DETERMINANTS OF PERFORMANCE OF INTERNET CYBER CAFES IN NAIROBI PROVINCE

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DECLARATION

This paper is my original work and has not been presented for a degree in any other university.

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DEDICATION

To my parents
Mr. Absalom Opicha Mang'oli and
Mrs. Eunice Opicha Mang'oli
with love.

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ABSTRACT

The informal sector has been recognized for its role in contributing towards national output and employment. In particular, the information and communication technology (ICT) sector has become a vital part in its contribution to the economy. In Kenya, especially the urban centers, the ICT sector has been recording a significant change facilitated by the Internet. This has been possible due to the proliferation of Internet cyber cafes that provide access to the Internet at a minimum cost. This research paper analyzed the performance of the Internet cyber cafes in Nairobi province.

A total of 70 cyber cafes from Nairobi were selected using the two-stage cluster sampling technique out of which four (4) cyber cafes were identified as outliers and hence the sample population was reduced to 66 cases. The data was analyzed using both descriptive statistics and the use of an econometric model. Performance of the cyber cafes was measured by output per month in terms of total hours used on the Internet by the customers and was regressed against explanatory variables. These explanatory variables included; monthly rent, cost of maintenance of computers per month, distance between the cyber cafes, age of the cyber café, total wages paid to the employees per month and the total hours of operation per month. The regression results revealed that rent (bigger space) was the most statistically significant variable in determining the performance of the cyber cafes. Other factors that significantly affect output are the age of the cyber café and total hours of operation per month.

Based on the findings of the study, it is recommended that the cyber cafes should be encouraged to expand their services which in turn would result in increased employment opportunities. This could be achieved by expanding business space in the province that will enable the cafes to acquire more equipment and thus hire more labour

and as a result increase their respective output. The government should also ensure that high security measures are attained and maintained to encourage the cyber cafes to operate for longer hours which in turn will generate higher output levels.

ACRONYMS

ARPANET	-	Advanced Research Projects Agency Network
CCK	-	Communications Commission of Kenya
DARPA	-	Defense Advanced Research Projects Agency
GDP	-	Gross Domestic Product
ICT	-	Information and Communication Technology
ISP	-	Internet Service Provider
KPTC	-	Kenya Posts and Telecommunications Corporation
NSFNET	-	National Science Foundation Network

DEFINITION OF TERMS

ARPANET:

A large-scale wideband data (packet switching) network interconnecting a large population of terminals and computers sponsored by the Advanced Research Projects Agency.

Cyber café:

A cyber café refers to a public bureau that offers access to Internet services through computers as its major commercial activity. It is a facility that houses computers connected to the Internet and charges for usage on time basis.

Information and communication technology (ICT):

ICT includes the telecommunication infrastructure, computers, broadcasting media and other electronic applications that have been combined to produce the Internet. Information technology (IT or informatics) covers all activities and technologies that involve the handling of information by electronic means: that is, information acquisition, storage, retrieval, processing, transmission and control.

Internet:

The Internet refers to a worldwide network interconnecting personal computers throughout the world, through ordinary telecommunication lines and modems that allow multiple users to access network services.

Internet Service Provider (ISP):

This is a business entity that adds value to a network service and can be characterized as "owning" the relationship with the consumer of Internet services. The ISP operates the network infrastructure that enables the consumers to access the Internet.

Computer:

A functional unit that can perform substantial computations including numerous arithmetic operations and logic operations without human intervention during a run. It may consist of a stand-alone unit or several interconnected units.

Network:

This refers to a system of physically dispersed computers interconnected by telecommunication channels.

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CHAPTER ONE
INTRODUCTION

1.0 Background of the Study

Technological change has been a major hallmark of economic development in recent years (Ajayi, 2002). An interesting and vital part of that technical change process has been the rapid evolution of information and communication technology (ICT). It is notable that the world is experiencing an information technology revolution that has drastically changed many aspects of the human life, from education, industry, economy, politics to entertainment. In addition, unprecedented capabilities of the information technology to process, store, refine and disseminate data, information and knowledge in a variety of ways across geographical boundaries, has dramatically changed the ways in which the public and private sectors operate all over the world. ICT has become a major factor in socio-economic development of every nation. ICT now plays a major role in education, research, agriculture, health, commerce and in poverty alleviation by generating or creating new jobs and investment opportunities.

A noteworthy feature of ICT development has been the brisk growth of the Internet. The Internet has become a core feature of the contribution of ICTs to the economy, affecting the way in which individuals communicate, acquire information, learn, conduct business, and interact culturally. As indicated by LeBel (2000), the expansion of Internet services represents one of most fundamental shifts in technology in several decades. As measured in terms of number of users, the level and range of services, and in terms of the impact on economic growth and productivity, the effects emerge as substantial. At current rates of growth, the Internet may create more

profound changes in the global economy in the 21st century than the introduction of mass production did for manufacturing in the 20th century. It is worth mentioning that the current approach to communication is a refreshing new model that represents a radical departure from the traditional postal and telephone modes of communication.

1.1 The Internet and Cyber Cafes

1.1.1 The Development of Internet

Mackie-Mason and Varian (1994) gave a historical account of the development of the Internet. Accordingly in early 1960's, the United States of America Department of Defense established a set of connected networks on scarce and expensive computers. This was to assist scientists and researchers from dispersed areas work together on their files. In 1973, the U.S.A. Defense Advanced Research Projects Agency (DARPA) initiated a research program to develop communication protocols that would allow networked computers to communicate transparently across multiple, linked packet networks. This was called the "Internetting" project and the system of networks that emerged from the research became the "Internet".

Kahn (1999) adds that the success of the Internet was heavily dependent on the underlying computer communications technology established by the Advanced Research Projects Agency that created the "ARPANET" in the 1970s. The 1970's period represented a phase of technological development in local area networks and personal computers. Later in the 1980s decade, the National Science Foundation Network (NSFNET) replaced the ARPANET as the backbone of the Internet and by the end of the decade there were thousands of networks and tens of thousands of hosts on the then emerging Internet. The United States federal government support for the NSFNET ceased during the 1990s after sufficient private sector networking capability

was considered to exist. This enabled the growth of commercialization of the Internet. The creation of world wide web (www), user-friendly innovations such as the mouse and affordability of computers made the usage of the Internet to accelerate dramatically as it became more accessible to the public.

During the late 1980's and early 1990's, the population of Internet users and network constituents expanded internationally. At present, traffic on the Internet, as measured by the number of web sites visited by each host, doubles at least every 100 days (International Institute of Economics)[1]. By August 2002, the NUA Surveys[2] estimated that more than 553 million people worldwide had Internet access with the United States accounting for 30 percent global access, Europe, 24 percent, Asia-Pacific, 14 percent, Latin America, 3 percent while the rest of the world accounted for the remaining 29 percent of Internet users.

1.1.2 The Internet in Kenya

The African Regional Center for Computing was the first provider of web-based Internet services in 1993 (Mweu, 2000). Later in 1995, the Kenya Posts and Telecommunications Corporation (KPTC) liberalized the market thereby increasing the entry of Internet Service Providers (ISPs). In December 1998, KPTC launched the EAFIX and Jambonet to ensure the provision of international Internet backbone services that guaranteed rapid expansion and accessibility in all parts of the country. This also reduced the cost of access to the Internet for ISPs, as the backbone could be accessed locally. The result was the entry of more ISPs in the market, which increased competition for customers. In July 1999, with the liberalization of the

[1] Global Electronic Commerce, page 174 (http://www.iie.com – 2001)

[2] http://www.nua.com/surveys (Oct. 1, 2002) - this is a weekly newsletter for Internet *demographics and trends*

telecommunications market in the country, the Communication Commission of Kenya (CCK) was formed to regulate the ICT sector.

The CCK further indicates that the Kenya Communications Act (1998) and Telecommunications and Postal Sector Policy (2001) were implemented to ensure that the government maintained an effective and dynamic policy environment in the communications sector.[3] The Communications Act provided for the establishment of a National Communications Secretariat to formulate and update policies and to conduct research and analysis. According to the Telecommunications and Postal Sector Policy (2001) statement, the ISPs, Internet Exchange Point (IXPs) and cyber café service provision markets are fully liberalized while the international Internet backbone services are under the monopoly of Telkom Kenya Limited until June 2004 subject to the fulfillment of market demands and requirements.

Despite the government's efforts of encouraging growth in the sector, such as the reduction of the annual ISP operating fees by 70 percent in 1999 and reduced duty on information technology based equipment as pointed out by Adeya and Oyeyinka (2002), the development of the Internet in Kenya was hampered by erratic or non-existent telecommunication facilities in various parts of the country. In addition to this, the absence of an efficient regulatory regime also compromised the development of the Internet and the growth of the Internet business. This limited the growth of Internet services within urban areas and especially the cities of the country namely Nairobi, Mombasa and Kisumu. Furthermore, despite the large number of licensed ISPs in the country, the ISPs still paid high fees, on average 0.1 million Kenya shillings as annual license fees although in most parts of the world ISPs were neither licensed nor

[3] www.cck.go.ke/policy/policy/html (Dec. 2001)

regulated. In addition the ISPs had to use the state telecommunications monopoly, Telkom Kenya Limited, as it operated the main international Internet gateway and backbone service in Kenya.

Through the National Development Plan 2002 – 2008, the government has identified main constraints in the sector as being lack of policy guidelines in management of the sector; inadequate investment in basic ICT and complementary infrastructure; inadequate public awareness of the importance of ICT; and inadequate ICT education and training (Republic of Kenya, 2002). The Development Plan further indicates that the growth of the Internet industry has created a wide range of activities that have resulted to increased employment contributing towards poverty alleviation. The government further recognizes the existence of various opportunities such as the use of ICT in health care, education, research, delivery of government services, tourism, trade and commerce, thereby enhancing development through equitable access to ICT and technological education. With this in mind, the government intends to focus on specific objectives during the plan period 2002 – 2008 such as the increasing basic ICT infrastructure in both rural and urban areas; creating an ICT empowered small and medium size enterprises sector to participate in provision of value-added services; ensure affordable price access for public education; and creating widespread public awareness of the potential benefits of ICT among Kenyans. This together with the integration of ICT programmes in national development planning will enable the country to secure maximum contribution in development and poverty reduction efforts.

