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Community-Based Information Technology Access: The Case of Cybercafé Diffusion in Sub-Saharan Africa

Abstract

Information and Communications Technology (ICT) use and access in Sub-Saharan Africa continue to increase significantly and has proven to be the major catalyst for users to access and share information and knowledge resources globally. However, most users' personal access to ICTs, such as the internet from home and work place, is hugely constrained due to lack of adequate infrastructure and affordability. With per capita incomes averaging less than $500 in most of Sub-Saharan Africa, families can hardly afford personal computers at home nor internet access charges. Although there is an increase in the number of PC's at work places and homes in most of Sub-Saharan Africa, most are not networked and hardly have internet access. Public and private educational institutions such as high schools, community colleges, universities, professional schools, and public libraries offer none or limited Internet access to their students, staff and faculty, while Small and Medium Enterprises (SME's) have limited or no access to Internet due to high access costs coupled with inadequate ICT Infrastructures. Thus, most SME's hardly engage in any form of e-commerce. The licensing of Internet Service Providers (ISP's) in some Sub-Saharan African countries only started in recent years as governments started liberalizing their telecommunications regimes. These ISP's, local entrepreneurs, and in some cases the incumbent telecommunications company responded to these constraints by building Internet community access centers called Cybercafés. This paper is an exploratory study of the diffusion of Cybercafés within the Sub-Saharan African region by analyzing country case studies. Our findings suggest that these Cybercafés were more affordable and reduced the constraints faced by users in terms of infrastructure, access to PC's and related ICT's. This increased the number of users from different socio-economic backgrounds accessing and using the Internet for social, political, educational, and economic reasons. We also found a gradual and steady increase in the number of Cybercafés, the quality of service and increased affordability.

Introduction and Background

The Internet has become an important medium for social, political, educational, and economic activities as well as extending knowledge resources and repositories, and enhancing access to information and knowledge sharing in and from Sub-Saharan Africa. Sub-Saharan Africa, home to 32 of the 48 least developed countries in the world, has a population of nearly 659 million people, and spans over twenty-four million square kilometers. Sub-Saharan Africa has historically been associated with inadequate telecommunications infrastructure and low penetration of personal computers per capita [13]. Access to and sharing of information and knowledge resources is quite limited, and often communication cost is quite high due to the inadequacy of telecommunications infrastructure and lack of competitive environment in the ICT sector. This lack of competitive environment in the telecommunications sector hinders the rapid diffusion of basic resources, such as telephone and wireless infrastructure, needed to establish Internet presence.

Previous research has associated the level of a country's basic telecommunications infrastructure with its teledensity [13], defined as the number of land telephone lines per 100 people. Sub-Saharan Africa significantly lags behind other regions of the world in terms of teledensity. While there are only about two main telephone lines per 100 persons in all of Africa, there is less than one telephone line per 100 persons for most Sub-Saharan African countries (Figure 1). These figures are substantially lower than the 7 per 100 in Asia, 10 in Latin America and the Caribbean, 37 in Europe, and 66 in the United States. With such low teledensity figures, the prospects of catching up with more developed countries in Internet use look grim.

Telephone Density 2000
- <1
- 1-5
- >5-10
- >10

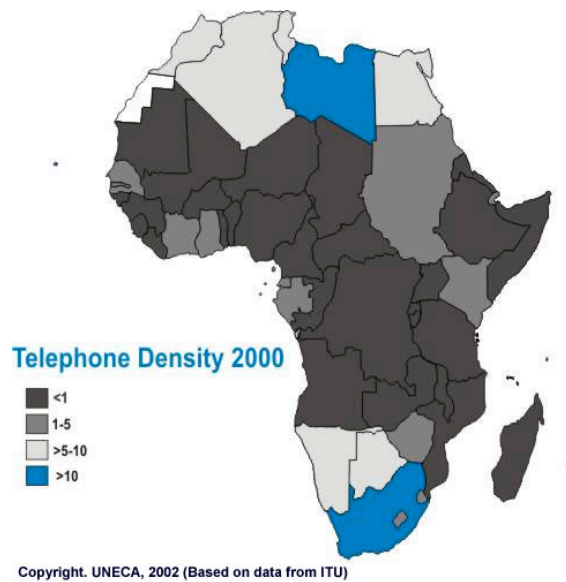Copyright. UNECA, 2002 (Based on data from ITU)

