CREATING SPACE FOR INNOVATION – THE CASE OF MOBILE TELEPHONY IN MSEs IN GHANA

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Abstract

Mobile telephony has made phenomenal impact on teledensity in Africa. However, to what extent are the broad productive segments of the economy such as Micro and Small Enterprises (MSEs) benefiting from innovations with the application of mobile technology? What are the options for enhancing innovations? Against the background of these and related questions, this paper adopts the Innovation System conceptual framework for analyzing the state of mobile telephony in Ghana, the trends and implications for enhancing benefits. The approach to the analysis emphasizes the role of the critical actors, the internal and external environment they operate in. The paper uses primary and secondary data in analyzing the real and potential innovative use of mobile telephones by the MSEs in Ghana. It examines the range of applications of mobile telephones in the MSEs, their emerging experiences and prospects for enhanced applications to expand the scope for businesses. It assesses current public policies and the outcomes of such policies on innovations in MSEs. Finally, it advocates for a more holistic promotion of innovations from the broad perspectives of policy formulation, regulation, among others.

1. Introduction

The phenomenal diffusion of mobile phones in human societies is subject of much discourse. Essentially the diffusion relates to the uniqueness of the mobile phone technology among other ICTs. As Smith et al (2008) have noted, new ICTs applied for development, or other purposes, are often leading to more openness in terms of structures and processes. They are greatly enhancing opportunities for communication and collaborative action. In all spheres of society, economy and polity, there is a bend towards immediacy. Real-time information and its analysis, decision and action have become the defining edge for competitiveness for human activity. Whatever the human engagement, there need be immediate access to information, the utilization of information and a precipitation of action. It is the primary advantage of mobile telephony.

The rationale for the focus on mobile phone and with particular reference to the micro and small enterprises (MSEs) is to address one of the fundamental challenges in creating relative wealth in the marginalized segments of the society and economy expeditiously. Africa's poverty incidence averages about 40% of the population below the poverty line of one dollar income per day. Sierra Leone, Liberia, Chad, Guinea Bissau and Niger have poverty incidences up to 70% below poverty line of one dollar income per day (UNDP, 2008). For most African countries including Ghana, the thrust of the development agenda is poverty reduction. Developing a strong and competitive MSEs will greatly reduce the incidence of poverty in Africa in general and Ghana in particular.

This paper therefore examines in broad terms the experiences of mobile phone applications in the MSEs and the opportunities for innovation in Ghana. It assesses the extent and potential of mobile innovations across the supply and demand sides of innovation and it discusses issues pertaining to policy formulation and implementation, regulation, human resource capacity, among others. Underpinning all the discussion is the concept of innovation.