1.1.3 The Development of Cyber Cafes

The subsequent growth of cyber cafes around the world continues to have a significant contribution towards use of the Internet. As revealed by Angelone (1996),

the first Internet café was set up in London by an enterprising group of British entrepreneurs in 1994. The café known as 'cyberia' later expanded to other major cities in Europe and America. In America, as a result of extensive press coverage and media attention, the cyber cafes spread all over the United States, Canada and other parts of the western hemisphere. Filtering into the suburban and rural communities, cyber cafes later moved from big cities to smaller cities and towns throughout the world. Perhaps the greatest reason for their rapid expansion is the public's need to communicate.

The United Nations Conference on Trade and Development (Unctad, 2001) conducted a survey on ten less developed countries[4] to identify the application of e-commerce in business operations, the potential business opportunities resulting from the world wide web, and the governmental and non-governmental institutions involved in promoting and/or supporting e-commerce initiatives at the enterprise level. The survey highlighted the proliferation of internet cafes as viable access options for individuals. Different cities had experienced growth in this area; for example, Katmandu (Nepal) had over 1,000 Internet cafes, Lomé (300), Dar-es-Salaam (100), Dhaka (50), Kampala (25) and Maputo (10). The popularity of the internet cafes appeared to be unrelated to the cost or quality of ISP services but rather to a greater or lesser awareness on the part of the general public regarding the internet and its benefits. It was noted that as telecommunication infrastructure improved in the developing countries, internet use became more familiar and countries gained access to modern methods of communication.

[4] The Unctad survey covered Bangladesh, Cambodia, Ethiopia, Madagascar, Mozambique, Myanmar, Nepal, Togo, Uganda and Tanzania.

Jensen (2001) reported that shared or public access and the use of corporate networks had continued to grow at greater rates than the number of dial-up users. Due to the relatively high costs of phone lines and computers, public access services were on demand in urban areas. As a result of this, most countries experienced a rapid growth in the number of kiosks, cyber cafes and other forms of public Internet access, such as adding personal computers to community phone-shops, schools, police stations and clinics. This assisted individuals with low incomes to share the cost of Internet access amongst a larger number of users. This was exhibited by AfricaOnline ISP, which rolled out public access kiosks as part of its electronic – touch (e-Touch) franchise programme in the late 1990s. The programme entailed the provision of computers to local stores for Internet access. The ISP had approximately 100 thousand users spread across 740 outlets in Cote d'Ivoire, Kenya, Uganda, Tanzania and Zimbabwe. However, the outlets generated insufficient income to maintain them and could not match up to the increasing competition in the sector resulting to closure of a significant number of the Internet access kiosks.

1.1.4 Cyber Cafes in Kenya

Notably, cyber cafes in Kenya can be classified as small and micro enterprises within the informal sector of the country's economy. As defined in Sessional Paper No. 2 of 1992, cyber cafes fall into the category of the informal sector since they are privately owned businesses unregistered with the registrar of companies and employ between five persons on the lower limit and fifty persons on the upper limit. In the informal sector, the owner bears all the risks for making choices under uncertainty. It is also easy to enter, exit and create jobs in the sector. The cyber cafes basically act as retailers re-selling what they purchase from the ISPs.

In addition to this, it is worth noting that the overall growth of cyber cafes in Kenya has been slowed down by various factors. The NUA Internet surveys (2002) noted that Kenya had no policy in place to guide cyber café owners in the Internet business. In addition to this, bureaucracy, illiteracy, poverty and to some extent the lack of professionalism in the business sector hindered use of the Internet. The cyber café operators also had no control on one of the key components of their service: the reliability of access. This was because of the need to go through Telkom Kenya Limited, hence a curtailment in the process of competition over providing better access. It was further noted that there were too many cyber cafes chasing few customers. The market outside the main urban centers was also small indicating insignificant growth in Internet accessibility.

Probably the most important factor in explaining the phenomenal success of the cyber cafes is that they provide access to the Internet at a minimum cost to the customers. This is because they encourage the sharing of fixed costs among the customers who cannot afford private accessibility to the Internet and hence provide an affordable access to the Internet. The fixed costs refer to the cost of a computer unit, telephone line, ISP license fee, appropriate software and modem. The cafes thus create an affordable access to the Internet for majority of Kenya's population. With an increase in the number of cyber cafes especially in Nairobi, the use of the Internet has been on the rise over the years and the cyber cafes have become the major access providers of the Internet. This is clearly illustrated in Table 1 that indicates the growth in the number of licensed cyber cafes in Nairobi province. The table shows a significant growth in the number of cyber cafes at 49.4 percent during the periods between October 1999 and September 2001. The growth rate drops down to 37.0 percent in the subsequent period. Notably the price charged per minute for the services declined at an

initial rate of 60 percent and later to 50 percent. Despite the slump in prices for Internet services, the sector has experienced an increase in the number of cafes or bureaus. This gives an indication of growth in supply for Internet services through the public access bureaus.

Table 1.1: Growth of Cyber Cafes in Nairobi Province (October 1999 – September 2002)

Period	Number of cyber cafes	Average price per minute for Internet services (kshs)*
Oct. 1999 – Sept. 2000	85	5
Oct. 2000 – Sept. 2001	127	2
Oct. 2001 – Sept. 2002	174	Less than 2

* The prices computed by taking the mean of 10 randomly selected cyber cafes that have existed through the periods.

Source: Nairobi City Council Licensing Department

In addition to the above growth in the population of cyber cafes in Nairobi, the number of cyber café users has been on the rise. As mentioned by Tinega (2002), the Cyber Café Operators Association of Kenya statistics indicated that 75-80 percent of Internet users accessed the web through the cyber cafes. Less than 20 percent of such users accessed the web through corporate companies and institutions. Furthermore, the NUA Surveys (2002) indicated that shared or public access and the use of corporate networks had grown at a faster rate than the number of dial-up users in Africa. This is because it was estimated that each computer with an Internet connection usually supported more than three users, that is, more than three persons accessed the Internet at different intervals using the same computer. The major reason for this difference was the availability of cyber cafes and affordability of accessing the Internet. This offers a glimpse of an increase in the demand for the Internet services offered by the cafes.

Lewis (2002) sheds more light on the cyber cafes as being numerous and in competition for few customers. It was noted that in Nairobi the cafes seemed to survive

on the notion of attracting customers at initial stages with minimum surfing charges (normally less than 2 Kenya shillings) in order to develop a stable customer base with the expectation that rates would increase later. The cyber cafe business was also an adjunct to other businesses like restaurants or secretarial/telephone bureaus to which it drove traffic. Few cafes were noted to offer training in web design programmes or software while others offered services ranging from compact disk (CD) recording, digital imaging to more complex software. Markedly very little differentiated the cyber cafes, as most of the customers were inclined to consider price as the determinant of the choice of one over the other. A notable feature is that there is stiff competition and a significant number of cyber cafes have been outdone by others.

The mushrooming of cyber cafes and their continuous multiplication basically indicates two things. One, there has been a massive increase in the number of people who want, and need, to be on line for a variety of reasons without having a personal computer of their own for a number of reasons, the top being finance; and two, the increasing demand provides a unique opportunity offering attractive returns for small and medium entrepreneurs. The success (or otherwise) of Kenyan cyber cafes provides an interesting prism through which to look at how the cyber cafes have established themselves in the business world. No doubt the cyber cafes are popular and hence a need to identify the driving factors of their establishment.

1.2 Statement of the Problem

It is evident that the Internet cyber café market has been expanding with time together with an increase in the number of Internet users. As a result of this increase in demand for the services, the communication sector has attracted the establishment of numerous cyber cafes. This contradicts the NUA Internet Surveys (2002), which

established that growth in the cyber café' business has been limited by the lack of policy guidelines and professionalism. In addition to this, the low prices offered for accessing the Internet in comparison to increasing competition amongst the cafes' bring into question the cafes performance that enables them to be sustainable and competitive. Thus, the research paper aimed at investigating factors that affected the performance of the cyber café sector. In view of this, the following research questions were asked:

i) What are the driving forces behind the success or failure of the cyber cafes?

ii) What significant factors determine the performance of the cyber cafes?

iii) What are the policy recommendations that can be formulated and implemented to enhance the performance of the cafes?

1.3 Objectives of the Study

The specific objectives of the study were:

i) To identify the relevant factors that contribute to the success or failure of the cyber cafes;

ii) To specify and estimate a model of the determinants of cyber café performance in Nairobi; and

iii) To suggest policies and recommendations based on the study findings on how to improve performance of the cyber cafes in Nairobi province and Kenya in general.

1.4 Significance of the Study

The cyber café is being recognized as an essential point of access for Internet services as the Internet becomes an integral part of communication. No other business

is playing such an instrumental role as the cyber cafe in the process of bringing the future of Internet technology to the public. Hence an identification of the significant factors that lead to the success or failure of cafes may assist in maximizing the potential benefits of the cafes in the country. This may also provide knowledge that will enable sustainable operation of the cafes, as their social and economic benefits are important to local communities. In addition to this, the knowledge about the operations of the Internet cafes is limited. Therefore the paper attempted to shed light on the cyber café sector and be a basis for more research in other areas of Kenya and developing countries. The findings of the study may also assist government agencies in the formulation of relevant policies that may improve the operations of the cyber cafes.

1.5 Scope and Justification of the Study Area

The study was limited to the cyber cafes situated within Nairobi province that provided Internet services to the residents. This was brought about by the development of basic communication infrastructure and the existence of an elite society willing to take advantage of the services. Nairobi province was chosen on the basis of various considerations. First, it is the main capital city of the country having well developed basic communication infrastructure. This enables individuals and private firms to invest in the provision of Internet services. Second, the vast population within the city provides a large market for the cyber cafes to target. Third, no similar study has been conducted in the province and thus it provided a prolific basis for this research.

CHAPTER TWO
LITERATURE REVIEW

2.0 Introduction

In this chapter, literature that is relevant to this study is reviewed. In general, this literature is classified to be under the informal sector that includes those businesses that are unregistered with the registrar of companies and employ at least less than fifty persons. Thus the establishment of cyber cafes may be classified in this sector. Most of the literature reviewed examined the performance of small and micro enterprises in different sub-sectors.