Figure 1. Low teledensity within the Sub-Saharan Africa region

Even though most countries in Sub-Saharan Africa have established Internet links, access is often quite expensive and is restricted to few users concentrated mostly in major cities. Currently, the average cost of using a local dialup Internet account for 20 hours a month in Africa is about US$68 per month (Figure 2). These costs include usage fees and local call telephone time, but not telephone line rental. The monopolistic structure of the telecommunications market in Sub-Saharan Africa and the parochial culture of the providers explain the exorbitant tariffs charged, and hence, high Internet access costs. Given that about 70% of Sub-Saharan Africans live in rural areas, and live at subsistence levels, it is almost impossible for the average person to afford such high Internet costs.

In terms of technology, most of Sub-Saharan African telecommunications switching is still done using analog equipment causing difficulty and inefficiency to network digital traffic using

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computers. Furthermore, policy makers often view telecommunications as a low priority, only meant for a select few, typically the urban 'elite.' These rigid practices isolate the majority of the population that would like access to information in order to participate in knowledge sharing and access. Through additional restrictive measures that stunt any innovative use of telecommunications technology to improve and expand the infrastructure, especially wireless telecommunications and voice over IP(VOIP) and other emerging technologies, the issue is even more acute in the case of Africa's vast rural population who remain isolated because of their inability to access and share information. Overtly regulated and covertly restrictive information inequality is markedly high, due to unscrupulous business practices, and capricious, and sometimes rigid, public policies. In fact, several Sub-Saharan African countries have laws that prohibit VOIP so that the government-run telephone provider can continue to control the telephone infrastructure and charge customers exorbitant prices. This further contributes to high telephone, and by extension, high Internet connection costs (Figure 2).
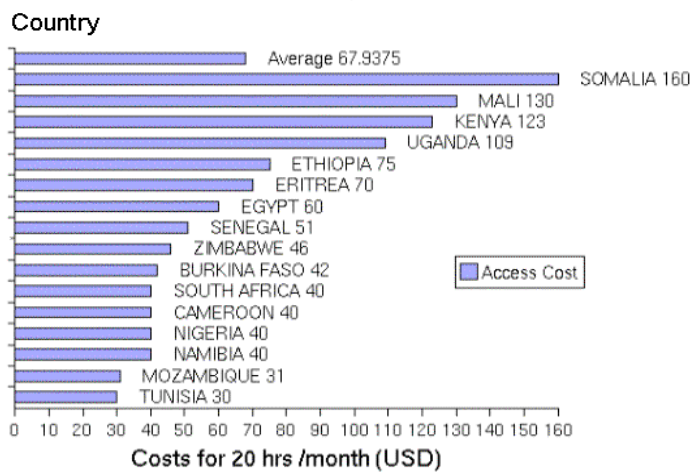

Figure 2. Internet dialup access cost [13]

Given the aforementioned low per capita income (less than $500) for most inhabitants of sub-Saharan Africa, high cost of owning a PC, and high Internet access cost, it is almost impossible for an average family within Sub-Saharan Africa to have a PC and Internet access at home. This lack of personal Internet access inhibits to some extent small and medium businesses e-commerce initiatives. These businesses have limited incentives to offer web-based services as opposed to their western counterparts. Hence, the evolution of Cybercafés, which enable users in Sub-Saharan Africa to have fairly low-cost Internet access at community-based Internet centers.

