Trends in ICT Usage by Small and Medium Scale Enterprises in Ghana

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Abstract

Information and communication technologies (ICTs) have assumed central position in the development agenda of most countries due to their critical roles in facilitating socio-economic development. Their contributions to enterprise development have been recognised and international organisations have called on developing countries including Ghana to develop policies that will integrate ICTs into enterprise development. Ghana has developed a national policy on ICTs which is transform Ghana into a middle income, information-rich, knowledge-based and technology driven economy and society.

In Ghana SMEs dominate the industrial landscape and they exhibit great potential in accelerating economic development which will lead to wealth creating and poverty reduction. It is therefore important to examine how ICTs have been adopted and used by these enterprises in the country to facilitate their economic activities. This paper analyses of survey results on access and usage of ICT facilities and services by SMEs in the country.

It is argued in this paper that the utilisation of ICT services is underpinned by commercial considerations such as cost of investment and the potential returns on business activities. However, one cannot discount the importance of literacy in the use of knowledge-intensive service as internet, but commercial considerations are strong.

Key words: ICT, SME, development, enterprise

1 Introduction

In the past, most political and development planners classified information and communication technology (ICT) as a luxury service, and therefore, ICT did not feature prominently in the national strategies for socio-economic development. However, in the contemporary world, ICTs are increasing seen as key elements for development. The contributions of ICTs to general economic development are varied, but the key ones include:

- Facilitating social change and economic activity
- Improving quality of life
- Bringing cost-benefits in rural social service delivery

Enabling political participation, promoting good governance and transparency (Panos, 2004).

ICT, therefore, has a critical role to play as an enabler of socio- economic development, as well as providing a pivotal support for effective governance of the political system. It also plays an important role to enterprise development. The contributions of ICTs to business development have been pervasive to the extent that it is becoming increasingly difficult for companies to compete effectively in the world market without adequate ICT infrastructures. The reason is that ICTs are revolutionising every activity in the global market, as the various components of ICTs have their significant roles in facilitating business promotion, efficiency and growth. The Internet, for example, has provided the platform for the development of electronic commerce (e-commerce) and offers potential for establishing low cost, open and 'many to many' trading systems (Humphrey et al, 2003). According to Labbè (2006) the Internet has become the global channel of unmatched scope for communication between people and between businesses, and at the moment, with over 80 million websites and over a billion internet users. Therefore, this provides an important medium for increased competition among businesses.

Again business processes such as ordering, transaction, delivery, inventory control and accounting can be streamlined and connected regardless of location through the use of network of computers (UNCTAD, 2005). The same UNCTAD report argues further that the Internet has the potential of improving customer-management relationship and enable firms to customize their services to meet the needs of their different clients. The customized service, according to the UNCTAD report will allow companies to respond to their customers in real time and thereby improving customer confidence. It also helps in monitoring customers preferences and lead to developing targeted marketing strategies. Invariably, the computer-mediated networks will allow these activities to be carried out quickly and efficiently, and contribute to efficiency in the operations of businesses.

Further, computers supported by various types of business software can enhance information and knowledge management within a firm and result in an evolvement of better business processes and performance (OECD, 2004). The use of e-mail system and the Internet can support business communication within the context of business to customers (B2C) or business to business (B2B). Invariably transaction costs may be reduced, result in increased transaction speed and reliability.

Other ICT-mediated services such as e-banking and e-business are dramatically affecting the traditional ways of providing those services and have great implications for many economic activities. However, small firms may adopt e-business and e-commerce strategies when benefits outweigh investment and maintenance costs (OECD, 2004). The report argues further that the use of and investment in ICT requires complementary investments in skills, organisation and innovation and investment and change entails risks and costs. Therefore, effective adoption of ICT services by SME calls for the need for these issues to be addressed

For SMEs which are the dominant economic operatives in many countries, especially the developing, ICTs offer great potential for growth, profitability and competitiveness. Support for SMEs is buttressed by the Action Plan developed at the first World Summit of Information Society held in Geneva, 2003. The Action Plan calls on governments to develop strategies that will facilitate widespread use of ICTs to support the growth of micro, small and medium scale enterprises and boost e-business. The issue is to what extent does the SMEs in Ghana have access and use ICTs to enhance their operations and competitiveness? How can SMEs utilise ICTs to facilitate their economic activities? It is important to address these issues since the country's business landscape is dominated by SMEs and they have great potential in achieving the developmental objectives of the country. This paper is an analysis of the results of a survey on access and usage of ICT services by SMEs in Ghana.

2 Overview of Policy Environment for SMEs

The contributions of SMEs to employment and wealth creation as well as poverty reduction are pronounced. This is buttressed by the fact that the industrial and business sector in Ghana is dominated by SMEs, especially the small enterprises. For example, about 70% of the Ghanaian enterprises are micro to small sized and it is estimated that nearly 40% of Ghana's GNI is attributable to informal sector activity (Ghana Government, 2002). It is believed that these small firms can easily propel growth in the economy than the large ones due to their numbers and niches they occupy in the national economy.

Therefore, the effective development of SMEs has become paramount and should feature prominently on government's development agenda. Fortunately, the government of Ghana has declared a "Golden Age of Business" as part of its development agenda, and has developed a national policy on private sector development with the general objective of strengthening the private sector through undertaking market reforms to support private sector development and sector-specific measures for strategic exports (Ghana Government, 2003a). The private sector development policy is largely to create an enabling environment for business to thrive and this should not be limited to the large businesses but to the SMEs which form the greater percentage of enterprises in the country.

Further, the country has developed a national policy which is specific to micro and small scale enterprises (MSEs). The overarching objective of the policy is to create conducive playing field for MSEs and to help the development of a vibrant, productive and competitive MSEs sector in the country (Ministry of Trade and Industry, 2002). Under the policy, the government among others is to:

- ⇒ Promote dynamic enterprise culture for innovation
- ⇒ Promote employment growth within the informal sector
- ⇒ Develop MSE to serve as a means to establish linkages between the formal and informal sectors of the economy
- ⇒ Improve the technology base, product quality and productivity of the MSE sector
- ⇒ Upgrade the application of indigenous technologies (Ministry of Trade and Industry, 2002)

These strategies when implemented may galvanise the MSEs to play critical roles in national development and help to create and distribute wealth so as to reduce poverty in the country.

2.1 National ICT Policy and SMEs

To propel SMEs to play meaningful roles in the socio-economic development of the country requires the adoption and use of ICTs to organize supplies, link customers, employees, acquire market information including prices and customer preferences, among others. Consequently, inn the late 2003 the government enunciated the National ICT for Accelerated Development Policy (ICT4AD) to prove the framework for utilizing ICTs in every sphere of socio-economic activities of the country. The main objective of the policy is to facilitate an ICT-led socio-economic development process which could transform Ghana into a middle income, information-rich, knowledge-based and technology driven economy and society (Ghana Government, 2003b). The achievement of the objective of the policy entails supporting the development, deployment and exploitation of ICT services by institutions, business enterprises and individuals in the country.

The policy is to position ICTs as one of the tools to enable the government to achieve its development goals as envisioned in the GPRS I and II. In view of this, the ICT4AD Policy has identified 14 priority focus areas which ICTs could play enabling roles to support accelerated national development. Out of this number, four directly relate to business activities of which SMEs dominate. These are:

- ⇒ Facilitating the development of the private sector,
- ⇒ Developing globally competitive service sector,
- ⇒ Modernization of agriculture and development of agro-business

⇒ Developing an export oriented ICT products and service industry.

The achievement of the objective of the national ICT4AD policy entails massive deployment and exploitation of ICT services by all economic operators, especially the SMEs to improve their competitiveness not only in the local market but global as well.