2.1 General Literature Review

As eminent from a number of policy papers in Kenya, the informal sector is a source of livelihood to many individuals especially in the urban areas. According to Sessional Paper No. 2 of 1992 (Republic of Kenya, 1992), the informal sector contributes significantly to the economy in terms of goods and services. It also creates jobs at low capital cost especially to the fast growing service sector. The Republic of Kenya report (1972) on small business development distinguished that small enterprise performance in terms of job creation and expansion was negatively affected by a string of legislative procedures that set up standards for business operations in Kenya. This could be seen in the local authority by-laws and licensing procedures. Furthermore the operations of the enterprises was hampered by macro-economic variables namely inflation, taxation and devaluation of currency. The report indicates that government policies play a major role in ensuring a conducive environment prevails that encourages sustainable growth in the informal sector. Carl et al (1976) agrees that small enterprises

are an important part of the economy of all nations especially the less developed for they not only provide a major share of the national product but employment.

Ochieng (1987) studied the effects of credit on the growth of the informal sector. The study revealed that lack of credit facilities limited the growth of the informal sector and hence employment creation. It was evident that overall performance of the enterprises improved with the injection of additional finances. The variables studied included the quantity of sales, employment changes, levels of investment and innovativeness of the entrepreneurs. It was established that credit had a positive impact on the growth of the informal enterprises as incomes, investment and cash flow increased with time.

Kiriti (1987) estimated an earnings function for urban mechanics informal sector using a log linear model. The main aim of the study was to establish the factors that affected the earnings of the mechanics. It was noted that the factors influencing earnings fell under three categories, that is, human capital variables, demographic variables and capital. The results indicated that institutional factors played a major role in influencing earnings. The most statistically significant variable in the determination of earnings in the urban informal sector was the training acquired by entrepreneurs. The level of education also played a great influence on the earnings as it improved the communication skills of the entrepreneur. However, interference by government and city council inspectors affected the enterprises negatively by lowering earnings.

In addition to this, Dondo (1989) indicated that the government had the responsibility of creating an enabling environment for informal sector growth and participation in national development. Local authorities had the task of permitting

entrepreneurs to undertake business activities by paying for a single license per year, as this would encourage them to participate in various sub-sectors. Sessional paper No. 2 of 1992 suggests that the government should act as a facilitator and create a conducive environment where entrepreneurs can emerge, grow and develop. This is because the sector contributes significantly towards the country's GDP, for example, the sector accounted for 12 – 14 percent of Kenya's GDP in 1995. Notably, the employment growth was 10 percent per year for 1994 – 95 period. Musinga (1994) confirmed this by establishing that small-micro enterprises had a higher capacity to generate employment in the developing countries even in times of hash economic conditions. The study also revealed that small-scale firms that were young in terms of years in operation had higher growth rates since the informal sector grew rapidly and was the most dynamic segment of the Kenyan economy.

Onyango (1990) analyzed the relative importance of different variables on growth and performance of small-scale enterprises in urban centers. The income function was estimated using a linear model with the variables being credit, types of business, land acreage, maintenance of business records and education level. It was established that the performance of small-scale enterprises was affected by lack of credit facilities, entrepreneur skills and competition from formal multinational and national companies. Education level and land acreage were found to be insignificant and hence did not affect the performance of the enterprises. Markedly the study used income as a performance indicator, which does not determine the firm's ability to bear the costs of inputs.

Ondiege (1993) found that there was a significant difference between firms that had access to credit and those that did not. The overall performance of small-scale

enterprises improved with the availability of credit. The study established that the provision of credit facilities to the sector would lead to increased employment, income and profit margin levels. The study further revealed that apart from credit, employment level was influenced by the labour force size, sales income and profits, human capital, capital stock, prevailing wages and macroeconomic policies. The study employed working capital to determine its relative significance in determining the performance of the enterprises.

In identifying factors that inhibited growth of the informal sector, Kibas (1995), noted that lack of working capital was a major barrier to the expansion of small-scale enterprises. The study pointed out that profit and sales in the informal sector improved when credit was provided. New jobs and linkages with other institutions were also created. Thus if loans were extended they would remove the barrier and allow for expansion and growth in terms of increased earnings and absorption of more employees. In addition, the percentage increase in profits after a similar loan was given was higher in services and trade sector than in the manufacturing sector. The study recommended undertaking of empirical studies to determine how enterprises in Kenya can grow because their growth would result to an expansion of the economy.

2.2 Specific Literature Review

Mbuthia (1998) studied the informal food sub-sector in Nairobi in an attempt to analyze the profitability and linkages of the food kiosks. The assumption was that profit was a function of input and output prices, Ministry of Health inspections, level of education and training, years of experience, age, gender, size, age and location of the food kiosk, variety of food and drinks, type of financing and working capital. On

estimating the model using both linear and log-linear model specifications, working capital was found to be the most statistically significant variable in profit determination in informal food kiosks. Other factors identified as significantly affecting profits included output price, degree of competition and gender differences. The study recommended that the government and other stakeholders of the informal sector should help in financing the operations of the entrepreneurs by improving the accessibility channels to credit facilities. To reduce the level of competition, the city council should allocate plots to build food kiosks based on population density. However, the study suggested that profitability determinants in other informal sub-sectors be studied as factors vary from sub-sector to sub-sector.

Ngui (2001) investigated factors that determined the performance of woodwork and metalwork enterprises. Profit was used as a performance indicator that was significantly affected by working capital, licensing, competition and entrepreneur's level of education. Further, the study found that finance was the major constraint in the expansion of the enterprise. It was also impossible to obtain previous profit records since the entrepreneurs did not have proper records. The study recommended that the government and other stakeholders to provide both financial and non-financial services at affordable rates to the small business operators and entrepreneurs. In addition the relevant authorities should provide land to the entrepreneurs and construct affordable structures that would reduce the level of competition.

2.3 Overview of the Literature

Notably, the reviewed studies focused solely on the performance of small-scale enterprises, adapting different variables as their measure of performance and growth. It

is a consensus that the small-scale enterprises play a significant role in the country's economy. Additionally Ochieng (1987), Ondiege (1993) and Kibas (1995) focused on the impact of credit on the earnings. Their observations were that credit improved the earnings and hence increased employments resulting in higher profits. However, the studies overlooked other entrepreneur and business characteristics that impacted on the sector performance. Of importance, the studies failed to observe the factor of location of the enterprises that is a crucial determinant in the business environment. Nevertheless the studies are useful to this study as they indicate the significance of credit availability as a major factor in enhancing the informal sector's performance. Kiriti's (1987) study established factors that affected the earnings of mechanics. The study mainly focused on the entrepreneur characteristics that affected the earnings of the owner. This indicated the importance of human capital as a significant variable in determining earnings. However, the use of earnings as a measure of improved performance of the enterprise does not accommodate the firms' expenditures and hence earnings may increase but profits remain stagnant, thus the overall performance of the sector remains at the same level. This also applies to Onyango's (1990) study as it adopted income as a measure of the overall performance of the small-scale enterprises. Onyango identified credit, entrepreneur skills and competition as being important variables in affecting the incomes of the businesses. Markedly Mbuthia's (1998) and Ngui's studies concentrate on the factors that affect profits different sub-sectors of the informal enterprises. Mbuthia's study identified working capital, output price, gender differences and degree of competition as being significant variables that affect the performance of enterprises. In addition to working capital and competition, Ngui's study noted that the entrepreneur's level of education was a significant factor. This raises the question of whether similar traits would be observed in the cyber café sector and whether insignificant factors in previous performance studies would be otherwise.

This study will adopt some of the variables in addition to others that are present in the sub-sector. However, the study will adopt output as a measure of performance and examine whether similar results will be obtained as compared to other performance studies.

CHAPTER THREE

THEORETICAL FRAMEWORK AND RESEARCH METHODOLOGY

3.0 Introduction

This chapter presents the theoretical and empirical framework that was employed in the attempt to achieve the objectives of the study. The chapter also presents the methodology used to collect the data. In order to develop the model, the study made the following assumptions:

i) The cyber café was the unit of analysis, with an unconstrained objective of providing Internet services for sale.

ii) The cyber café was faced with a well-behaved (differentiable) cost function that was non-decreasing in factor prices and homogenous of degree one in factor prices.

3.1 Theoretical Framework

Let the cyber café's cost function be given by

$$C = C(w, y) \tag{3.1}$$

where w is the vector of prices of the factors and y represents the units of output. The cost function summarizes the nature of the firm's technology as it describes the economic possibilities of the firm. Assuming that the cyber café employs two factor inputs, capital (K) and labour (L) in its production process with prices w_1 and w_2 respectively, then the cost function may be specified as,

$$C(w, y) = y\, w_1^{\alpha}\, w_2^{1-\alpha} \tag{3.2}$$

where the exponents α and $1-\alpha$ are an indicator of the degree of homogeneity satisfying the condition $0 < \alpha < 1$. The basic postulation of most economic analysis of a firm's behaviour is that the specification of a differentiable cost function, C(w, y), is equivalent to the specification of a differentiable production function. This is because the cost function is a sufficient statistic for the technology as the economically relevant information about the technology can be obtained from the cost function.[5] Applying the Shephard's Lemma derivative property on equation (3.2) yields the capital (K) and labour (L) factor demand equations, that is,

$$K = \alpha y w_1^{\alpha-1} w_2^{1-\alpha} = \alpha y \left[w_2/w_1\right]^{1-\alpha}$$

$$L = (1-\alpha)\, y w_1^{\alpha} w_2^{-\alpha} = (1-\alpha)\, y \left[w_2/w_1\right]^{-\alpha} \qquad (3.3)$$

Rearranging each equation gives

$$w_2/w_1 = (K/\alpha y)^{1/1-\alpha} \qquad w_2/w_1 = [\, L/(1-\alpha)y\,]^{-1/\alpha} \qquad (3.4)$$

Setting these equal to each other and raising both sides to the $-\alpha\,(1-\alpha)$ power in order to solve for y yields the Cobb-Douglas technology or production function that satisfies the assumptions of the cost function. The Cobb-Douglas production function is thus stated as,

$$y = [\alpha^{\alpha}(1-\alpha)^{1-\alpha}]\, K^{\alpha} L^{1-\alpha}$$

$$y = A\, K^{\alpha} L^{1-\alpha} \qquad (3.5)$$

where $A = \alpha^{\alpha}(1-\alpha)^{1-\alpha}$ is the efficiency parameter or level of technology, K and L are the factor inputs (capital and labour respectively) and the exponents α and $1-\alpha$ are elasticities, respectively with respect to labour and capital.