Just as the home-based personal access to the Internet is unaffordable and limited, so too is the access in public and private educational institutions. Thus, the students, faculty, and staff at these institutions have limited or sometimes no access to online knowledge repositories and others educational resources unlike their western counterparts. In addition to the lack of Internet access in public and private institutions, the ICTs infrastructure is inadequate and often nonexistent; thus, their students, staff, and faculty on average possess limited computer skills. The Cybercafés' growth in the Sub-Saharan region offers a solution to these problems as they provide access to online knowledge resources and computer training programs (i.e. certifications, e-learning), and allow knowledge sharing.

Historical Perspective of Cybercafé Diffusion in Sub-Saharan Africa

A Cybercafé is a place where people relax and snack while they surf the Internet. Café Cyberia, the first of its kind, was founded on September 1st, 1994, in London (UK) as a few Hewlett-Packard computers were connected to the Internet through dial-up modems (9.6 kilobits per seconds) to provide open, inexpensive public access to online resources. With this new kind of

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café, millions of people can communicate easily with friends and family members [1].With the success of this new business initiative, many Cybercafés opened around the globe. From a few hundred in the mid-1990s, the Cybercafé industry grew to thousands of units in the late 1990s. This International success of the Cybercafé business concept, coupled with the growing need of Internet access amongst Sub-Saharan populations for social, economical, educational and political activities in the early 2000s, inspired Sub-Saharan Entrepreneurs to invest considerable funds in this lucrative enterprise. Given that the majority of users in Sub-Saharan Africa have family members, colleagues, and business associates overseas, this avails them an opportunity to interact and exchange information. Most of the user community could hardly afford to call these family members overseas, but these Cybercafés provide the environment and access via the Internet for e-mailing or chat sessions to communicate in real-time [18]. Users are also able to access information and knowledge from various parts of the world. Some of this information is country specific, often not shared by their governments and policy makers, and usually too sensitive for the media to report. Thus, Cybercafés are per essence the major Internet diffusion channels in the Sub-Saharan region.

The evolution of the Cybercafé industry is having significant socio-economic and political impact on these societies [18]. Although users are now able to access and share useful information and knowledge resources that are valuable and were scarce a decade ago, they are also accessing and sharing information that was considered culturally "taboo". Thus, users are exposed to the good and bad of the Internet; exposure to different foreign cultures has had positive and negative social impacts, especially for African youth [28][18]. Cybercafés are also the local cyber crimes centers, as some of their clients engage in unscrupulous activities (i.e. Fraud, Identity Theft). Deception acts have existed since ancient societies as citizens of low

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morals earned living wages through unconventional activities; the new information age further facilitates and allows these acts on a larger scale because Internet users can access an incalculable amount of private, commercial, and governmental information, and disseminate scams through e-mails. Add to this, the socio-economical difficulties (i.e. high unemployment rate) of the Sub-Saharan region, and the environment is ripe for cyber crimes.

This paper presents an overview of the diffusion of Cybercafés within the Sub-Saharan African region. We present several country cases in the next section. Our findings suggest that Cybercafés reduce the constraints faced by users in terms of infrastructure, access to personal computers and related information technology devices, as well as affordability. This increases the number of users from different socio-economic backgrounds accessing and using the Internet for social, political, educational and economic reasons.

Cybercafé based Curriculum and Instruction can Eliminate Barriers Associated with Traditional Classroom Learning.

A larger majority of the benefits associated with e-learning (reduced cost, eliminating time of day constraints, access to the Internet and other electronic data repositories) make the Cybercafé a very attractive alternative to traditional classroom education for Sub-Saharan Africa. As more Cybercafés come online, giving the citizen of this region faster, cheaper access to the Internet and its vast collection of resources, e-learning techniques offer very suitable educational enhancements to traditional educational efforts. The cost associated with delivering instruction over the web is a small fraction of that associated with traditional classroom learning. There are no buildings to erect, no facilities to maintain, and no teachers to hire; essentially one well designed e-learning course can simultaneously service thousands of students. The science of E-

