.0
	Total	343	99.1	100.0	
Missing	99.00	3	.9		
Total		346	100.0		

Courses offered by the café: academic courses

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Frequently	4	1.2	1.2	1.2
	Occasionally	10	2.9	2.9	4.1
	Never	326	94.2	95.9	100.0
	Total	340	98.3	100.0	
Missing	99.00	6	1.7		
Total		346	100.0		

Priority of courses offered: First

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Computer, internet or application courses	48	13.9	84.2	84.2
	Academic courses	9	2.6	15.8	100.0
	Total	57	16.5	100.0	
Missing	99.00	289	83.5		
Total		346	100.0		

Priority of courses offered: Second					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Computer, internet or application courses	5	1.4	29.4	29.4
	Commercial courses	3	.9	17.6	47.1
	Academic courses	9	2.6	52.9	100.0
	Total	17	4.9	100.0	
Missing	99.00	329	95.1		
Total		346	100.0		

Priority of courses offered: Third					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Commercial courses	2	.6	100.0	100.0
Missing	99.00	344	99.4		
Total		346	100.0		

Other equipment/services: Drinks					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Frequently	6	1.7	3.3	3.3
	Occasionally	3	.9	1.6	4.9
	Never	174	50.3	95.1	100.0
	Total	183	52.9	100.0	
Missing	99.00	163	47.1		
Total		346	100.0		

Priority of other equipment/services: First					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Drinks	6	1.7	100.0	100.0
Missing	99.00	340	98.3		
Total		346	100.0		

Ever used Internet telephony					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	93	26.9	27.1	27.1

Use of computer and the Internet

Computer at home					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	59	17.1	17.3	17.3
	No	283	81.8	82.7	100.0
	Total	342	98.8	100.0	
Missing	99.00	4	1.2		

	No	250	72.3	72.9	100.0
	Total	343	99.1	100.0	
Missing	99.00	3	.9		
Total		346	100.0		

Frequency of using Internet telephony per month					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1- 2 times	53	15.3	53.0	53.0
	2 - 4 times	32	9.2	32.0	85.0
	4 - 8 times	4	1.2	4.0	89.0
	more than 8 times	11	3.2	11.0	100.0
	Total	100	28.9	100.0	
Missing	99.00	246	71.1		
Total		346	100.0		

Awareness of illegality of Internet telephony					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	172	49.7	50.1	50.1
	No	171	49.4	49.9	100.0
	Total	343	99.1	100.0	
Missing	99.00	3	.9		
Total		346	100.0		

Advocate of legalizing Internet telephony					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	295	85.3	85.8	85.8
	No	49	14.2	14.2	100.0
	Total	344	99.4	100.0	
Missing	99.00	2	.6		
Total		346	100.0		

Total		346	100.0		
-------	--	-----	-------	--	--

Internet connection at home					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	4	1.2	1.2	1.2
	No	334	96.5	98.8	100.0
	Total	338	97.7	100.0	

Missing	99.00	8	2.3		
Total		346	100.0		

Use of Internet: At home					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	At home	2	.6	100.0	100.0
Missing	99.00	344	99.4		
Total		346	100.0		

Use of Internet: University/School					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	University/School	23	6.6	100.0	100.0
Missing	99.00	323	93.4		
Total		346	100.0		

Use of Internet: In office					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	In office	22	6.4	100.0	100.0
Missing	99.00	324	93.6		
Total		346	100.0		

Use of Internet: In library					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Library	3	.9	100.0	100.0
Missing	99.00	343	99.1		
Total		346	100.0		

Use of Internet: In Internet café					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	In Internet café	339	98.0	100.0	100.0
Missing	99.00	7	2.0		
Total		346	100.0		

How much has your ability of using computer increased as a result of using Internet cafés?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	great advance	117	33.8	34.9	34.9
	some improvement	157	45.4	46.9	81.8
	not much change	54	15.6	16.1	97.9
	worse than before	7	2.0	2.1	100.0
	Total	335	96.8	100.0	
Missing	99.00	11	3.2		

Total		346	100.0		
-------	--	-----	-------	--	--

How long have you been using Internet cafés?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	This is first time	9	2.6	2.7	2.7
	Less than 6 months	63	18.2	18.9	21.6
	6 months to a year	67	19.4	20.1	41.7
	Over one year	194	56.1	58.3	100.0
	Total	333	96.2	100.0	
Missing	99.00	13	3.8		
Total		346	100.0		

Do you search for information on the Internet?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	253	73.1	74.6	74.6
	No	86	24.9	25.4	100.0
	Total	339	98.0	100.0	
Missing	99.00	7	2.0		
Total		346	100.0		

Types of contents interested in: Education					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very interested	92	26.6	35.9	35.9
	some interest	86	24.9	33.6	69.5
	No interest	78	22.5	30.5	100.0
	Total	256	74.0	100.0	
Missing	99.00	90	26.0		
Total		346	100.0		

Types of contents interested in: Health					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very interested	27	7.8	11.1	11.1
	some interest	95	27.5	38.9	50.0
	No interest	122	35.3	50.0	100.0
	Total	244	70.5	100.0	
Missing	99.00	102	29.5		
Total		346	100.0		

Types of contents interested in: Academic research					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very interested	55	15.9	22.3	22.3
	some interest	51	14.7	20.6	42.9
	No interest	141	40.8	57.1	100.0
	Total	247	71.4	100.0	
Missing	99.00	99	28.6		
Total		346	100.0		