[5] Varian (1992)

3.2 Empirical Framework

Economic theory puts forward that a relationship exists between output and inputs. The two inputs namely, capital and labour are aggregate and hence it's justifiable to disaggregate them into other variables. Capital can be disaggregated into rent (Rt), computer repair costs (Cr), form of financing (Ff), competition (Cp) and age of the investment (Ag). Labour can be disaggregated into the wages (Ws) and hours of operation (Hr). Thus the production function can first be improved by substituting α_i for α, β_j for 1-α, X_i for K and Z_j for L and stated as

$$y = A \prod_{i=1}^{n} X_i^{\alpha i} \prod_{j=1}^{m} Z_j^{\beta j} \qquad (3.6)$$

where $X_i = \{Rt, Cr, Ff, Cp, Ag\}$; $Z_j = \{Ws, Hr\}$ and i = 1,2, …., n; j = 1,2, …..,m.

Incorporating the above stated variables, the cyber café Cobb-Douglas production function can be expressed as;

$$y = A\, Rt^{\alpha 1}\, Cr^{\alpha 2}\, Ff^{\alpha 3}\, Cp^{\alpha 4}\, Os^{\alpha 5}\, Ag^{\alpha 6}\, Ws^{\beta 1}\, Hr^{\beta 2}\, e^{\mu} \qquad (3.7)$$

where y is the output per month, $0<\alpha_i, \beta_j<1$, μ is the error term and the other variables are defined above. Taking the logs of the parameters in equation (3.7) transforms the equation into linear form that may be stated as,

$$\log y = \log (A) + \alpha_1 \log (Rt) + \alpha_2 \log (Cr) + \alpha_3 Ff + \alpha_4 \log (Cp) + \alpha_5 \log (Ag)$$
$$+ \beta_1 \log (Ws) + \beta_2 \log (Hr) + \mu_1 \qquad (3.8)$$

This enables the model to be estimated using ordinary least square (OLS) method as it is easy to interpret the Cobb-Douglas production function in its linear form.

3.3 Expectations

With the adoption of the stated empirical model, the study had a number of expectations. From economic theory, the Cobb-Douglas production function is homogenous of degree $\alpha_i + \beta_j$ which in this case is equal to one, that is, homogenous of degree one. Thus each of the α_i and β_j were expected to be positive but less than one. Since production is a function of factor prices, it was expected that as the rent and wages increased, then output of the firm would also rise. The increase in cost in repair of computers was expected to reduce the output of the cyber café. Competition was expected to reduce the performance of the cafes as the nearer they were to each other the lower would be their output. A cyber café that had received a loan in its establishment process was expected to exhibit higher output. In addition, cyber cafes that had been in operation for longer periods were expected to exhibit higher levels of output than newly established cafes. The cyber cafes operating for longer durations were expected to attract more customers compared to those that operated for lesser periods of time. Therefore, these cyber cafes were expected to exhibit higher levels of output as compared to those that operated for shorter durations. The cafes that incurred higher wage bills were also expected to exhibit higher output compared to those that paid low levels of wages.

3.4 Definition and Measurement of Variables

The variables in question and their mode of measurement are defined below.

iable	Definition	Mode of measurement
	Output	Number of minutes used per computer per day multiplied by the number of computers in the cyber café times the total days of operation per month
	Wages	Number of employees multiplied by the average wage per month in shillings
	Rent	Shillings per month
	Computer repairs	Average cost incurred in repairing computers per month in shillings
	Form of financing	Dummy; 1 if entrepreneur has received loan and 0 otherwise.
	Age of the cyber café	Number of months of operation
	Competition	Distance between one cyber café and the nearest cyber café
	Hours of operation	Total hours that the cyber café is open to the public per month. This is the number of hours per week times four.

3.5 Area of Study

Nairobi is Kenya's principle economic, administrative and cultural center. The province hosts the capital city and is situated at an elevation of about 1600 meters (about 5450 feet) above sea level in the highlands of the southern part of the country. The province covers an area of 696.1 square kilometers and is divided into eight administrative divisions namely Central, Dagoretti, Makadara, Kasarani, Embakasi, Pumwani, Westlands and Kibera. Nairobi has an estimated population of 2.1 million people (Republic of Kenya, 2001).

Nairobi province was chosen on the basis of various considerations. First, it is the main capital city of the country having well developed basic communication infrastructure. This enabled individuals and private firms to invest in the provision of Internet services. Second, the vast population within the city provided a large market for the cyber cafes to target. Third, no similar study has been conducted in the province and thus it provided a prolific basis for the research.

3.6 Sampling Procedure

The sample population was drawn from cyber cafes located within Nairobi province whose main purpose was to provide Internet access to the public. The study obtained a sampling frame of licensed cyber cafes within the province from the Nairobi City Council Licensing Department. The cyber cafes were categorized according to their locations in the eight divisions of the province yielding eight sampling frames. From these sampling frames, the study adopted the two – stage cluster sampling procedure whereby a final sample was selected in each constituency. The target was to interview 80 cyber cafes from the entire population.

3.7 Research Instruments

In order to realize the stated objectives of the study, the researcher with the aid of an assistant distributed the questionnaires to the cyber cafes for self – administration. The questionnaires were mainly filled by the owners of the cafes and the management staff who were conversant with the operations of their respective café. The questionnaire is presented in Appendix 4.

CHAPTER FOUR

DATA ANALYSIS AND ESTIMATION RESULTS

4.0 Introduction

This chapter presents an analysis of the variables involved in the study and an estimation of the model presented in the previous chapter. In the first two sections, data description and data analysis is presented. The model estimation and analysis of the results are then discussed. The data analysis is divided into graphical analysis and data statistics. Eviews econometric software is employed in estimating the model. The analysis of the results is based on the estimation of the cyber cafe Cobb –Douglas production function for Nairobi province specified in Chapter three.

4.1 Data Description

This section presents the definitions of the dependent and the independent variables used in the study. Data was collected from 70 cyber cafes from Nairobi province on the following variables: the total hours used on the Internet by the cyber café per month (y); rent paid for the business space per month in Kenyan shillings (Rt); total cost of repair or maintenance of computers per month in Kenyan shillings (Cr); form of financing captured using a dummy, 1 if the café has received a loan and 0 if not (Ff); distance between a cyber café and the next cyber café in meters (Cp); cyber café age by number of months of existence (Ag); total wages paid to the employees per month in Kenyan shillings (Ws); and total hours of operation of the café per month (Hr).

4.2 Data Analysis

In this section, graphical analysis and descriptive statistics of the variables used in the study are presented.

4.2.1 Graphical Analysis

The graphs were obtained from the raw data collected from 70 cyber cafes in the divisions of Nairobi province. The variables as defined in 4.1 were plotted against the cyber cafes (respondents) to determine the distribution pattern and to identify any outlier observations. From the plots of variables, four outlier observations were identified. The outlier observations were removed from the sample. Thus the sample size was reduced from 70 to 66 observations. The variable plots from the raw data of the 66 respondents are presented below. Plots of the total hours used on the Internet by the cyber café per month (y); rent paid for the business space per month in Kenyan shillings (Rt); the total cost of repair or maintenance of computers per month in Kenyan shillings (Cr); the form of financing represented by 1 if the café has received a loan and 0 if not (Ff); the distance between a cyber café and the next cyber café in meters (Cp); cyber café age by number of months of existence (Ag); the total wages paid to the employees per month in Kenyan shillings (Ws); and total hours of operation of the café per month (Hr) are presented in Figures 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7 and 4.8 respectively.

Figure 4.1: Output per Month of the Cyber Cafes

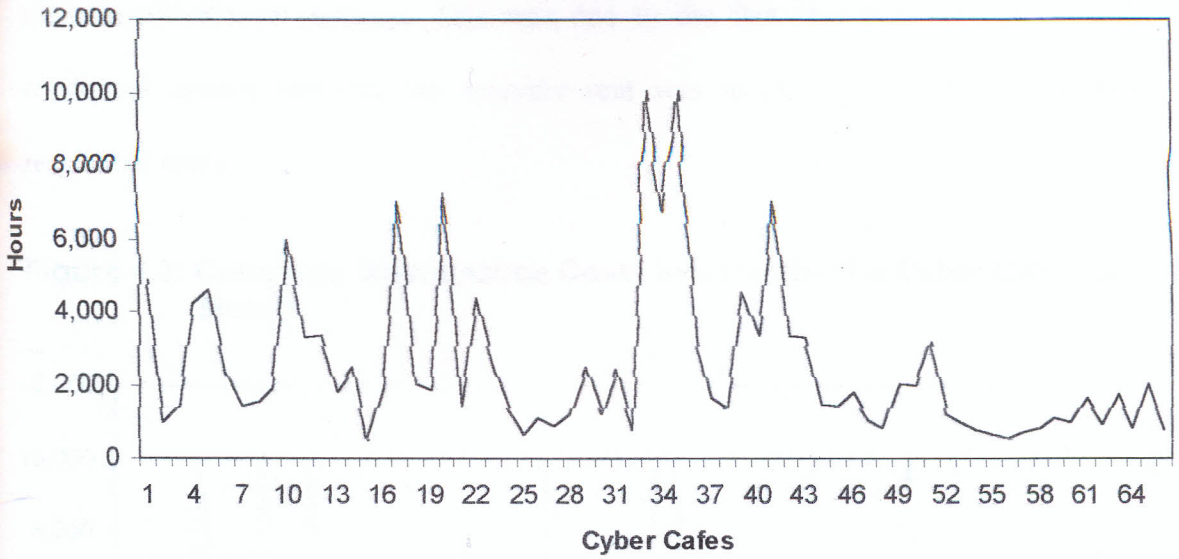
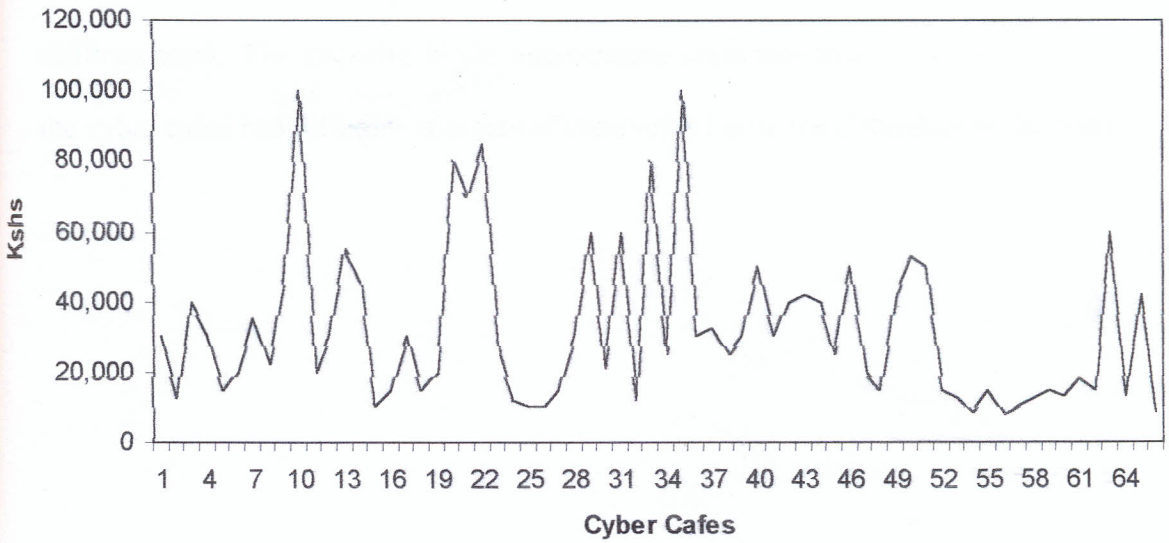