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learning transcends a discussion on technology and tools. The focus has shifted toward the need to design courses around sound pedagogy and methodology rather than technical tools [12]. E-leaning techniques such as web-based or multimedia instruction also give working citizens the flexibility to earn wages at their respected places of employment and take part in self-paced learning anytime during the day or night. The social elements of the Cybercafé offer students a community type learning environment where collaboration is encouraged. Within the walls of the Cybercafé, a built-in student structure supports students taking the same course, thus reducing the feeling of isolation associated with self-paced learning. Another important concern in the traditional classroom learning process is language dissimilarity. For the vast majority of Sub-Saharan African countries, multiple official and tribal languages are spoken. South Africa alone has eleven official languages and several unofficial languages spoken by sizable minorities [14]. This language barrier represents a substantial problem for traditional educational establishments. On the other hand, Cybercafé instruction can use special software to translate between languages, thereby opening the doors of education to everyone.

Cybercafé diffusion in the Sub-Saharan region also lends itself to certain quality of life enhancements, such as healthcare or politics, that otherwise would not be available. Healthcare for Sub-Saharan Africa, especially in rural or remote regions can be much more highly distributed through the use of telemedicine and Cybercafés. One regional physician can remotely diagnose and treat illness while the local nursing staff administers the treatment. Remote sensing for medical data has evolved to the point where medical personnel can now track vital signs and other critical information via fiber optics or infrared signal measurements. This would eliminate the need for traveling great distances for medical expertise while allowing a regional medical

specialist to concentrate on a particular area of medicine. Cybercafés also stand to impact local politics and social policy. Internet access gives citizens access to the world community, which makes the citizens participants in the global political arena as well as the global economy. Cybercafés can in fact be used to do electronic voting for constituents that may otherwise never have a voice in shaping their political agenda.

Country Cases

The selected countries in this study have similarities both in terms of their ICTs infrastructure and socio-economical constraints (see table 1), yet major differences in terms of their respective government policies, Cybercafés infrastructures, cultures, Cybercafés users' characteristics (i.e. gender, income, education, age), and Cybercafés enabled socio-economical , educational, and political initiatives (i.e. e-commerce, e-learning, e-government), as presented in these cases. Sub-Saharan Africa is home to 32 of the 48 least developed countries in the world, has a population of nearly 659 million people, and spans over twenty-four million square kilometers; thus, a complete coverage of the Sub-Saharan region in one study will require substantial resources. Therefore, we elected to choose five countries representative of their respective region, Tanzania and Kenya (Southeasthern Region), Nigeria and Ghana (Northwestern Region), and Cameroon (Central).

Table1: Basic Socio-Economic Facts [30]

Countries	Populations	Unemployment rate	GDP per capita	Telephone lines	Internet Users
Tanzania	36,766,356	NA	$ 700	149,100	250,000
Kenya	33,829,590	40%	$1,100	328,400	400,000
Nigeria	128,771,988	NA	$1,000	853,100	750,000
Ghana	21,029,853	20%	$2,300	302,300	170,000
Cameroon	16,380,005	30%	$1,900	110,900	60,000

*NA : Not Available

Tanzania

With a population of 33 Million people, Tanzania improved its technological infrastructure, accounting for 13 ISPs and over 3000 Internet accounts and ranked 13th among all African nations in 2000 [3]. The number of Cybercafés grew equally exponentially. The capital, Dar-Es-Salaam, alone accounts for about 100 Cybercafés. Even though most Cybercafés have experienced a drop in the retail Internet charges from US $1.25 to US $0.625 per hour, there is still profit to be made[4]. Video conferencing facilities exist in many cafés such as Auvionics in Mawanza and Next Call's Internet boutique in Dar-Es-Salaam [5]. People make telephone calls at a cheaper cost via the net. [4] Although the government prohibits the use of VOIP, the enforcement is unsuccessful. This situation is expected to continue until the government owned and controlled Tanzania Telecommunications Company Limited (TTCL)'s exclusivity ends in 2005 [4].