Types of contents interested in: Technical information					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very interested	40	11.6	16.4	16.4
	some interest	52	15.0	21.3	37.7
	No interest	152	43.9	62.3	100.0
	Total	244	70.5	100.0	
Missing	99.00	102	29.5		
Total		346	100.0		

Types of contents interested in: Job markets					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very interested	36	10.4	14.6	14.6
	some interest	45	13.0	18.2	32.8
	No interest	166	48.0	67.2	100.0
	Total	247	71.4	100.0	
Missing	99.00	99	28.6		
Total		346	100.0		

Types of contents interested in: Artistic					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very interested	26	7.5	10.8	10.8
	some interest	43	12.4	17.9	28.8
	No interest	171	49.4	71.3	100.0
	Total	240	69.4	100.0	
Missing	99.00	106	30.6		
Total		346	100.0		

Types of contents interested in: Recreational					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very interested	84	24.3	34.0	34.0

	some interest	63	18.2	25.5	59.5
	No interest	100	28.9	40.5	100.0
	Total	247	71.4	100.0	
Missing	99.00	99	28.6		
Total		346	100.0		

Types of contents interested in: Pornography					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very interested	28	8.1	11.5	11.5
	some interest	36	10.4	14.8	26.3
	No interest	179	51.7	73.7	100.0
	Total	243	70.2	100.0	
Missing	99.00	103	29.8		
Total		346	100.0		

Types of contents interested in: Community information					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very interested	56	16.2	22.6	22.6
	some interest	74	21.4	29.8	52.4
	No interest	118	34.1	47.6	100.0
	Total	248	71.7	100.0	
Missing	99.00	98	28.3		
Total		346	100.0		

Types of contents interested in: Tourist information					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very interested	19	5.5	7.8	7.8
	some interest	37	10.7	15.1	22.9
	No interest	189	54.6	77.1	100.0
	Total	245	70.8	100.0	
Missing	99.00	101	29.2		
Total		346	100.0		

Types of contents interested in: Government information					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very interested	36	10.4	14.6	14.6
	some interest	82	23.7	33.2	47.8
	No interest	129	37.3	52.2	100.0
	Total	247	71.4	100.0	

Missing	99.00	99	28.6		
Total		346	100.0		

Types of contents interested in: Commercial transaction					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very interested	22	6.4	9.0	9.0
	some interest	24	6.9	9.8	18.8
	No interest	199	57.5	81.2	100.0
	Total	245	70.8	100.0	
Missing	99.00	101	29.2		
Total		346	100.0		

Types of contents interested in: Buy and sell					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very interested	15	4.3	6.1	6.1
	some interest	17	4.9	6.9	13.1
	No interest	213	61.6	86.9	100.0
	Total	245	70.8	100.0	
Missing	99.00	101	29.2		
Total		346	100.0		

Users' perception of the quality of service provided by Internet cafés

Quality of services offered by Internet cafés : Ambiance					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	110	31.8	32.6	32.6
	Good	126	36.4	37.4	70.0
	Satisfactory	93	26.9	27.6	97.6
	Poor	8	2.3	2.4	100.0
	Total	337	97.4	100.0	
Missing	99.00	9	2.6		
Total		346	100.0		

Quality of services offered by Internet cafés: Software availability					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	51	14.7	15.0	15.0
	Good	143	41.3	42.2	57.2
	Satisfactory	122	35.3	36.0	93.2
	Poor	23	6.6	6.8	100.0
	Total	339	98.0	100.0	
Missing	99.00	7	2.0		
Total		346	100.0		

Quality of services offered by Internet cafés: Equipment					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	78	22.5	22.9	22.9
	Good	149	43.1	43.7	66.6
	Satisfactory	104	30.1	30.5	97.1
	Poor	10	2.9	2.9	100.0
	Total	341	98.6	100.0	
Missing	99.00	5	1.4		
Total		346	100.0		

Quality of services offered by Internet cafés: Technical ability of staff					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	78	22.5	22.9	22.9
	Good	211	61.0	61.9	84.8
	Satisfactory	42	12.1	12.3	97.1
	Poor	10	2.9	2.9	100.0
	Total	341	98.6	100.0	
Missing	99.00	5	1.4		
Total		346	100.0		

Quality of services offered by Internet cafés: Connection					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	132	38.2	38.7	38.7
	Good	138	39.9	40.5	79.2
	Satisfactory	56	16.2	16.4	95.6
	Poor	15	4.3	4.4	100.0
	Total	341	98.6	100.0	
Missing	99.00	5	1.4		
Total		346	100.0		

Quality of services offered by Internet cafés: Staff disposition					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	86	24.9	25.1	25.1
	Good	203	58.7	59.4	84.5
	Satisfactory	49	14.2	14.3	98.8
	Poor	4	1.2	1.2	100.0
	Total	342	98.8	100.0	
Missing	99.00	4	1.2		
Total		346	100.0		

Quality of services offered by Internet cafés: Hours of service of internet café					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	66	19.1	19.4	19.4
	Good	172	49.7	50.4	69.8
	Satisfactory	97	28.0	28.4	98.2
	Poor	6	1.7	1.8	100.0
	Total	341	98.6	100.0	
Missing	99.00	5	1.4		
Total		346	100.0		

Quality of services offered by Internet cafés: Courses and training					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	22	6.4	6.6	6.6
	Good	78	22.5	23.4	29.9
	Satisfactory	179	51.7	53.6	83.5
	Poor	55	15.9	16.5	100.0
	Total	334	96.5	100.0	
Missing	99.00	12	3.5		
Total		346	100.0		