Figure 4.1 shows that a large proportion of the cyber cafes have an output that is below 4,000 hours per month. Only two cyber cafes from the total population recorded high levels of output at 10,000 hours per month which are indicated by the high peaks in the figure.

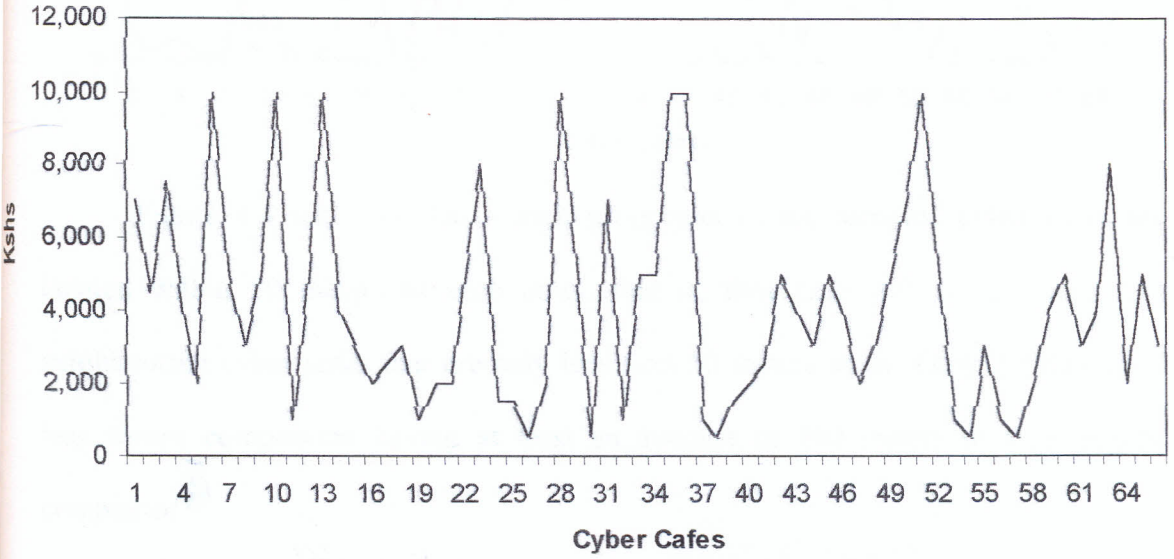
Figure 4.2: Rent Paid by the Cyber Cafes per Month



A large proportion of the cyber cafes paid a monthly rent of between 20,000 and 60,000 Kenya shillings, while the highest peak attained was at 100,000 Kenya shillings

as shown in Figure 4.2. A small proportion of the cyber cafes paid monthly rent of less than 20,000 Kenya shillings. This was due to the fact that they were located in residential estates whereby the monthly rent was much lower than that of non-residential areas.

Figure 4.3: Computer Maintenance Costs Incurred by the Cyber Cafes per Month



According to Figure 4.3, the costs incurred for maintaining the computers had high disparities from one cyber café to another but did not surpass the 10,000 Kenya shillings mark. The disparity in the maintenance costs was mainly due to the fact that the cyber cafes had different numbers of computers hence the difference in the costs.

Figure 4.4: Distance Between One Cyber Café and the Next

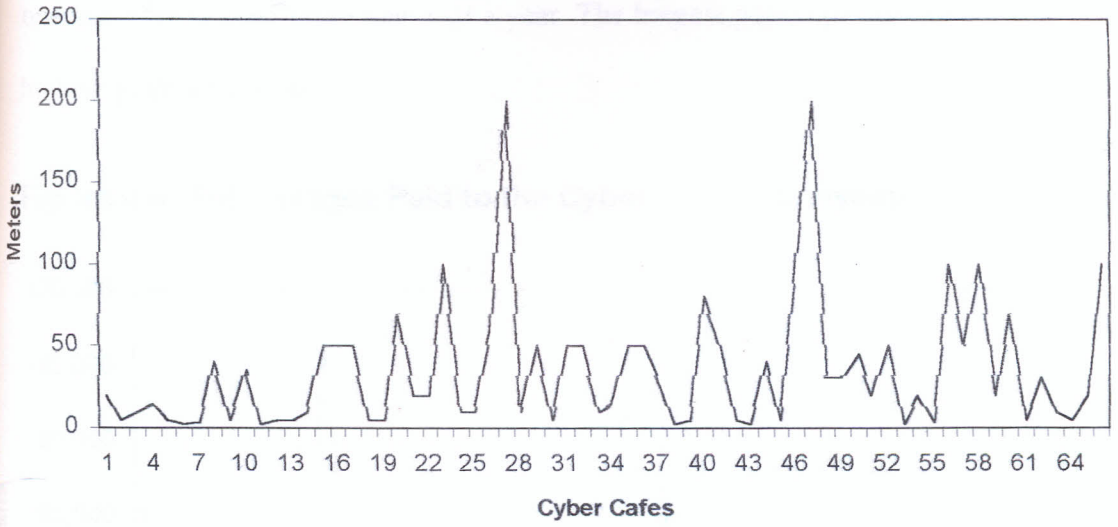


Figure 4.4 indicates that a high proportion of the sampled cyber cafes are located within 50 meters of each other, that is, they face stiff competition from neighbouring cyber cafes that are only less than 50 meters away. Only 2 cafes faced less severe competition having at least an average of 200 meters to their nearest competitor.

Figure 4.5: Age of the Cyber Café in Terms of Months

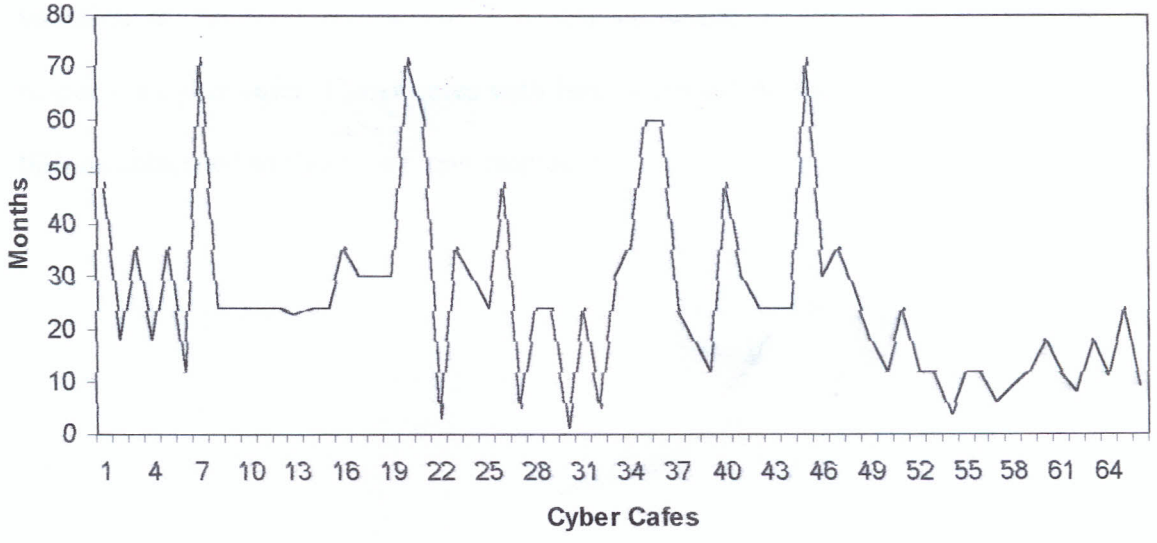
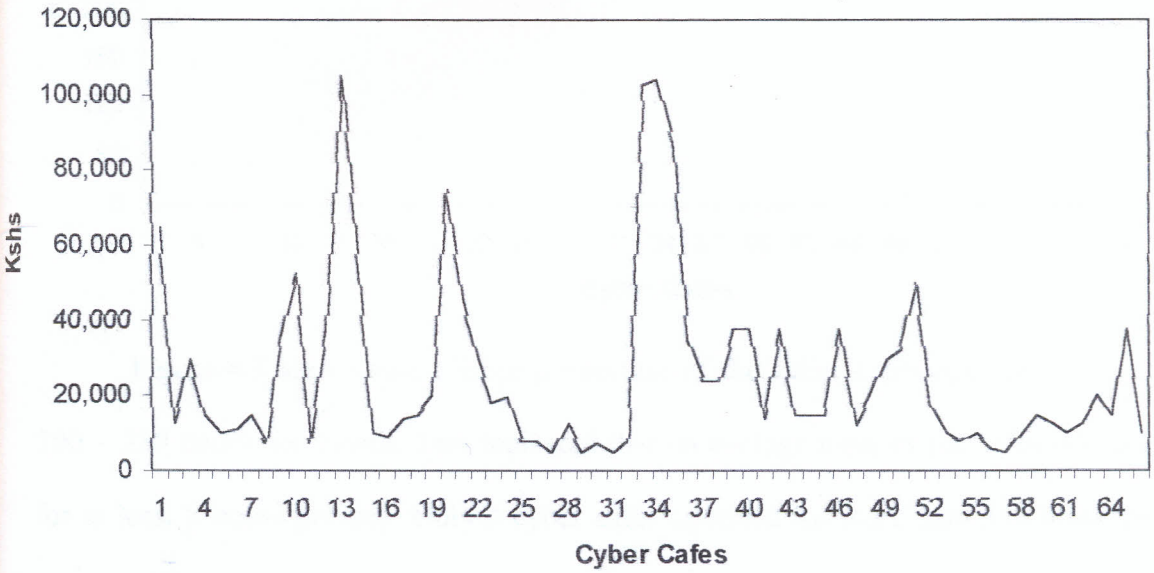


Figure 4.5 indicates that a significant number of the cyber cafes had been in operation for at least more than half a year. The longest period as indicated by the highest peak was 6 years.