3 Analysis of Survey on Use of ICTs by SMEs

This section discusses the results of a survey on access and usage of ICT services by SMEs in the three main commercial and industrial cities in Ghana; namely Accra/Tema, Kumasi and Takoradi. In all, 280 SMEs across the various business categories were selected. A Formality Index was developed to reclassify the SMEs into various levels of formality – informal, semi formal and formal. Indicators used to develop the formality index include: form of ownership, registration with Internal Revenue Authority and Value-Added Tax (VAT) offices, employees with formal contract of appointment, strict separation of business finances from personal ones, and availability of financial records (Stork and Esselaar 2006).

Using the formality index, 42 percent of the sampled SMEs fell into the formal category, 33 percent belonged to the semi formal and the rest to the informal category (see figure 1).

Indicators covered in the survey among others include; educational level of owners, access to ICT facility and the level of usage of such facilities. Under access to ICT facilities, the study looked at the main CT facilities such as mobile and fixed line telephones, fax, computers and internet service.

3.1 Educational Level of SME Owners

Modern forms of ICTs, especially internet-based services are knowledge-intensive, and therefore certain level of formal education and literacy is required before one could effectively appreciate their potency to support business activities. Table 1 provides a summary of the educational background of the owners of the SMEs sampled.

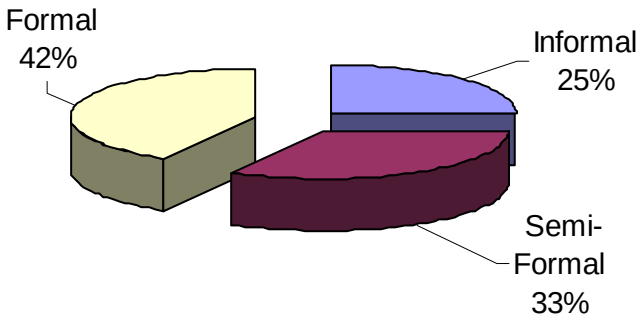
The majority of the SME operators had had some form of formal education. In all a little over 67 percent of the operators had received secondary and tertiary education, while 15 percent had received vocational training. The relative high literacy level puts the operators in a better position to utilise the more knowledge-intensive ICT services.

Using, the formality index, the enterprises that fell within the formal category had the highest number of owners with tertiary education with insignificant percentage without formal education (see figure 2). Interestingly, the informal category had an appreciable number of owners with secondary education (34.3 percent), while 20 percent had received tertiary education and such operators can easily migrate to the other categories.

3.2 Access to ICT Facilities

The use of ICT services largely depends on accessibility and ownership of ICT facilities, but here the emphasis is on the ownership of such facilities at the business prem-

Figure 1: Business Classification into Formality



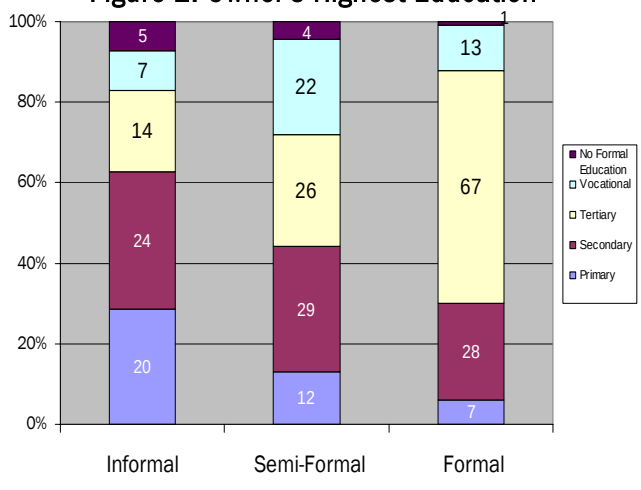
Source : Field Data, 2005

Table 1: Formal educational level of business owners

Type of education	Frequency	Percentage
Primary	43	15.4
Secondary	81	28.9
Tertiary	107	38.2
Vocational	42	15.0
Non	7	2.5
Total	280	100.0

Source: Field Data, 2005

Figure 2: Owner's Highest Education



Source : Frempong and Essegbey, 2006

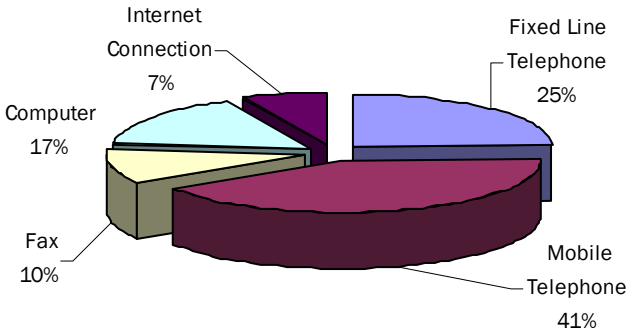
ises. However, cognisance is taken of the fact that in the informal sector in Ghana and other African countries, lack of ICT facility does not necessarily mean lack of access. An informal business operator can use the facilities of a neighbour to meet his/her communication needs.

In figure 3, mobile telephone was the dominant ICT facility owned by the majority of the SMEs with Internet as the least facility. The prominence of mobile telephones is linked to increased mobile telephone subscription in the country. Since 2002, there have been more mobile telephones in the country than fixed lines. For example, in 2002, the total mobile telephone subscribers in the country were almost 300,000 while that of fixed line was around 275,000. At the end of April 2006, the total mobile telephone subscription stood at 3.4 million, while that of fixed line telephones was 0.34 million (NCA 2006). One of the factors which has accounted for increased subscription to mobile telephone service, in spite of its high cost, is the ease of getting a subscription. One can subscribe to the service within few moments after of purchasing the starter packs, while subscription to fixed line telephone service can take months and even years depending on the availability of the service in the area of the applicant. Therefore, mobile telephone has become important business tool utilised by SMEs in Ghana.

Formality plays an important role in the type of ICT facility used by the SMEs. The ownership of fixed lines, computers, and fax and internet connection was associated more with the SMEs which belonged to the formal category. From figure 4, almost 61 percent of the SMEs which owned computers belonged to the formal category, and was followed by the semi-formal category which registered 28 percent. The formal category relatively had better access to internet at their work place. These firms are more established and relatively resourced to invest in ICT facilities which have high capital outlay.

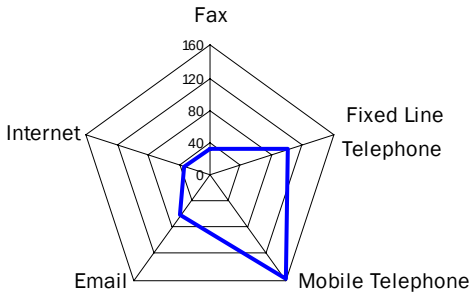
Mobile telephone was popular with all the categories but more pronounced with the informal enterprises. The reason for this phenomenon is not far fetched. The use of other ICT services required a more permanent, secured business structures and premises. However, most of the informal operators (especially the artisans) operate in temporary and makeshift structures, most often sited at unauthorised places. Therefore, the temporary nature of such structures give credence to the use of more flexible communication gadgets which one can easily carry along when the business has to relocate. This and in addition to others, have made mobile telephones attractive

