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The impact of Information and Communication Technologies (ICT) on Small and Medium Scale Enterprises (SMEs) in the Kumasi Metropolis, Ghana, West Africa

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Abstract
This paper presents the results of a research carried out to learn about the impact of Information and Communication Technologies (ICT) on Small and Medium Scale Enterprises (SMEs) in the Kumasi metropolis. The study investigates the extent to which the increase in productivity of SMEs can be attributed to the implementation of ICT, the contribution of ICT in the growth of SMEs that has adopted it, whether the advent of the internet has changed the ways of businesses and if the use of the internet is essential in locating additional contracts and to expand the enterprises' market. The study provides an insight on the barriers for the adoption of ICT. Data on these aspects of ICT was collected from 40 SMEs through a questionnaire instrument. The results of the study show that only a small number of SMEs in Kumasi are aware of the benefits of ICT adoption. Majority of the firms that use the internet mainly use it to locate customer and contracts, general business information, and e-mailing rather than sourcing for raw materials. Most of the SMEs have reported a positive performance and other benefits by utilizing ICT in their businesses. Lack of internal capabilities, lack of financial support, non – availability of infrastructure and personal reasons were the major barriers in adopting ICT. There is a need for more focus and concerted efforts on increasing awareness among SMEs on the benefits of ICT adoption. The results of the study recognize the need for more training facilities in ICT for SMEs, measures to provide ICT products and services at an affordable cost, and availability of free professional advice and consulting at reasonable cost to SMEs. Our findings therefore have important implication for policy aimed at ICT adoption and use by SMEs.
Keywords: Information and communications technology (ICT), small and medium sized enterprises (SMEs), ICT adoption, ICT use, government policy

1. INTRODUCTION

SMEs have played a key role in the economies of both developed and developing countries interms of turnover and level of employment. SMEs are often seen as the seeds foe a vital entrepreneurial economy, the majority of the Ghanaian workforce are employed by these SME,s. The role they play as a major source of innovation and growth has been emphasized in contemporary research (Bravnerhjelm, 2008). Research has also shown that firms that have been able to effectively utilize Information and Communication Technology (ICT) can provide small firms with a strategic advantage which can positively influence their competiveness. The adption of ICT can provide SMEs with valuable information, increase knowledge, improved performance, improve relationships with customers and suppliers, increase efficiency, reduce cost of production among others.

Big businesses have taken the opportunity of ICT to gain the edge over their competitors unlike the small and medium enterprises. There is strong evidence that ICT is the driver for economic growth and government all over are driving SMEs to adopt ICT.

1.1 PROBLEM STATEMENT

The recent increase in technological advancement has had strong impact on SMEs in other parts of the world including China and Brazil (James Manyinka et al, 2011). They came by as a result of conscious government efforts through the implementation of policies to make ICT available to SMEs. The government of Ghana is equally making such efforts by implementing policies to make the ICT sector more advanced. It has made the economy more attractive to attract investors in the telecommunication industry, television and radio and has made it easier to import computer related technologies into the country.

Emphasis on impact of information and communication technology on increase in productivity can be considered as an issue of much concern to the government of Ghana and most developing countries. The use of ICT to increase productivity is one of the problems being faced by SMEs presently due to the lack of knowledge on the benefit of ICT in their businesses. They are still using the traditional tools to stay competitive. Given the chances SMEs can identify the current economic possibilities and benefits in adopting ICT. Therefore the focus of this research is to assess the degree to which the application of ICT can help to improve the economy and increase productivity of small and medium scale enterprises in Kumasi.

1.2 RESEARCH OBJECTIVES

The overall purpose of this study is to investigate the impact of ICT on SMEs' performance.

To arrive at the above purpose the following research objectives are developed:

- To find out whether the increase productivity of SMEs can be attributed to the implementation of ICT
- To describe the contribution of ICT in the growth of SMEs that has adopted it.
- To find whether the advent of the internet has changed the ways of businesses and if the use of the internet is essential in locating additional contracts and to expand the enterprises' market.