Charges for Internet café services					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	too low	1	.3	.3	.3
	low	10	2.9	2.9	3.2
	about right	279	80.6	81.1	84.3
	high	31	9.0	9.0	93.3
	too high	23	6.6	6.7	100.0
	Total	344	99.4	100.0	
Missing	99.00	2	.6		
Total		346	100.0		

Do you pay the charges yourself?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	2	.6	.6	.6
	yes, partially	36	10.4	10.6	11.1
	yes, fully	303	87.6	88.9	100.0
	Total	341	98.6	100.0	
Missing	99.00	5	1.4		
Total		346	100.0		

Changes proposed to improve the services: increase computers					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	increase number of computers	39	11.3	100.0	100.0
Missing	99.00	307	88.7		
Total		346	100.0		

Changes proposed to improve the services: Increase speed/bandwidth					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	increase speed/bandwidth	31	9.0	100.0	100.0
Missing	99.00	315	91.0		
Total		346	100.0		

Changes proposed to improve the services: Increase application software					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	increase number of applications/software	10	2.9	100.0	100.0
Missing	99.00	336	97.1		
Total		346	100.0		

Changes proposed to improve the services: prohibit pornography viewing					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	prohibit pornography viewing	9	2.6	100.0	100.0
Missing	99.00	337	97.4		
Total		346	100.0		

Changes proposed to improve the services: increase number of staff					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	increase number of supporting staff	15	4.3	100.0	100.0
Missing	99.00	331	95.7		
Total		346	100.0		

Changes proposed to improve the services: improve environment					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	improve atmosphere	44	12.7	100.0	100.0
Missing	99.00	302	87.3		
Total		346	100.0		

Changes proposed to improve the services: Reduce charges					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	reduce	39	11.3	100.0	100.0
Missing	99.00	307	88.7		
Total		346	100.0		

	charges			
Missing	99.00	307	88.7	
Total		346	100.0	

Changes proposed to improve the services: Add computer accessories					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	add computer accessories	13	3.8	100.0	100.0
Missing	99.00	333	96.2		
Total		346	100.0		

Changes proposed to improve the services: add refreshment/drinks					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	offer refreshments/drinks	2	.6	100.0	100.0
Missing	99.00	344	99.4		

Total		346	100.0	
-------	--	-----	-------	--

Changes proposed to improve the services: put power stabilizer/UPS					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Install power stabilizers/UPS	4	1.2	100.0	100.0
Missing	99.00	342	98.8		
Total		346	100.0		

Changes proposed to improve the services: update computers					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Update computers	9	2.6	100.0	100.0
Missing	99.00	337	97.4		
Total		346	100.0		

Users' perception of the Tanzanian ICT, policies and related issues

Is ICT important for socio-economic development?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	2	.6	.6	.6
	somewhat	24	6.9	7.0	7.6
	agree	204	59.0	59.8	67.4
	strongly agree	111	32.1	32.6	100.0
	Total	341	98.6	100.0	
Missing	99.00	5	1.4		
Total		346	100.0		

Missing	99.00	178	51.4	
Total		346	100.0	

Area could be improved by use of ICT: Agriculture					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agriculture	200	57.8	100.0	100.0
Missing	99.00	146	42.2		
Total		346	100.0		

Area could be improved by use of ICT: Healthcare					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Healthcare	292	84.4	100.0	100.0
Missing	99.00	54	15.6		
Total		346	100.0		

Area could be improved by use of ICT: Education					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Education	329	95.1	100.0	100.0
Missing	99.00	17	4.9		
Total		346	100.0		

Area could be improved by use of ICT: Tourism					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Tourism	228	65.9	100.0	100.0
Missing	99.00	118	34.1		
Total		346	100.0		

Area could be improved by use of ICT: Industry					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Industry	168	48.6	100.0	100.0

Area could be improved by use of ICT: Transport and communication					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Transport and communication	276	79.8	100.0	100.0
Missing	99.00	70	20.2		
Total		346	100.0		

Area could be improved by use of ICT: Business/services					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Business/Services	273	78.9	100.0	100.0
Missing	99.00	73	21.1		

Total		346	100.0		
-------	--	-----	-------	--	--

Area should get first priority

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agriculture	8	2.3	2.4	2.4
	Education	239	69.1	71.8	74.2
	Industry	14	4.0	4.2	78.4
	Healthcare	14	4.0	4.2	82.6
	Tourism	7	2.0	2.1	84.7
	Transport and communication	19	5.5	5.7	90.4
	Business/Services	32	9.2	9.6	100.0
	Total	333	96.2	100.0	
Missing	99.00	13	3.8		
Total		346	100.0		

Area should get second priority

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agriculture	15	4.3	4.5	4.5
	Education	60	17.3	18.2	22.7
	Industry	44	12.7	13.3	36.1
	Healthcare	113	32.7	34.2	70.3
	Tourism	19	5.5	5.8	76.1
	Transport and communication	33	9.5	10.0	86.1
	Business/Services	46	13.3	13.9	100.0
	Total	330	95.4	100.0	
Missing	99.00	16	4.6		
Total		346	100.0		