Figure 3: Level of Access to ICT Facilities



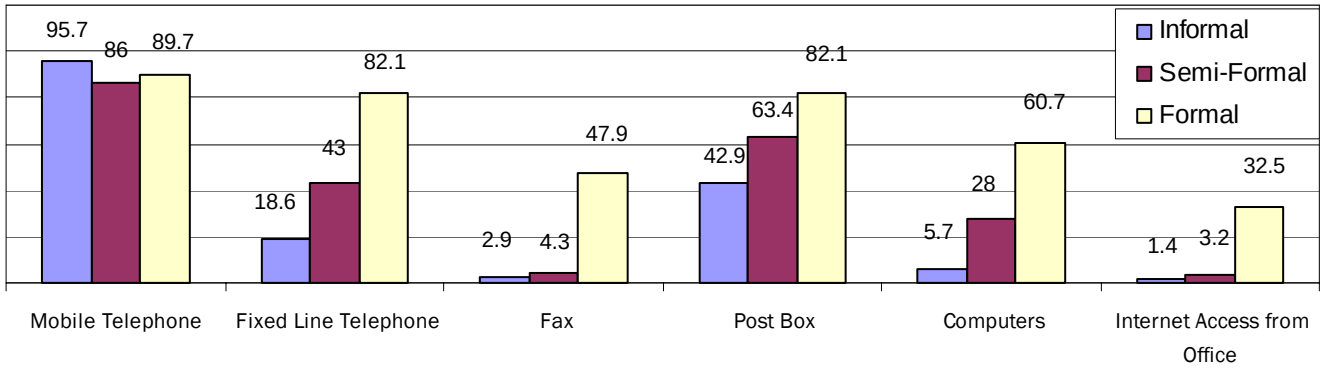
Source : Field Data, 2005

Figure 5: ICT Facility Used Most by Enterprises to Link Customers



Source: Field Data, 2005

Figure 4: Comparison of share of SMEs with access to Ee-devices across formality

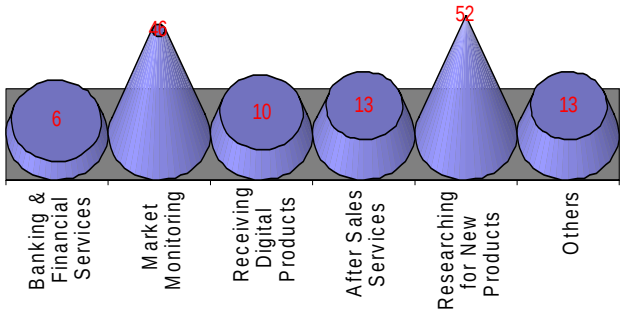


Source : Frempong and Essegbey, 2006

to the enterprises in the informal category. However, one cannot discount the issue of high cost in accessing the other ICT services such as computers, internet and fax, among others. The investments in these facilities are relatively higher and this may discourage many of the informal operators from acquiring them.

To conclude, it is evident that mobile telephone is very important to the activities of the SMEs, especially those belonging to the informal category. The question is, beside voice communication, what other use is mobile telephone put to by the SMEs? Further, access to the other ICT services also depend on the level of formality of the enterprise. The enterprises belonging to the formal category relatively had more access to fixed line telephone, fax, computer and internet access at their offices.

Figure 6. Purpose of using internet by enterprises



Source: Field data, 2005

4 ICT Usage by SMEs

The purpose of this section is to discuss the usage of ICT facilities by the SMEs in their business activities. The discussion will focus on ICT services such as internet, e-banking services and short messaging service (SMS).

4.1 Internet Usage

Internet has become one of the pervasive ICT services which is radically changing the traditional forms of trade and providing windows of opportunities which enterprises, especially those from developing countries could exploit. It is becoming increasing important that internet usage should form an integral part of the operations of the SMEs.

From Table 2 it is obvious that internet has not been ingrained into the operations of the SMEs, especially those from the informal and semi formal category. Relatively, its usage is high among enterprises from the formal category. About 39 (about 33.3 percent) enterprises of the formal companies used internet service from their offices, one company (less than one percent) had the internet service at home, while 27 (23.1 percent) enterprises personalized the service from internet cafes. In the case of the informal and semi formal categories the participation rates were 10 (14.3 percent) and 22 (23.6 percent) respectively.

Internet cafes should provide a viable alternative for the SMEs which could not afford individual ownership to gain access to the service. However, table 2 shows that only 14.3 percent and 20.4 percent of the enterprises from the informal and semi formal categories respectively utilised internet cafes. For those who have internet access in their offices, it is possible that the usage might be limited to the management, and thereby preventing the workers from taking advantage of the potential of the service. The low uptake of internet by the SMEs in Ghana is contrasted with the situation in Europe where nine out of 10 SMEs were equipped with computers at the end of 2000 and early 2001, and Internet was routinely used among SMEs (OECD, 2004). Another survey conducted by UNCTAD with the Fundación para el Desarrollo Sostenible en América Latina (FUNDES), in selected Latin American countries (namely Chile, Colombia, Costa Rica, Mexico and Venezuela) showed that 97% of the SMEs surveyed in these countries had computers and 94% had Internet access.

The question is what benefits are the SMEs gaining from their usage of the internet service? Figure 6 provides a summary of internet usage by the SMEs.

From figure 6, the SMEs used the internet mostly for market monitoring and browsing for new products. The other use which was relatively prominent was sourcing for after sales services. These activities, though likely to be limited to enterprises belonging to the formal category demonstrate the awareness of some of the SMEs to the potential benefits of internet to their competitiveness in both local and global markets.

Table 2: Internet Usage on Formality Basis

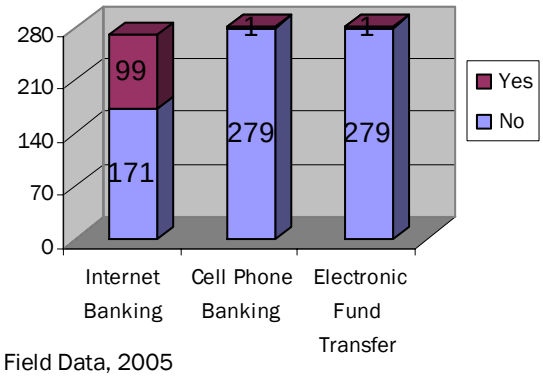
	Informal	Semi	Formal
Office or business	0	3	39
Home	0	0	1
Internet Cafe	10	19	27
No	60	71	50
Total	70	93	117

Source: Survey Data, 2005

4.2. E-Banking Services

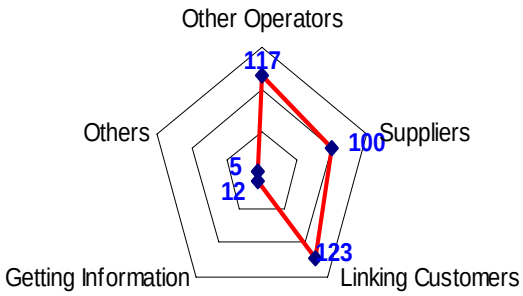
One of the industries being radically transformed by ICTs is banking. ICT- mediated services such as automatic teller machines, electronic fund transfer, electronic smart cards, cell phone banking among others, are transforming the traditional ways of banking and providing competitive edge for banks that provide those services. Consequently, attempt was made to find out the level of utilisation of these services in the country.

Figure 7: Usage of E-Banking Facilities



Source: Field Data, 2005

Figure 8: Business Purposes of Using SMS



Source: Field Data, 2005

From figure 7 an appreciable number of the enterprises have used internet banking mainly to check their balance and request cheque books. With other services such as cell phone banking and electronic fund transfer (EFT), little use had been made by the SMEs. EFT has been popular in Ghana. Banks like Agricultural Development, Ecobank Ghana Limited, Standard Chartered Bank, Merchant, Ghana Commercial Bank and SG-SSB among others are agents of international EFT companies such as Western Union Money Transfer, Money Gram.

The responses on EFT revealed that it is used in Ghana purely for social purposes – to receive remittances from relations living abroad. It is not being used for business payments for sale of goods and provision of services.

In the absence of wide usage of credit cards, EFT could be used by the informal enterprises to trade in foreign markets, especially with the emerging African shops in Europe and America. These shops are mostly owned by Ghanaians who are domiciled in these countries who normally order small quantities of merchandise from Ghana. Consequently, the effective use of EFT could facilitate trade among these enterprises.