2.0LITERATURE REVIEW

2.1 ICT AND GROWTH IN SMES

According to world development report (1999), for leading countries in the world economy, the balance between knowledge and resources has shifted so far towards the former that knowledge has become perhaps the most important factor determining the standard of living more than land, tools, and labor. Today's most technologically advanced economies are truly knowledge based. Countries in the world are moving from an industrial economy to a knowledge economy in which economic growth is dependent on a country's ability to create, accumulate and disseminate knowledge. Computers and the internet catalyzed the growth of the knowledge economy by enabling people to put knowledge into a digital form easily transmitted to anywhere around the world. ICT has sped up the pace of globalization and increase the complexity of business practices because firms not only need to be familiar with their local context but also with global developments. Thus, to compete in the knowledge economy, countries need a strong ICT literate skills base that can innovate and adapt quickly to change. More value is placed on the knowledge worker than ever before, knowledge economy relies heavily on ICT; it has led to the rapid growth of ICT sectors.

Many countries such as India, the Republic of Korea, Taiwan and China have created enabling environments to ensure that SMEs are well positioned to capture these emerging business opportunities. India, for example offered relief from import duties for IT hardware, tax deductions for income earned from software exports, and tax holidays, and developed infrastructure in software technology parks. India's thriving ICT sector has in turn propelled the country's economic growth. SMEs outside the ICT sector have also benefited by adopting ICT in their own operations, enabling them to communicate quickly, increase productivity, develop new business opportunities, and connect to global networks.

2.2 ICT CHALLENGES IN DEVELOPING COUNTRIES

Wolf, S. (2001) found that in most African countries, small and medium enterprise (SME) account for a significant share of production and employment and is therefore directly connected to poverty alleviation. Especially in developing countries SMEs are challenged by the globalization of production and the shift in the importance of various determinants of competiveness. ICTs can improve efficiency and increase productivity by different ways including, improving efficiency in resource allocation, reducing transaction costs, and technical improvement, leading to the outward shifting of the production function. Although South Africa is much more developed and its ICT infrastructure is far more advanced, Wolf in his study found that SMEs in South Africa faces similar problems as in other African countries with respect to poor management practices, limited access to technology, and limited access to credit facilities education, unemployment, ICT infrastructure and role of the SME sector leading to slow pace of internet services. The challenges is to move SMEs to go beyond these first few basic steps, and to eventually move towards integrating ICTs in more sophisticated business applications. This is a major step for SMEs, especially in developing countries, because these would require management and technical skills and investments (as well as organizational changes) that they may not be able to afford or for which they may not have ready access.

2.3 ICT DIFFUSION IN SMEs IN DEVELOPING COUNTRIES

There are very few studies about ICT adoption in developing countries (Temtime et al 2003), (Mutula et al 2006), (Yeh et al 2007), (Ssewanyana et al 2007), (Kapurubandara et al 2006). (Lal 2007) investigating adoption of ICT in

Nigerian SMEs found that, one of the major factors inhibiting ICT diffusion and intensive utilization is poor physical infrastructure. In developing countries some of the ICT adoption challenges include legal and regulatory issues, weak ICT strategies, lack of R& D, excessive reliance on foreign technology and ongoing weaknesses in ICT implementation (Dutta et al 2003)

There are a number of studies that discuss adoption of Internet and e-business in SMEs in developed countries (Lucchetti and Sterlacchini 2004), (Love et al 2004), (Schubert and Leimstoll 2006 and 2007a, b), (Koellinger 2006), (Stroeken 2001), (Morikawa 2004), (Caldeira and Ward 2002), (Gregor et al 2004), and (Doczi 2002). Governments around the globe recognize the importance of adoption of ICT by SMEs and they have created special groups to study various aspects of ICT adoption in SMEs. Despite the importance of ICT and emphasis by various governments to encourage SMEs to adopt ICT, it has been reported that SMEs have been slow in adopting ICT for various reasons (Houghton and Winklhofer, 2004),(Smallbone et al 2001), (Dawn et al 2002) and (Lawson et al 2003)

2.4 BARRIERS TO ICT ADOPTION

Large organizations have enough resources to adopt ICT while on the other hand SMEs have limited financial and human resources to adopt ICT. (Duan et al 2002) identified lack of ICT skills and knowledge in SMEs as one of the major challenges faced by all European countries, particularly in the UK, Poland and Portugal, in their study. (Houghton and Winklhofer 2004) have reported a slow response of SMEs relating to adoption of ICT. (Shiels et al 2003) found that characteristics of the firm and industry sector are contributory factors to the adoption and exploitation of ICTs by SMEs. (Kapurubandara et al 2006) have categorized internal and external barriers that impede adoption of ICT by SMEs in a developing country. The internal barriers include owner manager characteristics, firm characteristics, cost and return on investment, and external barriers include: infrastructure, social, cultural, political, legal and regulatory.