Most Cybercafés are open for about 18 hours a day and are evolving mainly as family businesses, a major source of employment and income for the families involved. Users are aged

Heather Bigley 2/7/06 12:02 PM
Comment [1]: And the results?

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between 14 and 22 and are mostly male. [4] However, the participation of women in the Internet boom through Cybercafés is increasing. A large number of women are becoming customers and users in the Cybercafés around the country and many own Cybercafés in Dar-Es-Salaam. [7] Given that Tanzania is faced with costly and inadequate educational institutions, E-Academy is aiming to use Cybercafés to create on-line e-learning communities. This is expected to alleviate the demands on the limited (and poor) educational infrastructure. [6]

Nigeria

Nigeria, the most populated African country and one of the biggest African economies, continues to experience many advances in the ICT sector. Nigeria has a population of about 130 million citizens, bordered by Benin, Cameroon, Chad, Niger, and the Gulf of Guinea; it is divided into 36 states and one territory. [34] Cybercafés make communications easier and increase the global contact for many Nigerians and expatriate communities. In 2002, Nigeria had about 2.3 million phone lines and 800,000 PC's with 200,000 Internet users. [9] Lagos alone accounts for more than 310 Cybercafés. [1] The Nigerian Internet project (NIP) aids the development of Cybercafés with the objective to provide "Internet access to every part of Nigeria." [1] The NIP has the goal to set up a "mega Cybercafé in Ilorin" with 84 computers. Another recently implemented Cybercafé project is that of Direqlearn Nigeria Limited, which aims to "equip 35 schools across the country with VSAT Internet access, and provide the schools with educational content, train teachers and provide a long term plan for stability." [26]

One of the problems found in Nigeria is that Cybercafés are used as "hubs" to commit local and international cyber crimes. This is especially true in the case of Nigeria's largest city, Lagos. The government is under pressure by citizens and the International community to address this issue.

[8] In spite of this issue, Cybercafés in Nigeria have created direct jobs for over 50,000 people in the country [22]. Some of the services offered by Cybercafés in Nigeria include: training classes in internet and computer usage, web design, web hosting, with special pricing to users that are club members and local university students. [11,13] Unfortunately, due to poor telecommunications infrastructure outside major urban areas, there exist only a handful of Cybercafés in especially rural areas that account for over 70% of Nigeria's population. [11,13] .

Kenya

As of 2002, Kenya had a population of 31.93 million. It is surrounded by Ethiopia, Somalia, Sudan, Tanzania, Uganda, Lake Victoria, and the Indian Ocean. [9] Cybercafés have helped increase the number of internet users and have provided computer literacy. Cybercafés used to be secretarial bureaus offering services like typing, photocopying, and binding [26]. One major company influencing growth of Cybercafés in Kenya is Africa Online that owns and operates multiple Cybercafés referred to as E-Touch. Kenya's Africa Online is replacing many of its E-Touch centers with larger E-Touch centers that have at least ten PC's, photocopiers, faxes, telephones, and they are maintained by one or two staff (usually women). [14]

Another major Kenyan Cybercafé initiative is UUNET. After taking services to major towns of the country, UUNET provides free Cybercafés services to select rural based colleges and secondary schools to promote social responsibility.. UUNET became committed to this initiative after the Kenyan government agreed to free the licenses for VSAT connections [20]. The greatest operating costs incurred by Cybercafés [11,13] come from subscription fees to ISPs, and the telephone lines [17] if using dial-up connection. Some Cybercafés are able to use VSAT links. Unfortunately, these are very expensive and currently Telkom Kenya, the sole Internet backbone,

determines who has access to the VSAT services. Recently, low cost two-way VSAT has become available in some areas, offering the possibility of internet and voice connectivity for rural areas, for as little as US $200 a month for each Cybercafé that subscribes [11,13]. There are 72 licensed ISPs in Kenya, and over 32 are now operational. [4] High license fees limit the number of operational ISPs. [33] Competition among the growing number of Cybercafés resulted in a price decrease for users.[4,14]