To a question on whether the SMEs have interest in cell phone banking (though almost none had used the service), over 66 percent of the enterprises declared interest to use the service in the future. It is interesting to note that banks such as Standard Chartered and SGS-SSB, and recently Zenith and CAL Banks have introduced the service in the country.

The result of the survey shows that e-banking has not been successful as very few enterprises from the sample had used the service. It could be speculated that issues of security and customer confidence, among others may have constrained the success of the service. What is required is aggressive marketing or promotions of the service by these banks in Ghana. It is hoped that the electronic transaction bill which is under consideration will be passed to provide some protection to users, and this may provide a fillip for increase patronage of the service in the country.

4.3 Usage of Short Messaging Service (SMS)

In Ghana SMS is one of the cheapest ways of communication not only among mobile telephone users in Ghana, but with users outside the country. It is more prolific than email system therefore, it is important to know the use of the SMS service by the sampled enterprises. From the survey results, 48 percent of the respondents had generally used SMS for communication. For business, the purposes of usage of the service were varied and figure 8 illustrates the various uses of the SMS service.

For business purposes, SMS was mostly used by enterprises to contact their suppliers, customers and other operators. Communication with customers was slightly higher than with other operators in the market who are competitors. The question is why that high level of interaction among operators in the same business segment? In Ghana, especially in the informal sector, there is a considerable level of market information sharing among the operators. For example, an informal operator, who had ran short of a commodity, can easily enquire from a 'competitor' if he/she had stock of that commodity, and might even sell on behalf of that competitor. The operators can also consult each other for market information and seek technical advice. The reciprocity which characterised the informal sector might have accounted for that level of interaction using SMS.

5 Discussion

In this section, we shall further discuss some critical issues that emerged from the survey results.

5.1 Mobile Telephones

The analyses have shown the preponderance of mobile telephones in the activities of the SMEs, notably those belonging to the informal category. For this group, the survival and the competitiveness of their economic activities, among others are propelled by the use of mobile telephones. Therefore, the existence of an efficient

mobile telephone infrastructure in the country is cardinal to SMEs development. However, the use of mobile telephones should not be limited to voice communication, but to other services such as banking, internet access and market surveillance, among others. For e-banking, a number of banks in the country have developed services (such as request for cheque book, balance enquiry, request for statement, check transactions) which can be accessed through one's mobile telephone. This has the advantage of reducing transaction cost in terms lost of man hours spent at a bank to request for a cheque book or make balance enquiry.

The adoption of GPRS technology by the mobile telephone operators in the country provides the opportunity for users of the service to access internet using their already acquired handset. Relatively, this has the advantage of less cost of access to the internet for limited usage in the form of sending and receiving emails. With the adoption of this technology, over 5million mobile telephone subscribers in the country could have access to internet through their handsets. Therefore, if the service is effectively utilised, it will considerably increase the total internet subscription in the country

One important use of mobile telephones which has not been exploited effectively in the country relates to advertisement. The increasing mobile telephone subscription provides an avenue for the SMEs to use the service to advertise their products and services. One SMS advert sent by a mobile telephone operator will reach all the subscribers of its service and this may be better than radio or TV advert which one can easily miss if the communication gadget (radio and TV) has been switched off. With the SMS advert, it can be saved for future reference and one can still receive the message later if his/her handset was initially turned off. Though the cost implication is not known, it is important that this service should be explored by the SMEs. It also means that the operators should adopt a competitive pricing system which could attract many potential SMEs to use the service to advertise their products. Therefore, it is important that aggressive marketing promotions (including cost incentives) are initiated by the mobile telephone operators to encourage the use of their value-added services.

5.2 E-banking Services

The discussion has shown that the SMEs have little knowledge and usage of e-banking services. The survey did not explore the rationale behind the use or non use of these services, neither did it enquire about the experiences of the very few enterprises which have used these services. However, it can be speculated that the less patronage of the e-banking services could be linked to the usual problems associated with adoption of new technologies. Adoption and innovation theory has indicated that a number factors namely; channel of communication of the innovation, time of diffusion of the innovation and the community of potential adopters affect the rate of adoption of new technologies or innovations. These factors, in addition to others may have accounted for the poor the adoption of e-banking services. As already mentioned, the critical problems hindering the acceptance of e-banking services are security and absence of legal framework to govern the entire electronic services in the country. Increasing banking fraud is putting off many potential users. It is hoped that actions will be expedited by Parliament on the Electronic Transactions Bill to provide legal framework for e-services in the country.

5.3 Internet Services

Literature is fraught with information on the role internet plays in supporting competitiveness of SME. Therefore, it is important that every business enterprise gain access and use the internet service to enhance their economic activities. The question is, if the stated assertion is true, then why the low level usage of the service in the country, given the relatively high literacy rate among the owners of the SMEs? Is it a question of availability and affordability of the service?

Interaction with an official of the Ghana Export Promotion Council (GEPC) revealed that most of the SMEs, though functionally literate are not computer and internet literate. As a result, the staff of GEPC has to perform internet searches on on-line databases on behalf of these people. Therefore, there is the need for private and statutory bodies responsible for SME development to integrate computer and internet training into their activities. The small number of SMEs using internet services raises the need to developing a policy framework that will sensitize the SMEs, especially the informal and the semi formal to integrate internet into their general operations.

Besides, there are other barriers to the use of internet in the activities of the SMEs, especially the informal ones. These include:

- ⇒ products/services not suitable for sale on the internet,
- ⇒ customers or enterprises not ready to participate in e-commerce,
- ⇒ security problems concerning payments,
- ⇒ Uncertainty about contracts terms of delivery & guarantees,
- ⇒ Logistical problems (Frempong and Essegbey, 2006)

Conclusion

The paper has shown the level of ownership and usage of ICT facilities by the SMEs in Ghana. It is evident that the extent and the type of ICT service used are linked to the formality of the enterprise. Mobile telephone was highly used by the enterprises belonging to the informal category while other services such as fixed line telephone, fax and internet were largely used by the formal

and to some extent the semi formal categories.

One striking thing is that internet usage may not be directly linked to the level of literacy, as in spite of the relatively high literacy rate among the SME owners, internet usage was not appreciable. Thus, adoption may be underpinned by commercial considerations such as cost of investment and the potential returns on business activities. Once these are not favourable to the SMEs, their usage of the service may be low. However, one cannot discount the importance of literacy in the use of knowledge-intensive service as internet, but commercial considerations are strong. Though the government has put in place a national policy on ICTs and also is in the process of developing action plans to implement the strategies of the policy, it is imperative that issues of affordability should be addressed critically.

Finally, with the preponderance of mobile telephone usage by all business categories, it is essential that value-added services emanating from the mobile technology are effectively utilised for business considerations.

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Mobile phones as the Missing Link in Bridging the Digital Divide in Africa

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Abstract

The digital divide—or inequalities in access to Information and Communication Technologies (ICTs)—is a familiar concept. Indeed, the earliest ITU statistics on telecommunications (published in 1871 recording data on telegraph operations since 1849) show a clear divide between the Member States of the Union, mainly within Western Europe at that time. Such gaps have narrowed and, in some cases, even reversed over time, but other disparities have arisen. This suggests that:

⇒ The digital divide is a dynamic concept, which evolves over time;

⇒ Older technologies tend to be more evenly diffused than newer ones;

⇒ There is not a single divide, but multiple divides: for instance, within countries, between men and women, between the young and the elderly, etc.

⇒ The main factor causing these divides is differences in wealth, between countries and within countries (between individuals).

African economies, especially Least Developed Countries in sub-Saharan Africa, have historically been among the lowest-ranked economies worldwide in terms of penetration of ICTs, and therefore, on the wrong side of the digital divide.