2.5 THE IMPACT OF ICT ON SMEs

It is only in the 1990s that empirical evidence was found that computers had a substantial effect on firms' productivity levels. In their studies of the effect of information technology on productivity, Brynjolfsson and Hitt (1995) observed that alongside firm effects, ICT capital contributes positively and significantly to output and productivity for large US firms. Similar results are also found when examining the effects the use of various ICTs has on productivity. These results were consolidated even further in a more recent study (Brynjolfsson and Hitt 2000), which underscores the importance of complementary factors such as restructuring the enterprise and improving the skills level of the personnel to get productivity growth as a result of investment in ICT.

There are hardly any studies that analyze the effect of ICTs on small enterprises in developing countries, partly due to data problems. Müller-Falke (2001) found out for Indian manufacturing SMEs that enterprises that use more advanced forms of ICT have on average a higher labour productivity and a higher growth rate. In a survey of 59 electric and electronic manufacturing Indian SMEs mainly employing less than 50 people, Lal (1996) observed higher profit margins, skill intensity and export and import intensities for firms using IT. There is also some evidence that export performance of SMEs is related to ICT adoption (Lal 1999, Nassimbeni 2001). However it is not the investment in the technology alone but the combination with other technologies and especially relevant skills that make ICT work.

Flexibility is considered to be a major source of competitiveness for SMEs compared to larger enterprises. The use of ICT could now on the one hand increase the competitiveness of SMEs as they enable the creation of more flexible links with trading partners because of faster and more reliable communication channels. On the other hand ICTs could help bigger enterprises to increase their flexibility through a restructuring of the organization which will enable them to adapt quicker to changing conditions. Therefore the competitive advantage of SMEs could also decline. (Susanna Wolf, 2001).

2.6 WHAT ARE SMEs

The Bolton committee (1971) formulated an economic and statistical definition. With regards to the economic definition a firm is regarded as small if it has relatively small share of their market place, managed by owners or part owners in a personalized way and not through the medium of a formalized management structure; is independent in the sense of not forming part of a large enterprise

However, according to Kalanje (2002), the definition of SMEs is based on an enterprise's number of employees, the level of assets, sales turnover of the said enterprise or a combination of these criteria in most countries. Southern and Tilley (2000) shares a similar view by acknowledging business that employ 150 people or fewer and are not a

subsidiary of a public limited company. Taylor and Murphy (2004), Martin and Matlay 2001 agree and acknowledge that SMEs are different and should be treated as such. There are many factors that make SMEs different, such as turnover, industry, number of employees and format of business. These factors need to be studied in more detail to establish how they influence the adoption process.

3.0 METHODOLOGY

To achieve the research objectives, both primary and secondary source of data was employed in this research. Primary source of data was basically interviews and administering of questionnaires to retrieve information from SMEs. The questionnaires which were administered to the SMEs provided wide range of options for them to choose from. Simple random sampling was used to select the SMEs. In all forty SMEs was chosen for the study. Secondary source of data for the study include textbooks, business articles and journals, the internet; and SMEs published accounts that are directly related the study area. The data obtained was analyzed with particular reference to the research questions using descriptive statistical tools such as tables and diagrams.

The target population comprises SMEs and individual business owners from the Kumasi Metropolis and the sample size was 40. The researcher employed probability sampling method to select the various elements for the study. This method was used because all the SMEs in the Metropolis cannot be covered due to their large numbers. The method therefore shall give a fair chance for enterprises in different industries to participate in the study.

Number of years in business (Table 1)

Years	Frequency	Percentage (%)
Less than 10	23	57.5
Over ten years	17	42.5
Total	40	100

Table 1 shows that majority of the firms had been in existence for less than 10 years. Twenty three (23) had been in existence for less than 10 years while seventeen (17) of the firms had been operating for more than ten (10) years.