Area should get third priority

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agriculture	15	4.3	4.6	4.6
	Education	19	5.5	5.9	10.5
	Industry	30	8.7	9.3	19.8
	Healthcare	71	20.5	22.0	41.8
	Tourism	35	10.1	10.8	52.6
	Transport and communication	88	25.4	27.2	79.9
	Business/Services	65	18.8	20.1	100.0
	Total	323	93.4	100.0	
Missing	99.00	23	6.6		
Total		346	100.0		

Quality of Tanzania ICT infrastructure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	4	1.2	1.2	1.2
	poor	20	5.8	5.8	7.0

	moderate	86	24.9	25.1	32.2
	good	166	48.0	48.5	80.7
	very good	66	19.1	19.3	100.0
	Total	342	98.8	100.0	
Missing	99.00	4	1.2		
Total		346	100.0		

Does government have a clear vision on ICT?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly no	5	1.4	1.5	1.5
	No	44	12.7	12.9	14.4
	somehow	71	20.5	20.8	35.2
	Yes	159	46.0	46.6	81.8
	Strongly Yes	62	17.9	18.2	100.0
	Total	341	98.6	100.0	
Missing	99.00	5	1.4		
Total		346	100.0		

Do measures taken by government encourage ICT development?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly no	5	1.4	1.5	1.5
	no	42	12.1	12.4	13.9
	somehow	59	17.1	17.4	31.3
	yes	163	47.1	48.1	79.4
	strongly yes	70	20.2	20.6	100.0
	Total	339	98.0	100.0	
Missing	99.00	7	2.0		
Total		346	100.0		

Can you name authorities concerned with ICT?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	204	59.0	60.4	60.4
	Yes	134	38.7	39.6	100.0
	Total	338	97.7	100.0	
Missing	99.00	8	2.3		
Total		346	100.0		

Authorities concerned with ICT: Tanzania Communication Commission

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Tanzania Communication Commission	32	9.2	100.0	100.0
Missing	99.00	314	90.8		
Total		346	100.0		

Influence of these authorities on ICT development					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly negative	4	1.2	3.1	3.1
	Negative	9	2.6	6.9	9.9
	somewhat	17	4.9	13.0	22.9
	positive	78	22.5	59.5	82.4
	strongly positive	23	6.6	17.6	100.0
Missing	99.00	215	62.1		
Total		346	100.0		

Can you name some official Tanzania websites?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	263	76.0	77.6	77.6
	Yes	76	22.0	22.4	100.0
	Total	339	98.0	100.0	
Missing	99.00	7	2.0		
Total		346	100.0		

Names of official Tanzanian websites:					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	tanzania.go.tz	51	14.7	100.0	100.0
	Total	51	14.7	100.0	
Missing	99.00	295	85.3		
Total		346	100.0		

How often do you visit these websites?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	frequently	13	3.8	14.9	14.9
	occasionally	46	13.3	52.9	67.8
	never	28	8.1	32.2	100.0
	Total	87	25.1	100.0	
Missing	99.00	259	74.9		
Total		346	100.0		

Perception of the impact of the Internet on Tanzanian culture					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly negative	5	1.4	1.5	1.5
	negative	18	5.2	5.3	6.7
	somewhat	99	28.6	29.0	35.8
	positive	164	47.4	48.1	83.9
Missing	99.00	262	76.1		
Total		346	100.0		

	strongly positive	55	15.9	16.1	100.0
	Total	341	98.6	100.0	
Missing	99.00	5	1.4		
Total		346	100.0		

Do you think more Swahili website should be designed?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly no	11	3.2	3.2	3.2
	no	26	7.5	7.6	10.8
	somehow	32	9.2	9.3	20.1
	yes	158	45.7	45.9	66.0
	strongly yes	117	33.8	34.0	100.0
Missing	99.00	2	.6		
Total		346	100.0		

Estimate of total number of Internet cafés in Dar es salaam					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	15-30	13	14	14	14
	31-50	26	8	8	22
	51-70	7	2	2	24
	71-100	30	9	9	33
	101-125	2	1	1	34
	126-150	15	4	4	38
	151-200	16	5	5	43
	201-300	11	3	3	46
	301-400	4	1	1	47
	401-600	29	9	9	56
	601-1000	76	21	22	78
	More than 1000	111	32	33	100
	Total	340	98	100	
	Missing	99.00	6	2	
Total		346	100.0		

Appendix F: Rough calculation of income of surveyed Internet cafés

Estimated number of users per week by administrators:

	Number of Users	Percent	Number*Percent
	15	14%	209
	45	7%	314
	80	14%	1116
	125	7%	872
	175	23%	4070
	250	9%	2326
	350	9%	3256
	500	16%	8140
total	1540	100%	20302

Weighted average. $20302/100 \sim 200$ users per Internet Café per week, which means 800 users per month.

Average time spent by users per visit:

48% spend 1 to 2 hours, and 46% spend less than 1 hour. Therefore, we can assume that the average time spent in Internet Cafes by users is 1 hour. We take 500Tsb per hour as it applies for 81% of surveyed Internet Cafes.

Combining these data we can make out that the average income for Internet Cafes is $800*1*500 \sim 400,000Tsb$ per month for Internet sales.

Appendix G: Questionnaire for administrators of Internet cafés in Dar es Salaam

This questionnaire is a part of a study on Internet Cafés in Dar es Salaam. The study is a Master of Science research for the department of *Technology Development Sciences* at the *Eindhoven University of Technology* in the Netherlands. The main goal is to determine the problems and opportunities with respect to Internet cafés in Dar es Salaam and to suggest recommendations for policymakers.