The Rise of Mobile Communications

However, the prospects of bridging this gap have never seemed brighter. In 2002, ITU made the bold claim in its World Telecommunication Development Report that mobile communications could provide the "missing link" that would help to bridge the digital divide, and to date, this claim has been largely fulfilled. Mobile communications have grown fastest among developing economies. In developing economies, the number of mobile phones rose from a mere 12 million in 1995 to over 1.15 billion in 2005, at a compound annualised growth rate of 58 per cent. Worldwide, the total number of mobile subscribers was 2.17 billion at the end of 2005 and is projected to surpass 3 billion by late 2007 and to reach 4 billion by 2010, with 80 per cent of new growth expected to come from lower-income emerging markets.

Arguably, Africa's greatest success story to date in telecommunications is the remarkable spread of mobile telephony throughout the continent. Africa's mobile market has been the fastest-growing of any region over the last five years and has grown twice as fast as the global market (Figure 1, left). Africa took over a hundred years to accumulate 28 million fixed lines; an average penetration rate of just 3 lines per 100 inhabitants, and still below 1 in many countries. However, the stunning growth of mobile led mainly by private operators resulted in mobile phones overtaking fixed lines in 2001. Mobile phones now outnumber fixed by nearly five to one, with 137.2 million mobile subscribers in Africa in 2005. The ratio of mobile to fixed phones is even higher in Sub-Saharan Africa, where nine out of every ten subscribers with access to a phone are using a mobile. Mobile penetration has doubled from 6.5 per 100 inhabitants in 2003 to 13.1 per 100 inhabitants in 2005. This remarkable growth has been driven by the private sector and is greatest where the mobile market is competitive. Prepaid has also been another major driver of mobile growth, with some 92 per cent of African subscribers using a prepaid package in 2005.

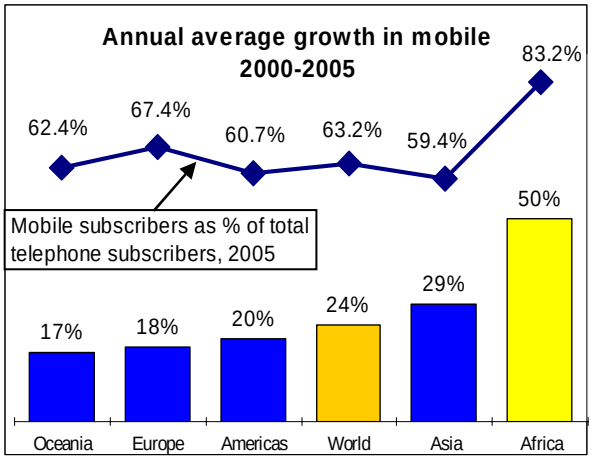
The future growth potential for mobile communications in Africa lies in making mobile telephony more affordable for the huge untapped market of lower-income consumers. Operators that can follow high-volume/low-cost strategies, combined with innovative pricing and payment methods, stand to make big gains in Africa (as the rise of indigenous African strategic investors—such as MTN, Vodacom, Orascom or Celtel—has proven). Making mobile communications affordable includes reducing both the total cost of ownership (for example, by introducing ultra low-cost handsets at below twenty dollars each), as well as addressing cash-flow ("cash-barrier") aspects. If operators can match payment profiles to incomes through micro-financing, shared phones and micro-prepaid schemes (for example, by using low denomination top-ups and balance transfers between subscribers), then rapid growth and large profits can be made in the African market. Furthermore, due to the limited personal finance sector in Africa and low levels of credit card ownership, there are tremendous opportunities for mobile operators in exploring Internet access and financial services over mobile phones, such as m-commerce and banking .

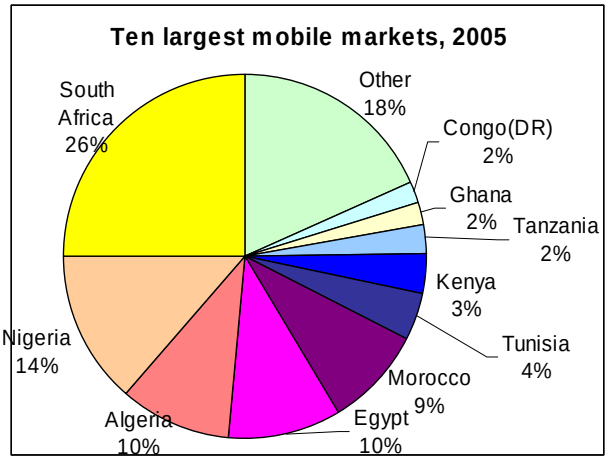
Market competition

The three essential ingredients of telecommunication sector reform, and the recipe for future growth, are market liberalisation, private sector participation and effective regulation. Although Africa embraced reform relatively late, compared with some other regions of the

Figure 1: African Mobile Markets

Annual average percentage growth in mobile network subscribers, Compound Annual Growth Rate, 2000-2005, world regions (left); Ten largest mobile markets in Africa, 2005 (right chart).





Source: ITU World Telecommunication Indicators Database.

world (for example, Latin America), it is now pressing ahead with telecommunication liberalisation, especially in the mobile sector.

Back in 1995, only four African economies allowed for competition in mobile communications. By 2006, this had increased to 44 out of 54 economies (75 per cent), which is a comparable percentage to the Americas (76 per cent) and Asia-Pacific (78 per cent). Greater competition and private ownership in the mobile sector compared with the fixed-line market are the main reasons for Africa's success in mobile. The liberalisation process needs to go further: for instance, by permitting greater competition in the fixed-line market, in the ownership of private payphones, in the use of very small aperture terminals (VSAT) and/or in the liberalisation of the international gateway. Nevertheless, Africa's experience with mobile communications has been a driving force for transformation .

While access to mobile communications is vital for access to voice services for today's African consumers, in the future, wireless could also provide access to Internet and other data-based services. In this context, it is the ability to upgrade to high-speed or broadband access that will enable Africa to compete most effectively in the global market. Given Africa's headstart in mobile telephony, broadband Internet access is most likely to be delivered over a mobile platform than a fixed line. Third-generation (3G) mobile services with higher transmission speeds and enhanced data services promise a range of new applications for users and new revenues for operators. ITU recognises the following 3G services as compliant with the IMT-2000 family of standards:

⇒ Wideband Code Division Multiple Access (W-CDMA), which can reach maximum data download speeds of 2 Mbit/s when fully implemented. It is sometimes known as UMTS or 3GSM in Europe;

⇒ High Speed Downlink Packet Access (HSDPA), an upgrade to W-CDMA allowing a theoretical peak downlink rate of 14.4 Mbit/s, although this is not currently widely available on commercial handsets.

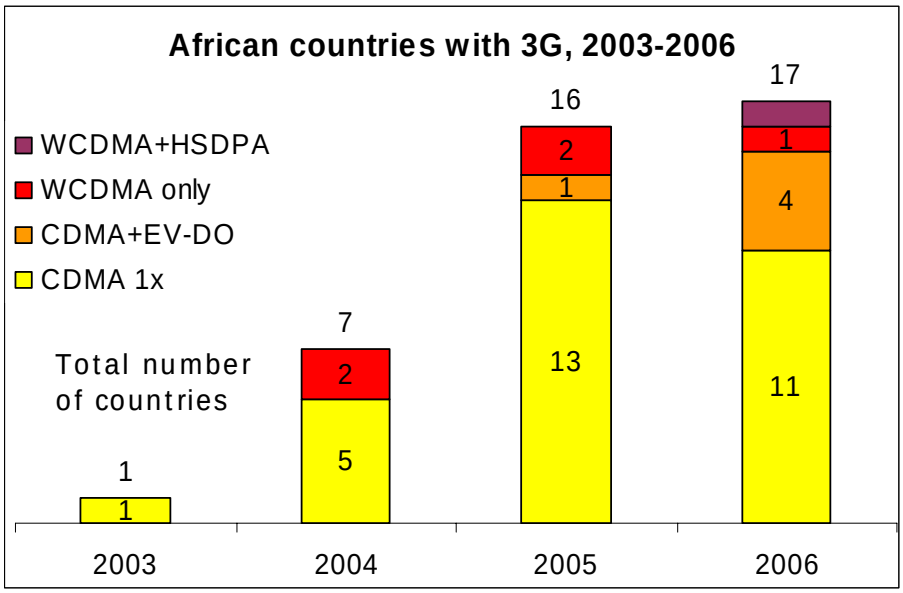
⇒ CDMA 2000 1x, which delivers speeds of up to 144 kbit/s. This does not qualify as "broadband" as it is below the threshold speed of 256 kbit/s.