3.1 ADAPTATION OF ICT BY FIRMS

Respondents gave information about their use of basic office automation systems, where thirty eight (38) firms representing ninety five (95%) percent responded positively and five (5%) percent representing (2) firms were not in use of any basic office automation systems.

3.2 IMPORTANCE OF ICT TO BUSINESS

To ascertain the views of the businesses as to whether information and communication technology is of importance, they were asked whether they considered the use of the internet important and 39 firms representing 97.5% considered it important whilst only 1 firm representing 2.5% considered it not important. Table 2 illustrates the number of firms that considered ICT to be important.

Importance of internet to business (Table 2)

Components	Frequency	Percentage (%)
Yes	39	97.5
No	1	2.5
Total	40	100

Source: field work, 2012

3.3 USE OF INTERNET BY FIRMS

Table 3 Use of internet by firms

Components	Frequency	Percentage (%)
Yes	29	72.5
No	11	27.5
Total	40	100

Source: field work, 2012

Internet is one of the basic components of information and communication technology and the sample shows that 29 firms representing 72.5% use the internet for their business whilst 11 firms representing 27.5% does not use the internet in their business. Among the firms that did not use the internet, 33% said it was due to the lack of finance, 15% of the firms attributed it to the non-availability of infrastructure, 17% of the firms did not give any reason for not using the internet and 35% also said it was due to the lack of knowledge on how to use the internet to improve

their business. This shows that although SMEs are aware of the importance of the internet, it is due to these constraints that they are not able to use it to improve their business.

Table 4. Uses of internet by firms

Components	frequency	Percentage (%)
Locate customers and contracts	9	31
e- mail and communication	7	24
General business information	10	35
Source for raw materials	3	10
Total	29	100

Source: field work, 2012

According to the table 4, firms who were using the internet used it for various purposes. Most of them were using it for obtaining information and also communicating. Some of the businesses also used the internet in transacting business.

Only 29 of the firms were using the internet. Among the firms that used the internet, 24% (7) use it to send emails and communicate. 31% (9) use it to locate customers and contracts. 35% (10) used the internet to access general business information whiles 10% (3) source for raw materials with the internet.

Firms with websites (Table 5)

Components	Frequency	Percentage (%)
Yes	28	70
No	12	30

Source: field work, 2012

The internet can be used to send e- mails, source for information on product design, market trends, and sources of new materials that attracts clients and customers as firms operate on websites to attract global market for their products. With regards to the sample it seems the firms were ready to access such an opportunity since more than half of them (70%) out of the 40 firms had websites or advertise on the internet.

Effects of websites on firms (Table 6)

Effect	Frequency	Percentage (%)
Increased in sales	17	60.7
Increase in popularity	11	39.3
Increased in contracts	0	0

Source: field work, 2012

The firms with websites, when interviewed claimed that they have seen increase in sales and. Table 6 shows that 17 (60.7%) percent of the effect was increase in sales.

3.4 FIRMS USE OF ICT TO REDUCE COST / IMPROVE BUSINESS (Table 7)

Components	Frequency	Percentage (%)
Yes	39	97.5
No	1	2.5
Total	40	100

Source: field work, Sept 2012

The summary of the firms' views on whether ICT had helped them to reduce cost and improve business operations is presented in table 13. 39 (97.5%) of the firms agreed that it has helped them to reduce cost. 1 of the firms that is 2.5% said otherwise.

3.5 FIRMS SALES BEFORE AND AFTER ICT

In table 8 below 40% of the firms were earning sales below 1,000 Cedis per month, 45% earning sales between 1,100 Cedis and 1,500 Cedis per month and 15% earning sales between 1,600 and 2,000 Cedis per month but with the adoption of ICT 5% earn sales below 1,000 Cedis per month. Also, 27.5% earn between 1,100 and 1,500 per month, 45% earn sales between 1,600 and 2000 Cedis per month 22.5% earn sales of 2,100 and above. This shows that there has been improvement in earnings below 1,000 Cedis. The number of firms within that range has move from 16 to 2 firms, and those earning 2,100 and above from 0 to 9 firms. It proves that that ICT plays a role in increasing the sales generated by firms.