Figure 4.6: Total Wages Paid to the Cyber Café Employees



According to Figure 4.6, the total wages paid by the cyber cafes was varied with only three cyber cafes incurring a wage bill of above 100,000 Kenya shillings. The variation in the total wages was a reflection of the number of employees in the respective cyber cafes. Cyber cafes with large numbers of employees had higher wage bills as compared to those with few employees.

Figure 4.7: Total Hours of Operation of Cyber Cafes per Month

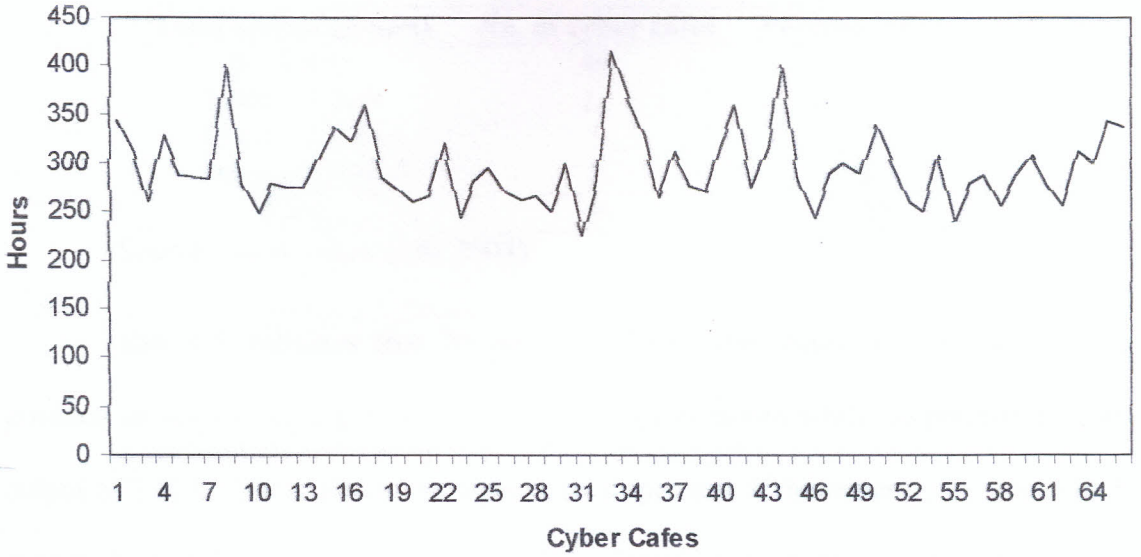


Figure 4.7 shows that a large proportion of the cyber cafes operated between 200 – 350 hours per month. This indicated that on average most of the cafes operated for at least 8 hours per day. Only 3 cyber cafes operated for more than 350 hours per month signifying that they operated for at least 12 hours per day.

4.2.2 Descriptive Statistics

The attributes of the cyber cafes are presented in this section. Percentages, mean and standard deviation together with tables are used to show the distribution pattern of the variables. Table 4.1 describes the total output produced by the cyber cafes, that is, the total hours used up on the Internet per month. Rent paid for the business space per month by the cafes, total cost of repair or maintenance of computers per month, competition between the cyber cafes, the age of the cyber café, total wages paid to the employees per month and the total hours of operation per month are respectively presented in Tables 4.2, 4.3, 4.4, 4.5, 4.6 and 4.7.

Table 4.1: Total Output of the Cyber Cafes per Month, Nairobi Province

Total output (hours)	No. of cyber cafes	Percentage (%)
0 – 2,500	46	70
2,501 – 5,000	13	20
5,001 – 7,500	5	7
Above 7,500	2	3
Total	66	100

Source: Survey data (July 2003)

Table 4.1 indicates that 70 percent of the cyber cafes in Nairobi province produce an output ranging from 0 – 2,500 hours per month while 20 percent have an output of 2,501 – 5,000 hours. No more than 10 percent of the cyber cafes have a high output above 5,000 hours. The mean number of total hours produced was 2,503.1 hours with a standard deviation of 2,166.3. The highest level of output for the cyber cafes was recorded as 10,080 hours while the lowest level was 50 hours.

Table 4.2: Rent Paid by the Cyber Cafes per Month, Nairobi Province

Rent (kshs)	No. of cyber cafes	Percentage (%)
0 – 25,000	34	52
25,001 – 50,000	21	32
50,001 – 75,000	6	9
Above 75,000	5	7
Total	66	100

Source: Survey data (July 2003)

Table 4.2 indicates that 52 percent of the cafes in Nairobi pay less than 25,000 Kenya shillings per month while 32 percent pay between 25,001 – 50,000 Kenya shillings as rent for their business premises. Only 16 percent of the cafes pay more than 50,000 Kenya shillings per month for their business spaces. The mean rent for the cafes was 32,200.3 Kenya shillings with a standard deviation of 22,650.1. The highest paid rent was 100,000 Kenya shillings while the lowest was 8,000 Kenya shillings.

Table 4.3: Cost of Maintenance of Computers per Month, Nairobi Province

Costs (kshs)	No. of cyber cafes	Percentage (%)
0 – 2,500	25	38
2,501 – 5,000	28	42
5,001 – 7,500	4	6
Above 7,500	9	14
Total	66	100

Source: Survey data (July 2003)

The study showed that 38 percent of the cafes incurred a monthly computer maintenance cost of up to 2,500 Kenya shillings while 42 percent incurred costs ranging from 2,500 – 5,000 Kenya shillings. Only 20 percent of the cafes had a maintenance cost above 5,000 Kenya shillings. The mean cost was 4,060.6 Kenya shillings with a standard deviation of 2825.0. The utmost cost incurred was 10,000 Kenya shillings while the lowest was 500 Kenya shillings.

Table 4.4: Distance Between Cyber Cafes, Nairobi Province

Distance (meters)	No. of cyber cafes	Percentage (%)
0 – 25	36	54
26 – 50	19	29
51 – 75	3	5
Above 75	8	12
Total	66	100

Source: Survey data (July 2003)

Table 4.4 shows that 54 percent of the cyber cafes faced stiff competition as the distance between the cafes was less than 25 meters whereas 29 percent had an estimated distance of 26 – 50 meters to their nearest competitor. Only 22 percent of the cafes faced less severe competition as the nearest cafes were at least 51 m and above. The mean distance between the cafes was 35.4 meters with a standard deviation of 40.9. The furthest distance between the cafes was 200 meters while the closest café was within 2 meters.

Table 4.5: Age of the Cyber Café, Nairobi Province

No. of months	No. of cyber cafes	Percentage (%)
0 – 12	19	29
13 – 24	24	36
25 – 36	14	21
Above 36	9	14
Total	66	100

Source: Survey data (July 2003)

From Table 4.5, it is evident that 29 percent of the cyber cafes had existed for a period of up to one year whereas 36 percent had been in operation for between 1 to 2 years. 21 percent of the cafes had at least been in operation for 2 – 3 years while 14 percent had operated for more than 3 years. The mean period of operation was 25.8 months or slightly more than 2 years with a standard deviation of 16.8. The longest period of operation was recorded as 6 years while the shortest was 1 month.

Table 4.6: Total Wages Paid by the Cyber Cafes per Month, Nairobi Province

Total wages (kshs)	No. of cyber cafes	Percentage (%)
0 – 25,000	44	67
25,001 – 50,000	13	19
50,001 – 75,000	4	6
Above 75,000	5	8
Total	66	100

Source: Survey data (July 2003)

Table 4.6 summarizes the total wages paid to the cyber café employees per month in Kenya shillings. It was observed that a bulk of the cyber cafes, that is, 67 percent incurred a total monthly wage bill of less than 25,000 Kenya shillings while 19 percent had a wage bill of between 25,001 – 50,000 Kenya shillings. 6 percent of the cafes incurred a wage bill of between 50,001 – 75,000 Kenya shillings while the remaining 8 percent paid total wages of above 75,000 Kenya shillings. The mean wage for the cyber cafes was 25,871.2 Kenya shillings with a standard deviation of 24,491.7.

The highest wage bill was 105,000 Kenya shillings while the lowest wage bill was 5,000 Kenya shillings.

Table 4.7: Total Hours of Operation per Month, Nairobi Province

Hours	No. of cyber cafes	Percentage (%)
0 – 100	0	0
100 – 200	0	0
201 – 300	42	64
301 – 400	21	32
Above 400	3	4
Total	66	100

Source: Survey data (July 2003)

From Table 4.7 majority of the cafes, that is, 64 percent operate for 200 – 300 hours per month while 32 percent operate for 300 – 400 hours. Only 4 percent of the cyber cafes operate for more than 400 hours per month. The mean hours of operation per month were 296.1 with a standard deviation of 39.3. The longest hours of operation were recorded as 416 hours (17 days) while the shortest were 226 hours (9 days).

Form of financing

The study also revealed that 34 percent of the cafes received financial assistance through loans to establish or improve the business. The remaining 66 percent did not receive any credit service in terms of loans.

4.3 Model Estimation

This section presents the results of the regression model specified in Chapter 3. The regression results are presented in terms of parameter estimates, measures of statistical reliability of parameter estimates (t-statistics), overall reliability of the model (F-statistic) and measure of the goodness of fit (adjusted R squared). Analytical tests were also conducted which mainly included calculation of the correlation matrix to determine the degree of multicollinearity between variables and determination of

heteroskedasticity by plotting residuals on a scatter diagram. Table 4.8 illustrates the estimation results of the linearized cyber café Cobb-Douglas production function. The correlation coefficient is presented in Appendix 2 whereas the plot of residuals is presented in Appendix 3.