Objectives of the questionnaire:

1. to identify the basic characteristics of administrators of Internet cafés,
2. to obtain general information about the Internet cafés
3. to identify the basic economic situation of Internet cafés,
4. to identify purposes for which the Internet cafés are used,
5. to identify the administrators' perception of the quality of service provided by Internet Service Providers, and
6. to identify the administrators' perception of the Tanzanian telecommunications, policies and other related issues.

This research is performed **independently** and the gathered data will be treated **confidentially** and used to draw **broad** conclusions only.

Please answer each question as honestly and as fully as you can.

Many thanks.

Below is intended for the interviewer.

Name of Internet Café:

Location:

District:

Name respondent:

Website Internet Café: http://.....

E-mail Internet Café:

Date: March 2002

Time: ...:.... p.m./a.m. (cross out the not applicable)

1. Sex: [] Male [] Female

2. Age: []
(Indicate the numbers of years old)

3. Marital status: (Choose just the corresponding alternative)

[] Single [] Married [] Living together [] Divorced/separated

4. Occupation (Choose all the alternatives that apply):

[] Student [] Professional (doctor, lawyer, engineer, etc)
[] Salaried worker [] Part-time job (<5 hours a day or <9 months a year)
[] Farmer [] Merchant/business owner
[] Teacher [] Unemployed looking for a job
[] Public employee [] Housework
[] Retired [] Housework (for others)
[] Self-employed [] Other, namely

5. Highest level of school attained:

(Choose just the corresponding alternative)

[] None
[] Primary education
Secondary education:
[] Ordinary level (1-4)
[] Advanced level (high school, 5-6)
Technical secondary education:
[] Ordinary level
[] Technical colleges
[] Advanced diploma level
[] Vocational training
[] Post-primary training
[] University (bachelor)
[] Postgraduate
[] Ph. D.
[] Other, namely

6. Knowledge of languages:

(Choose all the alternatives that apply):

[] Kiswahili
[] English
[] Other, namely

7. Knowledge of English:

(Choose just the corresponding alternative)

[] Very poor
[] Poor
[] Moderate
[] Good
[] Very good

8. What is your income per month (in Tsh)?

(Choose just the closest alternative)

[] Less than 10,000
[] Between 10,000 and 40,000
[] Between 40,000 and 100,000
[] Between 100,000 and 200,000
[] Between 200,000 and 400,000
[] Between 400,000 and 600,000
[] Between 600,000 and 1,000,000
[] Between 1 and 2 million
[] More than 2 million

9. What is your position in this Internet Café?

(Choose just the corresponding alternative)

[] Owner/manager
[] System administrator
[] Employee
[] Other, namely:

10. How long has this Internet Cafes been open?

[] Less than 6 months
[] 6 months to a year
[] 1 to 2 years
[] 2 to 4 years
[] More than 4 years

11. How many operating computers are in the Internet Café?

[] Less than 5
[] 6 - 10
[] 11 - 15
[] 16 - 20
[] 21 - 30
[] More than 30

12. Which types of computers are used in the Internet Café? (Choose all the alternatives that apply)

[] 486 and lower [] Pentium II [] Don't know
[] Pentium / MMX / pro [] Pentium III and higher [] Other, namely

13. How many computers are connected to the Internet?

[] Less than 5 [] 11 - 15 [] 21 - 30 [] None (skip next question)
[] 6 - 10 [] 16 - 20 [] More than 30

14. Which type of Internet access is used for the Internet Café?

- Wireless Local Loop (WLL)
- Dial-up connection
- Leased lines
- VSAT (Very Small Aperture Terminal)
- Other, namely

15. Are you satisfied with the speed of Internet access?

- Very satisfied
- Somewhat
- Very unsatisfied
- Satisfied
- Unsatisfied

16. How much do you pay (VAT included) per month in US\$ for Internet access?

(Please choose the closest alternative)

- 0 – 30 US\$
- 30 – 100 US\$
- 100 – 200 US\$
- 200 – 500 US\$
- 500 – 1000 US\$
- 1000 – 2000 US\$
- 2000 US\$ or more

17. Are you satisfied with the charges for the Internet access?

- Very satisfied
- Somewhat
- Very unsatisfied
- Satisfied
- Unsatisfied

18. Who is your Internet Service Provider (ISP)?

- University Computing Center
- Raha.com
- Wilken
- Cat-Net
- Internet Africa
- Simbanet
- Cyber Twiga
- TTCL
- Costech
- Africaonline
- Other, namely:

19. Are you satisfied with your ISP?

- Very satisfied
- Somewhat
- Very unsatisfied
- Satisfied
- Unsatisfied

20. Which one of the following equipment and services are provided in this Internet Cafés?

(Choose all the alternatives that apply)

Category 1: Equipment:

- Telephone
- Fax
- Photocopier
- Computer
- Printer
- Scanner
- Renting equipment

Category 2: Computer and Internet use

- Webpage design
- Applications and software (writing, drawing, games)
- E-mail
- Surfing on the Internet (WWW)
- Internet games
- Chat

Category 3: Courses:

- Computer, Internet or application courses
- Commercial courses (secretary, accounting)
- Academic courses (math, languages, science)

Category 4: Other equipment/services (please specify):

- No1
- No2

21. For which purposes are the Internet Café services used?

(Choose all the alternatives that apply)