Ghana

Ghana, in August 1995, became one of the first Sub-Saharan African countries to have full internet connectivity. [8] According to the National Communication Authority (NCA) more than 39 ISPs have been licensed but only 8 are currently operational, and they all operate from Accra, the capital. Over 15,000 users are currently estimated to have direct (personal) Internet connection and over 500,000 users have shared Internet connections from offices, friends, and Cybercafés. [4]

Cybercafés are found in every part of the country, but the majority is located in Accra where over 100 Internet access centers exist. The growth of Cybercafés has also triggered increased Internet use in the private sector where the Internet has become a very important tool for business. The average charge for usage is US $ 0.02 per minute. [4]

There are two main types of Cybercafés in Ghana: Africa Online's E-touch provides only e-mail access; other Cybercafés offer almost all Internet and other services such as printing and scanning. Sankofa café in Accra is an ICT and business consulting firm providing services such

as e-mail, networking, computer sales, general secretarial duties, website design, PC repairs, photocopy, fax, and telephone services [5].

Ghanaian investors in partnership with a US-based technology company have recently launched I-café, which provides individuals and businesses with expertise and resources to promote and expand their traditional businesses into e-commerce and other internet related activities. These activities are in collaboration with local and international agencies that promote development of the high-tech sector, as well as provide web-based learning opportunities to schools and individuals. [9]

VOIP is not permitted in Ghana. However, given that the Ghanaian government hardly imposes this rule, many Cybercafés tend to provide VOIP services for their customers who regularly call friends and relatives in other countries. Nagym Cybercafés provide one of the fastest internet services using 64K radio networks, which make VOIP easy and fast. [5] The National Communication Authority has started to shut down some operators using VOIP technology. [4] All universities and polytechnics have access to Internet, albeit limited access for teaching staff and students, who mostly use Cybercafés for access.

Cameroon

Cameroon, another developing country within the sub-Saharan African region is also experiencing exponential growth in Cybercafés. Introduced in 1992, Internet access through Cybercafés is almost ubiquitous in Cameroon with more than 90% of the total connections in Douala and Yaoundé, the two biggest cities. There are twenty-five Internet service providers, which include commercial ISPs and non-profit ISPs. At present none of the multinational

Cybercafé providers are involved. [4] Cameroon accounts for about 9000 Cybercafés and hundreds of thousands of Cybercafé users, where approximately 25-31% of the Cybercafé s use 2MB broad bandwidth. Average charges of Cybercafé are between $1 and $2 per hour. Typically, the cost of the Cybercafé usage depends on the bandwidth available and their locality. [4]

The users of Cybercafés are mostly women and students. A study conducted by Cameroon's University of Buea showed that approximately 40.71% of total Cybercafé users in Yaoundé (the capital city) are women. On a (debatably) negative side most women in Yaoundé use Cybercafés to find husbands. Cyber Marriage is in great demand in Cameroon, which creates problems regarding prostitution and drug trafficking [4]. To address this negative aspect of Cybercafé use in the country, the Association for Support to Women Entrepreneurs (ASAFE), a non-profit NGO that works for individuals as well as for institutions, promotes and develops entrepreneurship among Cameroon women. This keeps the women busy and less likely to continue engaging in prostitution. This Cyber-forum for women entrepreneurs introduced electronic commerce and its related applications to many women in Cameroon. The women have access to ASAFE's Cybercafés called "Cyber-Boutique." These Cyber-Boutiques are equipped with six to seven computers and training rooms that include computer-training facilities and staff [10].

The World Trade Center Cybercafés based in Douala, Cameroon's major economic city, has been helping with the TakingITGlobal (TIG) initiative. TIG encourages and motivates young people to build their self-esteem; it also helps create an environment that exposes kids to new

thinking and opportunities. Its main goal is to create entrepreneurship through the innovative use of technology [12].