The correlation matrix for the independent variables in the model indicated that the degree of multicollinearity between the variables was not high, although the cyber café's wages were moderately correlated with the cyber café's rent. The plot of residuals on a scatter diagram indicated that the data was homoskedastic since the residuals clustered around zero. This ascertains the assumption of ordinary least squares (OLS) regression method.

Table 4.8: Regression Results

Independent Variable	Coefficient	Std. Error	t-Statistic
C	-6.4759	2.9417	-2.2014
LRT	0.6153	0.1339	4.5935
LCR	-0.0428	0.0914	-0.4686
FF	-0.0227	0.1348	-0.1682
LCP	-0.0471	0.0523	-0.9006
LAG	0.1466	0.0893	1.6423
LWS	0.1322	0.1123	1.1773
LHR	1.1465	0.5059	2.2662

R – squared = 0.588561
Adjusted R – squared = 0.538905
Durbin Watson statistic = 1.512254
F – statistic = 11.852672

No. of observations = 66

Note:

LRT – Log rent
LCR – Log computer maintenance costs
FF – Form of financing
LCP – Log competition
LAG – Log age
LWS – Log wages
LHR – Log hours

4.4 Interpretation of Regression Results

Regression results show that 53 percent of the variations in the log of output were explained by the regression line. In the estimation there were two statistically significant variables, that is, rent (t-ratio = 4.5935) and hours of operation (t-ratio = 2.2662) at 5 percent level of significance. Other variables were statistically insignificant as their individual t-ratios were below 2.0. The F – statistic of 11.8526 is significant indicating that there is a significant linear relationship between the independent variables and output produced by a cyber café.

In the section below, each variable is discussed in regard to sign, significance and possible policy implications.

Rent paid by the cyber cafes (LRT)

The rent paid by the cyber cafes for use of the premises was statistically significant with a t-ratio of 4.5935. The variable demonstrated the expected positive sign. This implies that a one–unit increase in the rent will result in an increase in the level of output by 0.6153 units, which is in line with theory, since production function is non-decreasing in factor prices. Hence the cyber cafes that paid high rents exhibited higher levels of output as compared to those that paid low rents. Higher rents indicated large business space that had a capacity to accommodate numerous computers or equipments and as a result be able to serve a higher number of Internet users. This in turn yielded higher levels of output.

Cost of maintenance of computers (LCR)

The total cost incurred by the cyber cafes in maintenance of its computers was statistically insignificant with a t-ratio of - 0.4686. The coefficient of this variable was negative as expected indicating that a unit increase in the costs reduces the level of output.

Competition between cyber cafes (LCP)

Competition between the cyber cafes is expected to lower output. In this study competition is measured using the distance between cyber cafes. Therefore, output is expected to increase as the distance between the two cyber cafes increases. A coefficient of – 0.0471 was obtained. However, it was statistically insignificant with a t-ratio of - 0.9006. This was in contradiction with the expectation that the lower the distance (high competition) would yield lower level output. This is due to the fact that, as the distance between the cyber cafes decreases, the cafes have to compete for customers resulting into lower output compared to cyber cafes that faced less severe competition.

Age of the cyber café (LAG)

The age of the cyber café was positively related to output as expected. The coefficient had a t-ratio of 1.6423, which was statistically significant at 10 percent level of significance. This indicates that as the cyber café continues to operate for longer periods, its output is expected to increase. This can also be attributed to the fact that customers develop a habit of visiting the old cyber cafes.

Total wages paid by the cyber cafes per month (LWS)

As expected, the total wages paid by the cyber cafes had a positive effect on output. However, the coefficient had a t-ratio of 1.1773 that was statistically insignificant at both 5 and 10 percent level of significance. However, the positive sign of the coefficient was consistent with economic theory as an increase in labour input results into an increase in the output. Hence, cyber cafes that incurred higher wage bills comprised of higher numbers of employees resulting into higher levels of output.

Total hours of operation per month (LHR)

The total hours of operation of the cyber café was positively related to output as expected. This indicated that an increase in the hours of operation would result to an increase in the output of the cafes. The variable was statistically significant with a t-ratio of 2.2662. As a result, the cyber cafes that operated for 7 days of the week exhibited longer hours that in turn yielded higher levels of output.

Form of financing (FF)

Output differentials between self-financed cyber cafes and those that had access to credit was statistically insignificant with a t-ratio of 0.1682. In addition, the coefficient had a negative sign indicating a negative relationship with output. This was inconsistent with the expectation that businesses that had access to credit would yield higher levels of output.

4.5 Concluding Remarks

In order to achieve the stated objectives, the study employed both descriptive and inferential statistics. The descriptive statistics were used to establish the percentages, mean, standard deviations, minimum and maximum levels of the variables. Conversely, inferential statistics were used to analyze statistical results of the estimation model. The coefficient of determination (R^2) was approximately 0.54, implying that 54 percent of the variations in cyber cafes' performance in Nairobi province could be explained by the independent variables in the model.

Out of the independent variables, four variables exhibited a positive relationship with the total output of the cyber cafes. These variables included rent, age of the café, total wages and total hours of operation. Out of these, only total wages was statistically insignificant. The cost of maintenance of computers, form of finance and competition (distance between one cyber café and the next) were negatively related to output. The regression results further indicate that the cyber café Cobb-Douglas production function demonstrates increasing returns to scale function. This is due to the fact that the sum of the exponents exceeds one, that is, $\Sigma\, \alpha_i + \beta_j > 1$ (1.928). As a result a unit increase in the inputs would result into a more than one unit increase in the output.

CHAPTER FIVE

SUMMARY, CONCLUSION AND POLICY RECOMMENDATIONS

5.0 Summary

The Internet cyber café sector has experienced rapid growth in Kenya especially in the urban areas despite the absence of adequate policy guidelines. According to the Nairobi City Council Licensing Department, the number of cyber cafes in Nairobi has been expanding at an average of 43 percent per annum for the past four years. This indicates an existence of positive returns to investment in the sector that have resulted in an increase in the number of entrepreneurs willing to take advantage of the market. Thus, the study's main objective was to establish the factors that determine the performance of Internet cyber cafés in Nairobi province. Performance was measured in terms of the total output produced by individual cyber cafes. Descriptive and inferential statistics were employed in analyzing the data.

From the estimated model, the study revealed that the most statistically significant variable was rent that had a t-ratio of 4.5935. It was noted that 52 percent of the cyber cafes paid a monthly rent of less than 25,000 Kenya shillings while the remaining 48 percent paid more than 25,001 Kenya shillings per month. The rent indicated the location and size of the business. It was also noted that the high rents were existent in the central division of the province where the central business district was based. Hence the cyber cafes in the city center had to pay higher rents as compared to those in the residential areas. In addition, the high rents also indicated high levels of output and thus better levels of performance. This could be attributed to the high population that visits the business district every day and hence offer an attractive

market for the cafes. The hours of operation per month were also statistically significant. The study established that those cafes that operated for longer hours had an advantage in generating higher outputs than those that operated for shorter hours. It was noted that majority of the cafes (64 percent) operated for between 200 – 300 hours per month while 36 percent operated for more than 300 hours per month. In addition, it was also observed that the cyber cafes that paid high rents opened for longer hours and thus the resulting high output. The age of the cyber cafes was also statistically significant at 10 percent level of significance. Only 29 percent of the cyber cafes had operated for at least one year while 36 percent had operated for not more than 2 years. Thirty five (35) percent of the cafes had been in business for more than 2 years.

The distance from one cyber café to the next (competition), total wages, cost of computer maintenance and form of financing were all statistically insignificant in the estimated model. The results indicated that 83 percent of the cyber cafes faced severe competition as they were located within 50 meters of their nearest competitor. This indicated a reduction in the level of output of the cafes. An estimated 86 percent of the cyber cafes also incurred an average of not more than 7,500 Kenya shillings in terms of maintenance costs. This indicated manageable levels of maintenance of the computers that enabled the businesses to run efficiently. In terms of total wages paid by the cyber cafes per month, majority of the businesses (67 percent) paid a total of less than 25,000 Kenya shillings per month. This indicated that most of the cafes had few employees as compared to 14 percent of the cafes that incurred a wage bill of above 50,000 Kenya shillings. The study results also indicated that only 34 percent of the cyber cafes had access to credit which in turn did not have a positive influence on the performance of the businesses. Nevertheless, the coefficient of determination explained 54 percent of the variations in the determination of cyber café output.

5.1 Conclusion

The major finding of this study is that there exists a linear relationship between the independent variables and output in the linearized cyber café Cobb-Douglas production function. The estimated model reveals an increasing returns to scale relationship whereby a unit increase in the inputs would result into a more than unit increase in the output. Of this relationship, the variables rent, age of the cyber café, total wages and hours of operation were all positively related to output. Out of these four variables only total wages was statistically insignificant while age of the cyber café was significant at 10 percent level of significance. The costs of maintenance, form of financing and competition variables were all negatively related to output. The variables were also statistically insignificant in the estimated model. All the same, the regression results indicated that 54 percent of the variations in the cyber café Cobb-Douglas production function were explained by the independent variables.

5.2 Policy Recommendations

The results of this study have the following implications for policy:

i) By establishing themselves in different localities, the cyber cafes should also be encouraged to expand their services which in turn would result in increased employment opportunities. This could be achieved by expanding business space in the province that will enable the cafes to acquire more equipment and thus hire more labour and as a result increase their respective output.

ii) Measures to ensure high security levels should be attained and maintained to encourage the cyber cafes to operate for longer hours in order to generate higher output.

5.3 Limitations of the Study

The study was faced with the following limitations:

i) The study was faced with a number of qualitative data that could only be captured by dummies and the estimation of many dummy variables in the model would result in estimation problems.

ii) Some of the respondents were reluctant to give information required which resulted in incomplete questionnaires that lead to poor data quality specifically a measurement error.

5.4 Suggestion for Further Research

Given the significance of the cyber cafes in the provision of Internet services, it is suggested that further research be conducted in this IT field using time series data to establish the changes experienced in the sector in response to some of the policies contained in the current National Development Plan, 2002 – 2008 (Republic of Kenya, 2002). A survey on other factors such as demand and supply of the Internet services should be carried out on both the consumers and suppliers of the services. A survey could also be conducted to determine ways in which the cafes could be encouraged to invest in other urban areas of the country.