Firms sale before and after ICT (Table 8)

Components	Below 1000	Between 1100 and 1500	Between 1600 and 2000	Above 2000
Profit before ICT	28(70%)	8(20%)	4(10%)	0 (0%)
Profit after ICT	8(20%)	21(52.5%)	6(15%)	5(12.5%)
Sales before ICT	16(40%)	18(45%)	6(15%)	0(0%)
Sales after ICT	2(5%)	11(27.5%)	18(45%)	9(22.5%)

Source: field work, 2012

1 US =1.85 Ghana Cedis

3.6 FIRMS' OUTPUT BEFORE AND AFTER ICT

According to the data, 53.3% of firms output were below 3,000 per month, 26.7% of firms output were between 3,000 and 5000 per month and 20% of firms output were above 5000 per month. Furthermore, after the adoption of ICT 30% of firms output were below 3,000 per month, 43.3% of firms output were between 3,000 and 5000 per month and 26.7% of firms output were above 5,000 per month. These shows a decrease of firms output below 3,000 from 16 to 9 firms, an increase of those output between 3,000 and 5,000 from 8 to 13firms, those output above 5,000 6 to 8 firms. This shows that ICT plays a role in increasing the output produced by firms.

Firms output before and after ICT

Components	Below 3000 units	Between 3000 and 5000 units	5000 units and above
Before the use of ICT	30(75%)	5(12.5%)	5(12.5%)
After the use of ICT	0(0%)	29(72.5%)	11(27.5%)

Source: field work, September 2012.

4.0 DISCUSSION OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

From the survey, we identified a number of other key problems faced by SMEs with regard to ICT adoption and use. These can be grouped into two categories: technology related and business related.

In terms of technology, the most important concern was a fear of technology obsolescence requiring frequent updates. In the cash-poor, highly competitive context in which SMEs operate, the need to find funding for updates was a real concern. Firms also frequently encountered operational problems with their ICT

Furthermore, considering firms usage of the internet, although most of the firms find the internet important they do not use it in their business because of certain constraints and challenges like lack of knowledge about its usage, lack of financial support, no – availability of infrastructure and personal reason but I believe that with time and the address of these constraints, firms will take advantage of the benefits associated with ICT since the results shows high usage of the facility. The results shows that most of the firms fail to use the facility for the benefit of their business as well as create comparative advantage due to lack of knowledge as to how to use it.

Moreover, majority of the firms that use the internet mainly use it for e-mail and communication, to locate contracts and general business information rather than sourcing for raw materials. Firms who use the internet are those who are young in the industry and are willing to explore and accept change rather than those grown in the business that are reluctant to change and prefer their old ways of doing business.

The data shows that firms use ICT to improve business activity and the objective of the study as to whether ICT helps in the increase in productivity of SMEs, the study shows that indeed firms output increase after the adaption of ICT since it increases the pace and save time used in production and increased output to meet the demand of customers to the firms since customers nowadays pay attention to quality and this tends to increase the sales of firms that adopt ICT in their business. Although profit is likely to drop slightly due to the cost associated with ICT adaptation, it does not dispute the fact that ICT increase productivity. The study also show that most of the firms are ICT inclined and firms in such industry are expected to always be abreast with the technologies needed to meet demands of customers since this industry always experience the entry of new firms.

4.1 RECOMMENDATION

The data on SMEs in Kumasi based on this study shows clearly that ICT plays an important role in the increase of productivity and economic activities. Generally firms enter into business to make profit and ICT does not only help in increasing productivity but also quality and make the way business operate less complicated and time saving. It

also shows business the new trends of business and how business are suppose to address such change in the industry, gives alternatives to create comparative advantage

Also, focusing only on increase in productivity by ICT limits the role played by ICT in improving the economic activities of a country and so there is the need to assess the competition created by firms' adaptation of ICT and also whether ICT adaptation by business can increase the quality and design of a product. Also, extensive research can also be conducted on the risk management on SMEs adopting ICT.

In summary, our survey findings suggest that SMEs need to think more strategically in relation to the use of ICT. In this respect, SMEs are falling behind best practices adopted by their larger counterparts in the global economy. Agencies charged with the development of SME capabilities also need to reorient their delivery mechanisms to address the ICT capability and information gaps identified in this survey.

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