⇒ CDMA EV-DO (Evolution Data Only) enhances 1x speeds up to 2.4 Mbit/s.

⇒ Time Division Synchronous CDMA (TD-SCDMA), which has not yet been commercially launched, but may be the preferred choice for 3G systems in China.

3G services have been commercially available since 2001 worldwide and in Africa since 2003, when the first Wireless Local Loop (WLL) CDMA 1x networks were rolled out in Nigeria. South Africa and Mauritius launched W-CDMA networks in 2004, with South Africa already implementing a HSDPA network in 2006. A total of seventeen African countries now boast IMT-2000 mobile networks (Figure 2). Eleven countries have CDMA 1x networks, while operators in Angola, Cote d'Ivoire, Nigeria and Rwanda have launched EV-DO networks. Further 3G launches are expected in

Figure 2: 3G networks in Africa
(Number of African countries with 3G (IMT-2000) networks commercially available, 2003-2006.)



Source: ITU.

2007, including Etisalat and Vodafone in Egypt (in Q1 and Q3 respectively) and Vodacom in Tanzania.

The future digital divide

As noted at the start of this article, the digital divide is not, and never has been, a stable concept. It continues to evolve over time, both in terms of geography and in terms of the nature of services. Africa is well on the way to addressing some of the disparities in access to basic voice telecommunications, through investment in mobile phones. However, as the world becomes increasingly dependent on ICTs, the digital divide may come to be measured more in terms of the "quality", rather than simply the "quantity", of access to ICTs. Africa has decisively opted for a mobile future in voice communications, and this is likely to be reflected too in its choice of a wireless platform for high-speed Internet access. This suggests that coverage can be expanded more rapidly through wireless platforms, rather than fixed-line solutions (based on fibre optics, copper wires - such as asymmetric digital subscriber lines - or cable modems). However, there will still be an important geographic element to the digital divide, as coverage is initially provided to capital cities and other large urban areas at higher speeds, rather than to rural Africa. That is where the future digital divide will lie.

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(visited 27.3.2007). The designers of MIT's 100$ laptop had this problem in mind when they equipped it with a hand crank. The Chinese product equally consumes very little power. Another way to free users from unreliable power supply are commercially available solar powered PCs, even if at high prices, see https://www.solarpc.com/catalog/, (visited 27.03.2007). Other than device-connected solar power requires still too costly and pose the problem of storing energy, see Wikipedia, http://en.wikipedia.org/wiki/Solar_power (visited 31.3.2007).

15. As to the preconditions for using the internet (in one's own language), see Pimienta, D. (2005) Models and Approaches Linguistic Diversity in Cyberspace – Models for Development and Measurement, in: Measuring Linguistic Diversity on the Internet, UNESCO, Paris 2005, 13.

16. WGIG: Cluster 4 Assessment Report, April 25, 2005, http://www.wgig.org/docs/WGIGPaper-Cluster4-development.pdf (last visited 13 December 2006), 1.

17. Interconnection standards and agreements including peering agreements are critical to the successful functioning of the Internet and for maintaining its end-to-end and cost-effective availability and reliability. In so-called peering agreements the internet service providers in developed countries agree to accept traffic from one another's customers. The agreements are concluded between the different owners of the physical infrastructure and mostly confidential by nature. No data is available on whether the applicable ITU recommendation D.50 is actually being implemented. Since the internet traffic is not very dense and few users mail to developing countries, internet service providers (ISPs) from developed countries have no business incentive to enter a shared-cost peering agreement with ISPs from developing countries. The agreements concluded instead are so-called transit agreements where the ISPs from developing countries pay for inbound and outbound traffic, thus subsidizing providers of the developed world. Unfortunately this is not only the case for international communication; even inner-African traffic might have to be routed via the U.S., because of the lack of so called Internet Exchange Points (IXP) within the developing part of the world.

    As peering agreements rely on a "critical mass" of customers of each of the contracting ISP it is difficult to imagine how African ISP should be able to gain this critical weight if prices remain high and new customers cannot be won easily. IXP-Construction is needed to reduce the cost for inner African or South American traffic.

18. Wireless access via WiMax, WiFi or GPRS relies on spectrum policies, management and availability. The subject has therefore been on the agenda of international organisations. Unfortunately the developing countries which could profit the most of this affordable technology are only insufficiently represented in standard setting bodies such as a professional organisation called Institute of Electrical and Electronics Engineers, Inc. (IEEE).

19. Computer and Internet Penetration Rates ITU (2004) http://www.itu.int/ITU-D/ict/mdg/, (visited 9.3.2007).

20. Tongia, R. (2005) 95.

21. Id..

22. http://en.wikipedia.org/wiki/WiMAX.

23. V. Haarhoff (2006) Uganda gets WiMax network, ITWEB, June 1, 2006, http://www.itweb.co.za/sections/telecoms/2006/0606011040.asp?A=SME&S=SME&O=FPIN, (visited 3.7.2007).

24. Levy, A. (2003) Creating Affordable Universal Internet Access, TechKnowLogia, January - March 2003, http://www.techknowlogia.org/TKL_active_pages2/CurrentArticles/main.asp?IssueNumber=19&FileType=HTML&ArticleID=475.

25. On satellite access see, R. Tongia (2005), 93.

26. It is a multi-stakeholder cross-sectoral platform and forum that brings together all stakeholders representing relevant constituencies such as governments - development cooperation, foreign policy, finance, social, sectoral (health, education) and regulatory agencies; in the private sector - industry and workers associations, producers and consumers of ICT, the media; in civil society, NGOs, foundations, scientific, academic and ICT communities and individuals providing advocacy and oversight on Information Society issues and implementing programs addressing MDGs.

27. The western side of Africa is connected via SAT3. To give it its full name, SAT3/WASC/SAFE Consortium is an international fibre that goes from Portugal to South Africa and out across the Indian Ocean to Asia. The cable system is divided into two sub-systems, SAT3/WASC in the Atlantic Ocean and SAFE in the Indian Ocean. The combined length of the SAT3/WASC/SAFE system segments measures 28 800km. It has 36 members who put up US$600-million to build and operate it for the life of the cable over the next 25 years. Of the African continent it connects Senegal, Côte d'Ivoire, Ghana, Benin, Nigeria, Cameroon, Gabon, Angola and South Africa. As the members of the Consortium are monopolists in their countries and liberalisation slow broadband access is still expensive in certain areas; see BBC New: Warning over African internet cable, March 15, 2006, http://news.bbc.co.uk/2/hi/africa/4787422.stm (visited 7.3.2007). Unconnected countries such as Namibia have trouble getting access, Jensen M. (2006) Open Acess: Lowering the Cost of Bandwidth in Africa, Association for Progressive Communications (APC), 8, APC Issue Papers Series 2006, APC-200610-CIPP-I-EN-PDF-0027.

28. The NEPAD arose from a mandate given to the five initiating Heads of State (Algeria, Egypt, Nigeria, Senegal, South Africa) by the Organisation of African Unity (OAU) to develop an integrated socio-economic development framework for Africa, http://www.nepad.org.