- Study related assignments
- Keep in touch with friends/family
- Matters related to personal business
- Government issues
- Banking matters
- Literary/artistic work
- Job search
- Buy/identify products via Internet
- Learn computers and Internet use
- Commercial learning (management, secretary, accounting)
- Entertainment/recreation/socializing:*
- music
- computer games
- chat
- pornography (x-pics/movies etc)
- Other use, namely

22. Is Internet telephony used in this Internet Cafe? Yes No (skip next question)

23. How often is Internet telephony used per day?
 1 - 2 times 10 -15 times
 2 - 5 times 15 - 25 times
 5 - 10 times More than 25 times

24. Are you aware that Internet telephony is illegal in Tanzania? Yes No

25. You think Internet telephony should be allowed? Yes No

26. Please give an estimate of the number of users per week? (Please choose the closest alternative)
 Less than 30 60 to 100 150 to 200 300 to 400
 30 to 60 100 to 150 200 to 300 More than 400

27. How much do you charge the users for surfing (in Tsh)?

28. What are the sources of income for this Internet Cafe?
 (Please indicate main source of income and secondary source of income)

	Main source (1 alternative)	Secondary source (More alternatives)
<input type="checkbox"/> Equipment rental	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Computers and Internet use	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Internet telephony	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Training and courses	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Drinks and snacks	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Other, namely.....	<input type="checkbox"/>	<input type="checkbox"/>

29. Some argue that information and communication technology (**ICT**) (Internet, computer, telephone etc) is important for social and economic development. Do you agree with this? (Just choose one alternative)

completely disagree somewhat strongly agree
 disagree agree

30. Which areas could be improved by the use of ICT? (Choose all the alternatives that apply)

A = agriculture D = healthcare G = transport and communication
 B = education E = tourism F = other, namely.....
 C = industry F = business/services

31. Which of the above-mentioned areas should get main priority? (Fill in the **letter** matching the area)

1st priority 2nd priority 3d priority

32. What is your perception of the quality of the Tanzanian ICT-infrastructure?

Very poor Moderate Very good
 Poor Good

33. Does the government have a clear vision on ICT?

strongly no somehow strongly yes
 no yes

34. Are the measures taken by the government encouraging ICT development?

strongly no somehow strongly yes
 no yes

35. Can you name some authorities that are concerned with ICT?

No (skip next question) Yes, namely:
 No 1:
 No 2:
 No 3:

36. What is your perception of the influence of these authorities on ICT development?

- Strongly negative Somewhat Strongly positive
 Negative Positive

37. Can you name some official Tanzanian national websites?

- No (*skip next question*) Yes, namely:
No 1:
No 2:
No 3:

38. How often do you visit these websites?

- Frequently Occasionally Never

39. What is your perception of the impact of the Internet on Tanzanian culture?

- Strongly negative Somewhat Strongly positive
 Negative Positive

40. Do you think more Swahili websites should be designed?

- strongly no somehow strongly yes
 no yes

41. Could you please name your neighbouring Internet Cafes?

#	Name Internet Café	Location
No 1
No 2
No 3
No 4
No 5
No 6
No 7
No 8
No 9

42. Do you have a license to operate this Internet Café? No Yes
(skip next question)

43. What are the reasons for not having a license?

- Process of application is complex and takes too much time License is too expensive
 License is not really necessary Other, *namely*
.....

44. Optional:

If you wish, you can give your e-mail address. It will be used exceptionally, in case it is necessary to make some corrections. It will also allow us to inform you, once this study is finished, where you can find the results on the Internet. In any case, your address will not be given nor used for commercial purposes.

E-mail:

Thank you for taking the time to fill in this questionnaire.

Appendix H: Questionnaire for users of Internet cafés in Dar es Salaam

This questionnaire is a part of a study on the Internet cafés in Dar es Salaam. The study is a Master of Science research for the department of *Technology Development Sciences* at the *Eindhoven University of Technology* in the Netherlands. The main goal is to determine the problems and opportunities with respect to Internet cafés in Dar es Salaam and to suggest recommendations for policymakers.

Objectives of the questionnaire:

1. to identify the basic characteristics of users of Internet cafés,
2. to identify for which purposes the Internet cafés are used,
3. to identify the use of computers and Internet by users,
4. to identify the users' perception of the quality of service provided by Internet cafés, and
5. to identify the users' perception of the Tanzanian telecommunications, policies and other related issues.

This research is performed **independently** and the gathered data will be treated **confidentially** and used to draw **broad** conclusions only.

Please answer each question as honestly and as fully as you can.

Many thanks.

Note: this questionnaire is *neither* meant for children under 15 years of age, nor for transients (visitors to the city).

Below is intended for the interviewer.

Name of Internet Café:
Location:
District:
Date: March 2002
Time:	...:.... p.m./a.m. (<i>cross out the not applicable</i>)

XXXX

Questionnaire

1. Sex: Male Female

2. Age:
(Indicate the numbers of years old)

3. Marital status: (Choose just the corresponding alternative)

Single Married Living together Divorced/separated

4. Occupation (Choose all the alternatives that apply):

Student Professional (doctor, lawyer, engineer, etc)
 Salaried worker Part-time job (<5 hours a day or <9 months a year)
 Farmer Merchant/business owner
 Teacher Unemployed looking for a job
 Public employee Housework
 Retired Housework (for others)

5. Highest level of school attained:

(Choose just the corresponding alternative)

None
 Primary education
Secondary education:
 Ordinary level (1-4)
 Advanced level (high school, 5-6)
Technical secondary education:
 Ordinary level
 Technical colleges
 Advanced diploma level
 Vocational training
 Post-primary training
 University (bachelor)
 Postgraduate
 Ph. D.
 Other, namely:

6. Knowledge of languages:

(Choose all the alternatives that apply):

Kiswahili
 English
 Other, namely:

7. Knowledge of English:

(Choose just the corresponding alternative):

Very poor
 Poor
 Moderate
 Good
 Very good

8. What is your income per month (in Tsh)?

(Choose just the closest alternative)

Less than 2000
 Between 2,000 and 5,000
 Between 5,000 and 10,000
 Between 10,000 and 20,000
 Between 20,000 and 40,000
 Between 40,000 and 100,000
 Between 100,000 and 200,000
 Between 200,000 and 400,000
 Between 400,000 and 600,000
 Between 600,000 and 1,000,000
 More than 1,000,000

9. How far do you travel to reach an Internet Café in general? (Just choose one alternative)

< 1km 1 to 5km 5 to 10km More than 10km

10. How often do you use Internet Café services? (Just choose one alternative)

4 or more days a week 1 day a week 3 or 4 times a year
 2 or 3 days a week 1 to 3 times a month less than twice a year

11. How long do you spend in Internet Cafés during a typical visit? (Just choose one alternative)

Less than 1 hour 2 to 4 hours 6 to 8 hours
 1 to 2 hours 4 to 6 hours more than 8 hours

12. For which purposes do you use the Internet Café services?

	Main use (1 alternative)	Secondary use (More alternatives)
Study related assignments	[]	[]
Keep in touch with friends/family	[]	[]
Employment related matters	[]	[]
Matters related to personal business	[]	[]
Government issues	[]	[]
Banking matters	[]	[]
Literary/artistic work	[]	[]
Job search	[]	[]
Buy/identify products via Internet	[]	[]
Learn computers and Internet use	[]	[]
Commercial learning (management, secretary, accounting)	[]	[]
Academic learning (math, languages etc)	[]	[]
Entertainment/recreation/socializing:		
music	[]	[]
computer games	[]	[]
chat	[]	[]
pornography (x-pics/movies etc)	[]	[]
Other use, namely:	[]	[]

13. Which one of the following equipment and services do you use in Internet Cafés?

(For each equipment or service choose only one alternative. Arrange the equipment and services in **EACH** category according to the importance or priority to you. Use 1 for first, 2 for second and 3 for the third priority)

	Frequently	Occasionally	Never	Priority
Category 1: Use of equipment				
Telephone	[]	[]	[]	[]
Fax	[]	[]	[]	[]
Photocopier	[]	[]	[]	[]
Computer	[]	[]	[]	[]
Printer	[]	[]	[]	[]
Scanner	[]	[]	[]	[]
Renting equipment	[]	[]	[]	[]
Category 2: Use of computer and/or Internet				
Webpage design	[]	[]	[]	[]
Applications and software (writing, drawing, games)	[]	[]	[]	[]
E-mail	[]	[]	[]	[]
Surfing on the Internet (WWW)	[]	[]	[]	[]
Internet games	[]	[]	[]	[]
Chat	[]	[]	[]	[]
Category 3: Courses offered by the Internet Café				
Computer, Internet or application courses	[]	[]	[]	[]
Commercial courses (secretary, accounting)	[]	[]	[]	[]
Academic courses (math, languages, science)	[]	[]	[]	[]
Category 4: Other equipment/services (please specify):				
No1	[]	[]	[]	[]
No2	[]	[]	[]	[]

14. Have you ever used Internet telephony (VoIP)? [] Yes [] No (skip next question)

15. How often do you use Internet telephony per month?

- [] 1 - 2 times [] 4 - 8 times
 [] 2 - 4 times [] 8 times or more

16. Are you aware that Internet telephony is illegal in Tanzania? [] Yes [] No

17. You think Internet telephony should be allowed? [] Yes [] No

M.Sc. Theses in Technology and Development Studies: 1999

- 99.01 Daan Kers: Industrialisation and electricity supply: Mbagala, Tanzania as a case.
- 99.02 Barbara Simaeyts: Electrificación de baja escala en el bosque nublado del Ecuador: La elaboración de dos casos en la provincia del Carchi.
- 99.03 Ame Kraus: Housing finance in Tanzania, a survey on the demand of the low-income households for a more applicable housing finance system and how it can facilitate the introduction of new bamboo construction technologies.
- 99.04 Renilde Becque: The sustainability of ferrocement stairs (production) in a social housing project in Nova Friburgo, Brazil, aimed at lower-income groups.
- 99.05 Bas Lebbing: Energy use in small-scale brick making industries in Northeast Thailand.
- 99.06 Maïke van Rooy: Optimisation of purchasing process for state oil company Suriname in Saramacca.
- 99.07 Dennis van Hunen: Technologies for municipal solid waste management in Masaya Nicaragua. A study on compost systems.
- 99.08 Ronald Warmerdam: Opportunities for improving solid waste management in Kanpur, India. The increase of private sector involvement.
- 99.09 Arjan van Bergeijk: An appropriate school for Tanzania. Evaluation of the involvement of PLAN International Tanzania in school constructions in Dar es Salaam, Coastal region, Morogor region and Mwanza municipality.
- 99.10 Joris van Iersel: Assessment of an appropriate drying technology for the drying of coffee by small rural producers in the south of Lempira, Honduras.
- 99.11 Felix Tillie: Terms of Reference for a Training Programme for Roof Tilers in Urban Tanzania.
- 99.12 Nathalie van Hoeven: Assessment of opportunities to improve the capacity of the Kejetia Public Transport Terminal in Kumasi, Ghana.