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APPENDICES

APPENDIX 1: Survey Data

Obs.	y	Rt	Cr	Ff	Cp	Ag	Ws	Hr
1	4,900	30,000	7,000	0	20	48	65,000	344
2	1,008	12,500	4,500	1	5	18	12,500	312
3	1,440	40,000	7,500	0	10	36	30,000	260
4	4,200	30,000	4,000	1	15	18	15,000	329
5	4,608	15,000	2,000	0	5	36	10,000	288
6	2,376	20,000	10,000	0	2	12	11,000	286
7	1,440	35,000	5,000	0	4	72	15,000	284
8	1,512	22,000	3,000	0	40	24	7,500	400
9	1,920	45,000	5,000	1	5	24	35,000	280
10	5,952	100,000	10,000	1	35	24	52,500	248
11	3,267	20,000	1,000	1	2	24	7,500	280
12	3,360	30,000	5,000	0	5	24	37,500	276
13	1,800	55,000	10,000	0	5	23	105,000	276
14	2,464	45,225	4,000	0	10	24	60,000	308
15	504	10,000	3,000	1	50	24	10,000	336
16	1,920	15,000	2,000	0	50	36	9,000	322
17	7,000	30,000	2,500	0	50	30	14,000	360
18	2,016	15,000	3,000	1	5	30	15,000	286
19	1,848	20,000	1,000	1	5	30	20,000	274
20	7,215	80,000	2,000	1	70	72	75,000	260
21	1,440	70,000	2,000	1	20	60	45,000	268
22	4,368	85,000	5,000	0	20	3	30,000	320
23	2,592	25,000	8,000	0	100	36	18,000	244
24	1,344	12,000	1,500	0	10	30	19,500	282
25	672	10,000	1,500	0	10	24	8,000	296
26	1,080	10,000	500	0	60	48	8,000	272
27	880	15,000	2,000	1	200	5	5,000	264
28	1,200	30,000	10,000	1	10	24	12,500	268
29	2,464	60,000	5,000	0	50	24	5,000	250
30	1,213	21,000	500	0	5	1	7,500	300
31	2,400	60,000	7,000	0	50	24	5,000	226
32	792	12,000	1,000	0	50	5	8,000	280
33	10,080	80,000	5,000	0	10	30	102,500	416
34	6,720	25,000	5,000	1	15	36	104,000	368
35	10,080	100,000	10,000	0	50	60	87,500	328
36	3,200	30,000	10,000	0	50	60	35,000	266
37	1,633	32,500	1,000	0	30	24	24,000	312
38	1,344	25,000	500	1	3	18	24,000	278

39	4,560	30,000	1,500	0	5	12	37,500	272
40	3,360	50,000	2,000	1	80	48	37,500	316
41	7,000	30,000	2,500	0	50	30	14,000	360
42	3,360	40,000	5,000	0	5	24	37,500	276
43	3,267	42,000	4,000	1	2	24	15,000	316
44	1,470	40,000	3,000	0	40	24	15,000	400
45	1,440	25,000	5,000	0	5	72	15,000	284
46	1,800	50,000	4,000	0	100	30	37,500	244
47	1,040	20,000	2,000	0	200	36	12,000	290
48	800	15,000	3,000	0	30	27	20,000	300
49	2,020	42,000	5,000	0	30	18	30,000	290
50	1,960	53,000	7,000	0	45	12	32,500	340
51	3,160	50,000	10,000	0	20	24	50,000	300
52	1,206	15,000	5,000	1	50	12	17,500	260
53	986	12,500	1,000	0	3	12	10,000	250
54	760	8,500	500	0	20	4	8,000	308
55	680	15,000	3,000	1	4	12	10,000	240
56	540	8,000	1,000	0	100	12	6,000	280
57	732	10,000	500	0	50	6	5,000	288
58	846	12,500	2,000	0	100	9	10,000	256
59	1,080	15,000	4,000	1	20	12	15,000	288
60	960	13,000	5,000	0	70	18	12,500	308
61	1,640	18,000	3,000	1	5	12	10,000	280
62	932	15,000	4,000	0	30	8	12,500	256
63	1,736	60,000	8,000	0	10	18	20,000	312
64	800	13,000	2,000	1	5	11	15,000	300
65	2,026	42,000	5,000	0	20	24	37,500	344
66	792	8,500	3,000	1	100	9	10,000	336

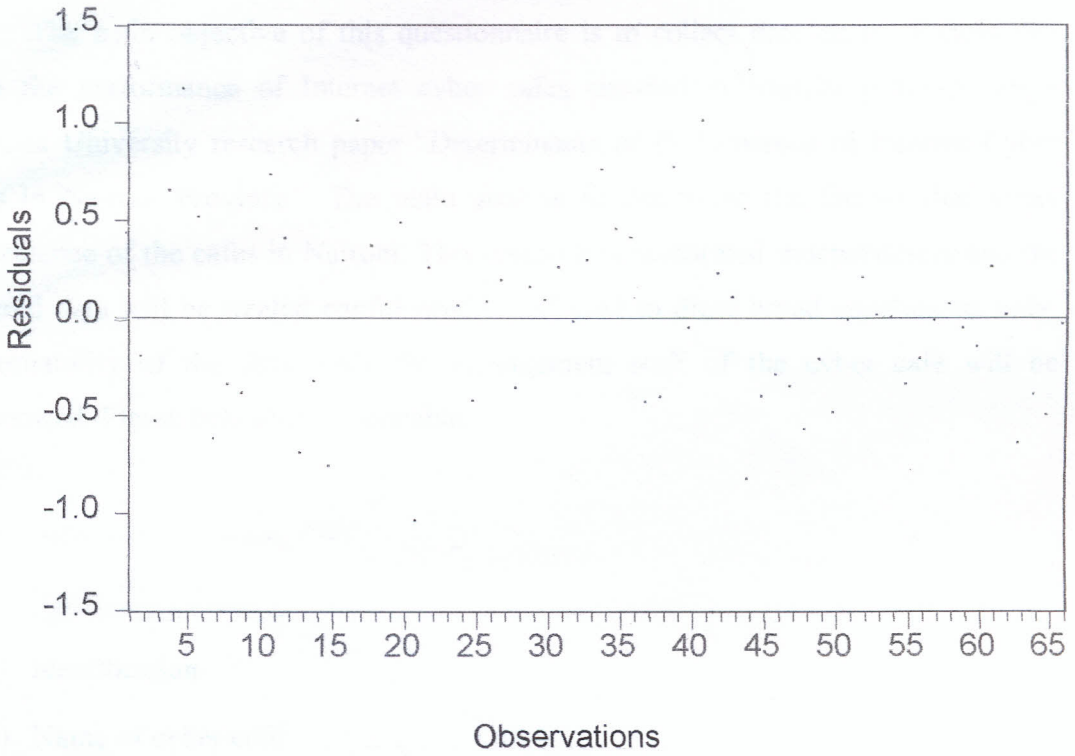
Source: Survey data (July 2003)

Note:
Obs - observation
y – output
Rt – rent
Cr – cost of maintenance of computers
Ff – form of financing
Cp – distance from one cyber café to the next (competition)
Ag – age of the cyber café
Ws – total wages paid per month
Hr – total number of hours of operation per month

APPENDIX 2: Correlation Matrix between Variables

	lrt	lcr	ff	Lcp	lag	lws	lhr
lrt	1	0.547329	-0.074274	-0.026654	0.349594	0.666632	0.069348
lcr	0.547329	1	-0.043906	0.000744	0.345212	0.459823	0.028841
ff	-0.074274	-0.043906	1	-0.184569	0.013297	0.013463	-0.096534
lcp	-0.026654	0.000744	-0.184569	1	0.023758	-0.114066	0.052665
lag	0.349594	0.345212	0.013297	0.023758	1	0.418638	0.048841
lws	0.666632	0.459823	0.013463	-0.114066	0.418638	1	0.198802
lhr	0.069348	0.028841	-0.096534	0.052665	0.048841	0.198802	1

APPENDIX 3: Plot of Residuals



APPENDIX 4: Questionnaire

The main objective of this questionnaire is to collect data on the factors that affect the performance of Internet cyber cafes situated in Nairobi province for a Kenyatta University research paper "Determinants of Performance of Internet Cyber Cafes in Nairobi Province". The main goal is to determine the factors that affect performance of the cafes in Nairobi. This research is performed independently and the gathered data will be treated confidentially and used to draw broad conclusions only. For reliability of the data, only the management staff of the cyber café will be interviewed. Please tick where applicable.

Date .....

A. Identification

1) Name of cyber café .....

2) Location of cyber café

   i. Division – Central [ ] Dagoretti [ ] Pumwani [ ] Makadara [ ]
   Embakasi [ ] Kibera [ ] Kasarani [ ] Westlands [ ]

   ii. Street .....

   iii. Building .....

   iv. Floor .....

3) Name and position of respondent .....

B. Cyber café details

4) How long has the cyber cafe been in operation? .....months / years.

5) For how many days of the week does the café operate? .....days

6) The cyber café operates from .....a.m/ p.m. to .....a.m/ p.m.

7) If the cyber café operates on weekends, please state the hours of operation if they are different from weekdays.
   Saturday ..... to ..... Sunday ..... to .....

8) How many operating computers are in the cyber café? .....

9) How many computers are connected to the Internet? .....

10) How much rent per month does the cyber cafe pay for use of the business space? .....Kshs

11) What are the average costs incurred by the café in repairing its computers per week or per month? .....Kshs

12) Has the owner of the cyber café ever received a loan for the sole purpose of starting or improving the cafes operations? Yes / No

13) How many persons are employed in the cyber café? .....

14) How much do you pay each of them?

	No. of Employees	Wage per month
i)	.....	.....
ii)	.....	.....
iii)	.....	.....
iv)	.....	.....
v)	.....	.....

15) What is the total number of minutes or hours used on the Internet per day for one computer in the cyber café? (Please select any computer at random)

Computer number.....

Number of minutes / hours .....

16) How many customers on average visit the cyber café;

per hour – .....persons

per day – .....persons

C. General Information

17) What is the distance from your cyber café to the next cyber café? ..... meters

Thank you for taking the time to fill in this questionnaire.