29. Vechiatto, P. (2007) Eassy (N)BINned, Feb. 20, 2007, ITWEB, http://www.itweb.co.za/sections/telecoms/2007/0702201600.asp, (visited 7.3.2007). For news coverage on the matter see, Fibre for Africa – Opening up Affordable Bandwidth in Africa, http://www.fibreforafrica.net

30. Oyuke, J. (2006) Kenya signs undersea cable pact, The Standard, Nov. 21, 2006, http://www.eastandard.net/hm_news/news.php?articleid=1143961365, (visited 7.3.2007).

31. "Kenya-SA fibre route planned", Jan. 14, 2007, Balancing Act, http://www.balancingact-africa.com/ (visited 7.3.2007).

32. WGIG Assessment of Governance Arrangements for Cluster 1 a Issues (Telecommunications infrastructure, broadband access, VoIP, Peering and interconnection, spectrum policy and technical standards) April 12, 2005 at I.4., http://www.wgig.org/docs/WGIGPaper-Cluster1aFinal.pdf (last visited 13 December 2006). See also, Dufborg, A. (2005) in: Open Access for Africa, Challenges, Recommendations and Examples, S. Danovsky (ed.),, UNESCO 2005, iii.

33. Keck, A./Djiofack-Zebaze, C. (2006) Telecommunication Services in Africa: The Impact on Multilateral Commitments and Unilateral Reform on Sector Performance and Economic Growth, Working Paper, 7

34. Id. at I.5. (b).

35. Malcalm, E. (2004) Flattening The World -The Prospects for Fiber Optic Technology in Africa http://www.iconnect-online.org/Resources/Flattening%20The%20World_Ebenezer%20Malcolm.pdf/download (11.3.2007).

36. See Chinn, M. D. and Fairlie, R. W. (Sept. 2006) ICT Use in the Developing World: An Analysis of Differences in Computer and Internet Penetration, NET Institute Working Paper No. 06-03, available at SSRN: http://ssrn.com/abstract=936474, who emphasise that a similar level of legal development is important to bridge the digital divide, 28.

37. See IGF Inaugural Meeting November 2006, Minutes of the Access Panel, Bagiire, V.W,. Colaboration on International ICT Policy for East and Southern Africa, Uganda; Dempsey, J., NGO Center for Democracy and Technology, U.S.A.; Woodcock, B., Packet Clearinghouse, U.S.A., http://www.ingovforum.org/IGF-Panel5-011106.txt, (visited 8.3.2007).

38. Neto, I. / Best, M. L. and Gillett, S. E. (2004) License-Exempt Wireless Policy: Results of an African Suvey, http://itc.mit.edu/itel/Docs/2004/ITS_paper_neto_best_gillett.pdf (visited 10.3.2007). For a more detailed analysis see, Neto, I. (2004) Wireless Networks for the Developing World: The Regulation and Use of License-Exempt Radio Bands in Africa, Masterthesis, MIT, http://itc.mit.edu/itel/students/papers/neto_thesis.pdf (visited 10.3.2007).

39. The reasons fort he high prices are different from country to country. Kenya for example levies an excise tax of 10 % on mobile phone usage which unnecessarily slows down growth in related sectors see, May , G. (2006) Excise duty on mobile phone usage not justified, August 21, 2006, http://www.mobileafrica.net/a73.htm (visited 31.03.2007). See in more detail Hesselmark, O./Engvall, A. (2005) Economic Development in Africa Powered by Mobile Telephony, in: Open Access for Africa, Challenges, Recommendations and Examples, S. Danovsky (ed.), UNESCO, 155, 161.

40. Keck, A./Djiofack-Zebaze, C. (2006), 7 (supra note).

41. Table on Computer and Internet Penetration Rates ITU Union (2004), http://www.itu.int/ITU-D/ict/mdg/, (visited 9.3.2007).

42. Id.; 8.13 persons out of 100 were using PC in 2004.

43. See the initiative's homepage with the technical specifications, http://www.laptop.org/laptop/hardware/specs.shtml, (visited 3.3.2007).

44. Singel, R. (2007) High Security for 100$ Laptop, in: Wired News of Feb. 7, 2007, http://www.wired.com/news/technology/0,72669-0.html?tw=rss.index, (visited 3.3.2007).

45. Carney, S. (2007) One Cheap Desktop for All, in: Wired News of June, 29, 2006, http://www.wired.com/news/culture/0,71222-0.html, (visited 3.3.2007).

46. Id.

47. http://www.infodev.org/en/Publication.107.html

48. Mobile Telecoms - Out of Africa, The Economist, Dec. 6, 2006, 65.

49. For access to the topic see, http://www.mobileafrica.net/.

50. Hesselmark, O./Engvall, A. (2005) Economic Development in Africa Powered by Mobile Telephony, in: Open Access for Africa, Challenges, Recommendations and Examples, S. Danovsky (ed.), UNESCO, 155, 157.

51. Bangemann, E. (2006) Microsoft's alternative to US $100 laptop: the cell phone, Mobile Africa, Feb. 22, 2006, http://www.mobileafrica.net/a58.htm, (visited 3.3.2007).

52. Id.

53. On that see, the OPLCWiki, http://wiki.laptop.org/go/Educational_ideas (visited 30.3.2007).

54. Example Ghana where 100 kilobyte cost about U.S.$ 0,02, Ajao, O.D., (2007) Mobile Internet in Ghana, March 5, 2007, http://www.mobileafrica.net/a91.htm.

55. Tanburn, J./Singh, A.D. (2001) ICTs and Enterprises in Developing Countries: Hype of Opportunity? InFocus Programme on Boosting Employment through Small EnterprisE Development (SEED) Job Creation and Enterprise Department, International Labour Organisation, Working Paper No. 17, v.

56. Move it to your mobile phone, (2007) The Hindu, March 1, 2007, http://www.thehindu.com/thehindu/seta/2007/03/01/stories/200703030100201700.htm; Tongia, R. (2005) Open Access Networking in Africa: The FiberAfrica Proposal, in: Open Access for Africa, Challenges, Recommendations and Examples, S. Danovsky (ed.), UNESCO, 94 even with regard to only voice enabled mobiles.

57. The WTO Basic Telecommunications Agreement ("BTA") is a plurilateral agreement, meaning that although only a subset (roughly 84) of the WTO's 144 members have made specific commitments for basic telecommunications, all are entitled to take advantage of the trade benefits conferred by those commitments. Most countries making specific commitments under the BTA did so as part of the negotiations concluding in 1997, but countries may continue to make new (or improved) commitments in variety of ways: (1) when joining the WTO; (2) as part of a formal "round" of negotiations unilaterally. Very few African countries made commitments see http://www.wto.org/english/tratop_e/serv_e/recap_e.xls; or (3) (13.3.2007).

58. Keck, A./Djiofack-Zebaze, C. (2006), 4; only Côte d'Ivoire, Ghana, Kenya, Mauritius, Senegal, South Africa and Uganda allow for market access of foreign telecommunications providers, and Nigeria has opened its mobile market, id. at 9, supra note 57.

59. See the W3C Workshop on the Mobile Web in Developing Countries, Bangalore India, December 5-6, 2006, http://www.w3.org/2006/07/MWI-EC/agenda.html (visited 31.3.2007).

60. Vosloo, S. (2005) Towards a Sustainable Development View of Local Content using ICTs in South Africa. A Key Priority in the National Information Society Strategy, in: Willard et. al. (eds.) A Developing Connection: Bridging the Policy Gap between the Information Society and Sustainable Development, International Institute for Sustainable Development 2005, 34.

61. See supra note 12.

62. Vosloo, S. (2005), 10, 24, 34 supporting a wider approach. For an assemblage see, Ballantyne, P. (2002) Collecting and Propagating Local Development Content – The Case Stories, International Institute for Communication and Development, Research Report No. 8, 8-2002 http://www.ftpiicd.org/files/research/reports/report8.pdf (visited 27.3.2007).