M.Sc. Theses in Technology and Development Studies: 2000

- 00.01 Eric Lakerveld: Information and Performance. The role of Quality Information Systems in a multinational electronics company.
- 00.02 Martijn Vis: Assessment of the Possibilities to Utilize Large Solar Water Heaters for Industrial and Commercial Sectors in Thailand.

- 00.03 Amber Beernink: Vehicle/Pedestrian Traffic Conflicts. Appropriate Construction Technology for a Pedestrian Crossing at Kejetia, Kumasi, Ghana.
- 00.04 Pascal Vlieghe: Lake Pollution and Vulnerability of Fishing Communities. Mwanza Gulf of Lake Victoria, Tanzania.
- 00.05 Bart Frederiks: Assessment of Sustainable Means of Private Electricity Production. A case study at Katani Ltd., Tanzania.
- 00.06 Rolf Verlaan: Identification of the Opportunities for Sustainable Production of Energy from Biomass Residues in Swaziland.
- 00.07 Anne van Hoof: Maintenance and Utilisation of physical capacity at Ghana Textile Printing Co. Ltd.
- 00.08 Rob van der Werff: The Value of Technical Education. A Cost/Benefit Analysis of Technical education and other Subjects of Education in Tanzania.
- 00.09 John Brenters: Design and financial assessment of small scale sisal decortication technology in Tanzania.

M.Sc. Theses in Technology and Development Studies: 2001

- 01.01 Piet Hein Breeuwsma: The Demand-led Approach to Vocational Skill Training: The Cosdec Programme Namibia.
- 01.02 Eduard J. Boonstra: Establishment of a Calcium-silicate unit Industry in Indonesia.
- 01.03 Arjan van Dal: Assessment of a more Sustainable Sanitation Technology System for a Harijan Community in India.
- 01.04 Benoit Chamuleau: Energy Efficient Low Cost Housing in South Africa.
- 01.05 Arnoud van Bemmelen: Energy Conservation Opportunities in Hotels in Costa Rica.
- 01.06 Herwich Hobbelen: Assessment of Domestic Liquid Waste Runoff, Dar es Salaam, Tanzania.
- 01.07 Sander Gelsing: Solar Home Systems in the Caprivi. Evaluation of the Technology Choice and the Implementation of Small-scale Electricity Technologies in rural Namibia.
- 01.08 Ilse Oosterlaken: Industry Study: Thai Building Material Industry (1960 - 2000) - "Opportunities for SMEs Producing Building Materials: Case of Northeast Thailand.

- 01.09 Joost Ossevoort: Systematic Assessment of Water Pollution in Ebríé Lagoon, Ivory Coast. Modelling eutrophication, followed by an inquiry into the causes and impacts of this phenomenon.
- 01.10 Jeroen Steman: Pre-feasibility Study on Centrifugal Pump Manufacturing in Zambia. An identification of feasible production technologies.
- 01.11 Krista Jansen: Future Supply and Demand for Petroleum Products in Indonesia; Challenges and Options for the Refining Sector.
- 01.12 Marieke de Ruijter de Wildt: The Searching Enterprise. Information Usage of Small Enterprises and Business Development Services.El Salvador.

M.Sc. Theses in Technology and Development Studies: 2002

- 02.01 Jeannette Klein: Water Pollution in the Accra-Tema Metropolitan Area. Sources and Impacts. Ghana.
- 02.02 Shila de Vries: Bamboo Construction Technology for Housing in Bangladesh. Opportunities and constraints of applying Latin American bamboo construction technologies for housing in selected rural villages of the Chittagong Hill Tracts, Bangladesh.
- 02.03 An Nguyen: The Introduction of Digital Terrestrial Television in Vietnam. An opportunity study.
- 02.04 Martijn Jonker: Building Technological Capabilities to Improve Performance. A case study of the paper industry in West Java, Indonesia.
- 02.05 Jeroen Nuijten: Sustaining the Basic Research Program of the International School of Photonics. Cochin, Kerala. India.
- 02.06 Brecht Mommen: Changes in the Basic Needs Situation due to Hydro-projects in Nepal. A case study of Kali Gandaki project.
- 02.07 Roy Vink: Assessment of Impacts of Hydro-project Balsa Superior on Economic Activities in the Canton San Ramón de Alajuela, Costa Rica.
- 02.08 Svend Minderhoud: Technological Performance in Indonesian Paper Industry. A case study.
- 02.09 Mirjam Pronk: Sustainable Building Systems for Low-cost Housing in Guayaquil, Ecuador.
- 02.10 Thijs Gilde: "Save Water"- An assessment of the major causes of non-revenue water in the drinking water distribution system of SEMAPA in Cochabamba, Bolivia.

02.11 Mark van Stiphout: What are the costs of wetland pollution? Integrating the environmental effect chain and the total economic value for a coastal wetland in Ghana.

02.12 Rick Boellaard: Op weg naar ontwikkeling.CFAR-Kasangulu, Zaïre.

If you would like to receive a copy of one of the above indicated M.Sc. theses, please contact:

Department of Technology and Development Studies

Eindhoven University of Technology

M.Sc. research co-ordinator

Mrs Dr.Ir. E.L.C. Van Egmond

DG 1.02

PO Box 513

5600 MB Eindhoven

The Netherlands