Netphone, telephone via Internet, is the most popular Cybercafé feature in Cameroon. It is a VOIP technology that Cybercafé customers use to communicate with people outside the country at much cheaper rates compared to rates provided by Cameroon's main government-owned telecommunications operator. Several US-based web companies are signing VOIP agreements with Cameroon. For example, T3 communications of Los Angeles, California, an emerging IP global exchange carrier, signed an exclusive distribution agreement for IPStar/InterStar/InterPhone products in Cameroon. This tremendously helps to make VOIP communications easy and fast.

Analytical Discussion

The diffusion of Cybercafés has led to tremendous socio-economical changes in the Sub-Saharan region. The growth of the Cybercafés industry has resulted in thousands of new jobs, additional taxes revenues for the government, better and cheaper internet-based services to the public, increased involvement of women in social activities, and increased access to information and various online knowledge repositories.

Cyber Entrepreneurial

sSub-Saharan Africa is subject to high unemployment rate ranging from 15% to 40%. Traditional jobs (i.e. accountant, banker, school instructor) are hard to find. The Cybercafé concept fostered entrepreneurial initiatives in this region as thousands of unemployed have opened a Cybercafé business or have been hired by one. The costs (ranging from few thousands to hundreds of

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thousands of dollars) associated with the start-up and operation of a Cybercafé are not substantial, which allows citizens of different social classes to compete in this industry. Perhaps, the Cybercafé industry is the most competitive industry in Sub-Saharan Africa.

Government Policies and E-government

Most governments are taking major steps to liberalize the communications industry; such new governmental policies will allow Cybercafés owners to operate at lower costs and provide additional services. The growth of Cybercafés infrastructure is an important building block of most E-government initiatives as citizens can have access to various government services such as passport and identification card applications online at those Cybercafés. .

E-learning

College students take advantage of the various online continuing education opportunities and obtain online degrees and certifications. Students and faculty have access to various databases through online subscriptions. Cybercafés enable access to resources that complement the existing educational resources at Sub-Saharan universities, high schools, and professional schools.

Onsite Continuing Education

 Computer illiteracy is a major barrier to Internet diffusion, e-learning, and e-government, amongst many others initiatives in Sub-Saharan Africa. Most universities and colleges do not possess the infrastructure and the faculty needed to train their students to build and utilize computer-based skills. Cybercafés offer services such as web development, word processing, amongst many others onsite hands on training services to their clients.

Implications and Conclusion

Cybercafés have made large contributions to users and communities in Sub-Saharan Africa. Based on observations, the authors contend that the successful Cybercafé saga in sub-Saharan Africa has been partly due to high collective-family and community-based values, a phenomenon reminiscent of most African cultures. At these community centers (Cybercafés), people do not just access the Internet and other technologies; they also meet to chat (face-to-face) and interact with friends and many others with whom they have little or no family ties. In terms of the technologies used, these Cybercafés provide a plethora of ICT related services to the citizens and a base for Internet connectivity for business and educational entities such as schools and distance learning facilities. Cybercafés have especially provided a great opportunity for African Internet users, most of whom can neither afford their own PCs nor personal connectivity to the Internet. This opportunity has greatly contributed to reduce the digital divide, as well as the gender gap in ICT use in Sub-Saharan Africa.

The cases presented in this study suggest that, albeit the problems faced by Cybercafés, such as poor and inadequate telecommunications infrastructure; connectivity and affordability problems; rigid telecommunications policies; and poor electricity infrastructure in sub-Saharan Africa; Cybercafés have emerged and are diffusing at an exponential rate throughout sub-Saharan Africa. These Cybercafés have allowed these countries to be connected to the information-based global economy, created job opportunities (especially for women), and helped in the access, use, and sharing of global information and knowledge resources.

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Future Studies

The diffusion of Cybercafés and the impacts of such diffusion on Sub-Saharan Africa is an important topic that needs attention from the academic and practitioners communities. Future studies should investigate country specific diffusion processes. New frameworks and theories are needed to foster our understanding of this phenomenon. Both qualitative and quantitative studies will yield relevant results.

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