63. GAID Business Plan for 2006 – 2007, para.17, http://www.un-gaid.org/fr/businessplan, (visited 4.3.2007). More information can be found on the Telecentre homepage: http://www.idrc.ca/telecentres/ev-64612-201-1-DO_TOPIC.html (9.3.2007).

64. International Development Research Centre (IDRC, Canada), http://www.idrc.ca/index_en.html; Microsoft; Swiss Agency for Development and Cooperation (http://www.sdc.admin.ch); the Malaysia based Global Knowledge Partnership (GKP), http://www.globalknowledge.org/; dozens of local or regional networks.

65. See Development Research Network (D.Net) (2007) Evolving "Mobile Lady" into "Info lady": A Solution to the Financial Sustainability to the Telecentres, Innovative Solution Series 1, http://www.dnet-bangladesh.org/main.html, visited (9.4.2007).

66. The use of generally understandable symbols for typical webpage functions may be an option,

67. O'Neill, E./Lavoie, B. and Bennet, R. (2003) Trends in the Evolution of the Public Net 1998-2002, in: D-Lib Magazine, http://www.dlib.org/dlib/april03/lavoie/04lavoie.html (visited 13.3.2007).

68. Generally on multilingualism and the Internet see, Wright, S. (ed.) 2004 Multilingualism on the Internet. International Journal on Multicultural Societies 6/1, http://portal.unesco.org/shs/en/ev.php-URL_ID=7142&URL_DO=DO_TOPIC&URL_SECTION=-465.html (visited 13.3.2007); Danet, B. and Herring S. C., (eds.) 2003 The Multilingual Internet: Language, Culture and Communication in Instant Messaging, Email and Chat. Journal of Computer-Mediated Communication 9 (1), http://jcmc.indiana.edu/vol9/issue1/, (visited 13.3.2007).

69. Vosloo, S. (2005), 26.

70. Håkansson, A.-K. /Deer, K. (2006) Indigenous ICT Taskforce, IGF-Contribution, p. 2, http://www.intgovforum.org/Substantive_1st_IGF/IGF_contr.f.doc (last visited: august 18, 2006).

71. For a detailed description of the incredible work that has to be done, Diki-Kidri, M. (2006) L'accès au cyberspace des langues peu dotées, Presentation for Union Latine of UNESCO at the ITU an UNESCO Global Symposium on Promoting the Multilingual Internet, Geneva, 9-11 May 2006, p. 4, http://www.itu.int/ITU-T/worksem/multilingual/papers/sintro-paper-diki-kidiri.pdf (last visited August 18, 2006). Especially the analysis of sounds must happen with great delicacy otherwise the language's richness and oral local variations will be lost. Håkansson, A.-K. / Deer, K, 2. Already writable languages have lost such variations; only terminology, but not a specific spelling depicting the articulation will reveal whether an American or and Englishman has written a text.

72. Preferably a script proper to a dominant well-known language spoken in the area should be chosen so as to avoid that people who know how to read have to learn another script.

73. The Unicode standard assigns a unique number to each character used in the written languages of the world. The storage of these numbers in text processing comprises another topic; problems result from the fact that much software written in the Western world deals with 8-bit or lower character encodings only, with Unicode support added only slowly in recent years. Consequently, the fact that a character has been encoded by UNICODE standard does not mean working with it becomes directly possible. On its homepage Unicode provides a list of Unicode enabled products, www.unicode.org/onlinedat/products. html, (visited 31.3.2007).

74. It should be noted however that great efforts have been undertaken already prior to the WSIS to bring minority languages to the internet, see the e.g. the B@bel Initiative of the UNESCO launched

75. Millions of SMS are exchanged in Hindi, but spelt phonetically in Latin script since mobiles with a Devanagiri touchstone set are not so widely available. It could be said that exclusive availability of mobiles with Latin characters will erode the otherwise well established writing and reading in Devanagiri, see Balakrishnan, A. (2006) A future with Hindi in English script? Oct. 27, 2006, http://www.rediff.com/money/2006/oct/27ab.htm, (visited 6.3.2007).

76. A Bangladesh based project of The Development Research Network (D.net) is about to use Smart Phones instead of regular mobiles because although web browsing is not convenient for the users, as the screen is very small, See (2007) Evolving "Mobile Lady" into "Info lady": A Solution to the Financial Sustainability to the Telecentres, Innovative Solution Series 1, http://www.dnet-bangladesh.org/main.html, visited (9.4.2007)

77. The 100$ laptops will provide the possibility to write in the locally most prevalent language.

78. An especially successful example is Busyinternet in Ghana, http://www.busyinternet.com.

79. The distribution of computer under the sister project "Shared Access" took place in Kenia. Nigeria is the target country for distributing mobile handsets. For more details see http://www.gsmworld.com/developmentfund/projects/voice.shtml.

80. Hesselmark, O./Engvall, A. (2005), 155, 160.

81. Tanburn, J./Singh, A.D. (2001), 3.

82. Hesselmark, O./Engvall, A. (2005), 162.

83. Http://www.tradenet.biz (visited 09.04.2007) and Southwood, R. (2007) Africa: TradeNet launches market Intel Platform for Buying and Selling Agricultural Goods, February 5, 2007, http://allafrica.com/stories/200702050560.html (visited 09.04.2007).

84. A report on the project is to be found at http://www.idrc.ca/en/ev-8117-201-1-DO_Topic.html (visited 09.04.2007).

85. Anderson, C. (2006) 'The Long Tail: How Endless Choice Is Creating Unlimited Demand', 6 July, at: http://longtail.typepad.com/the_long_tail/2005/04/media_meltdown.html. This builds on previous work by Shirkey, C. (2003) 'Power Laws, Weblogs, and Inequality', at: http://www.shirky.com/writings/powerlaw_weblog.html. These both build on prior work on power laws and distributions with long tails, see Shapiro, C. and Varian, H. (1998) Information Rules: A Strategic Guide to the Network Economy. Cambridge, MA: Harvard Business School Press.

86. Marsden, C./Cave, J. /Nason, E. /Parkinson, A. / Blackman, C. and Rutter, J. (2006) Assessing Indirect Impacts of the EC Proposals for Video Regulation prepared by Rand Corporation Europe for the United Kingdom Office of Communication, 22, http://www.ofcom.org.uk/research/tv/reports/videoregulation/ (visited 13.12.2007).

87. See http://bango.com/Default.aspx (visited 09.04.2007).

88. See generally Ivatury, G./Pickens, M. (2006) Mobile Phone Banking and Low-Income Customers. Evidence from South Africa, Consultative Group to Assist the Poor (CGAP)/The World Bank and United Nations Foundation, 2.

89. For other examples see Wishardt, N. (2006) Micro-Payment Systems and their application to mobile networks, International Bank for Reconstruction and Development/The World Bank, Washington D.C.

90. Ibid., at 43.

91. Southwood, R. (2004), ICTs and Small Enterprise, A Motor of Economic Development in Africa, IICD Research Brief – no. 9, March 2004.

92. Mannestig, D./Sotomane, C./ Macanze, J. (2005) Nurturing Entrepreneurship in Mozambique, in: Open Access for Africa, Challenges, Recommendations and Examples, S. Danovsky (ed.), UNESCO, 25, 30.

93. Southwood, R. (2007) Africa: TradeNet launches market Intel Platform for Buying and Selling Agricultural Goods, February 5, 2007, http://allafrica.com/stories/200702050560.html (visited 09.04.2007).

94. There is even evidence that mulitlateral commitments will not be decisive for reducing the price of telecommunications, Keck, A./Djiofack-Zebaze, C. (2006), supra note 57 at 22.