2. The Conceptual Framework

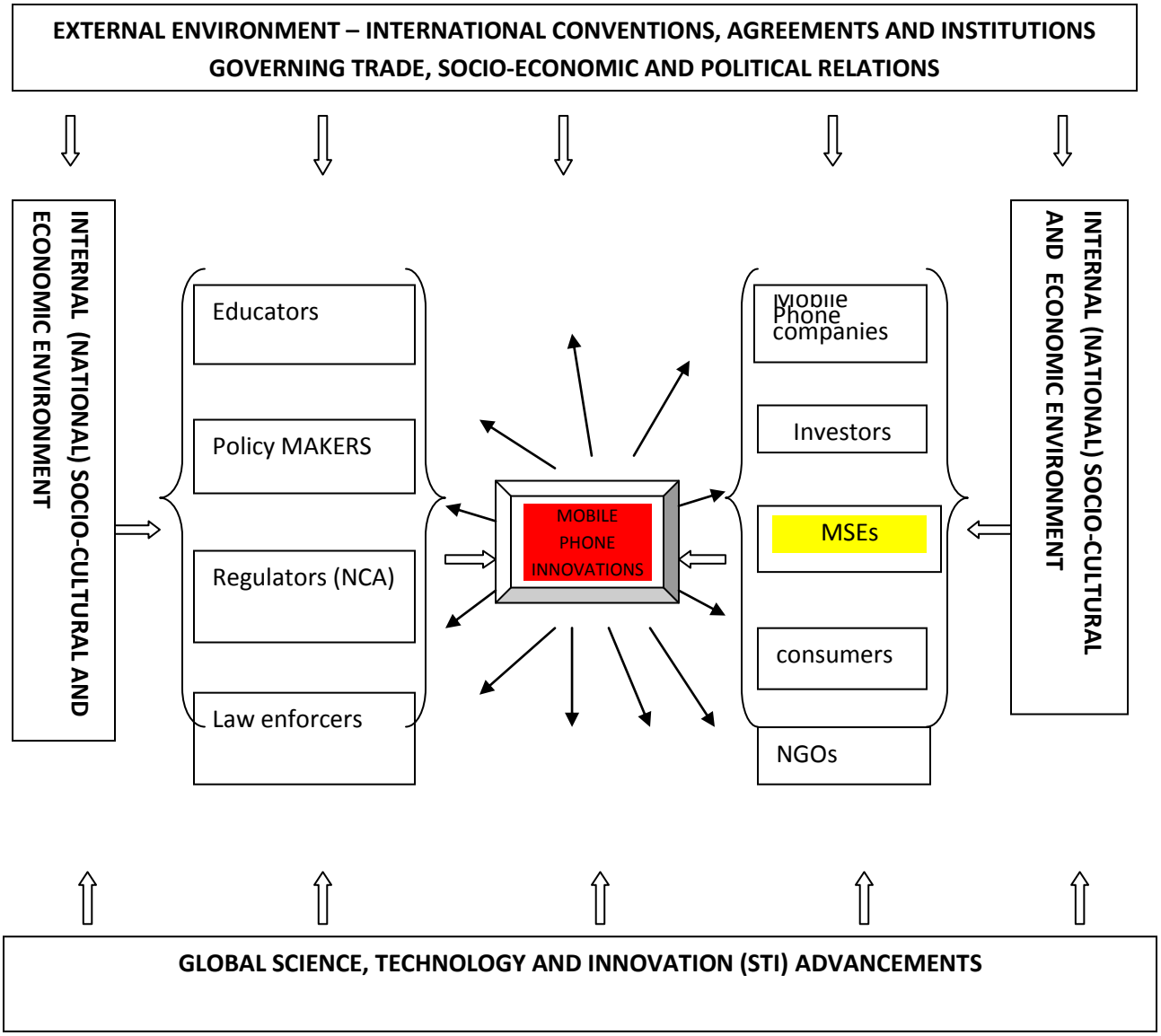
The concept of openness underpinning the IDRC Conference is stimulating. It affords wide latitude to examine ICT innovations and diagnose the drivers and inhibitors of society's engagement with the respective technology. Accordingly, the authors adopt the innovation system concept to analyze the mobile phone innovations in Ghana with particular emphasis on the state of innovations, the trends, drivers, constraints and options for policy formulation and implementation.

In recent years a body of literature has emerged discussing the concept of innovation with the perspective of a systemic perspective (Lundvall 1992; Nelson, 1993; Mytelka, 2000, Hall, 2007). A system can be delineated. There are nominal boundaries defined in relation to geography, geopolitics and even sector-specificity e.g. Agricultural Innovation System. Yet even as there is a definitive boundary and therefore there is supposed to be a particular kind of innovation system e.g. National Innovation System (NIS), there is a definitive openness characterizing the innovation system. For the purposes of this paper, this section highlights elements of the innovation system, the flow of knowledge and information, flow of socio-economic outputs,

critical actors, external and internal influences on the innovation process. There are critical actors in a given innovation system who are important in defining the innovation process and its outcomes. Knowledge cannot apply itself. People acting within a given environment with identifiable habits, norms and behaviours imposed by their cultures and their geographical endowment use knowledge as appropriate to their context. The roles and functions of the critical actors become the interactive framework for the innovation process. Where there are dysfunctions, there may not be successful outcomes in the innovation.

There are internal and external influences on the NIS. The international policy regime for trade and economic relations affect the national socio-economic conditions. One may argue that the national conditions also affect the international policy regime as all countries collectively determine the international policy regime. This is only true to some extent for most African countries which lack the political and economic clout to exert much influence. The external influences are also derived from the scientific and technological advancements internationally.

Figure 1: Diagram of the Mobile Phone Innovation System



Source: Essegbey and Frempong, 2009

The illustration of the Mobile Phone Innovation System (MPIS) in Ghana as in Figure 1 highlights the broad relationships among the actors and institutions. It is difficult to capture the

details of the interactions and levels of intensity which overall impinge on the innovation process especially as there is an intrinsic dynamism in the system. However what Figure 1 achieves is to show the identifiable components and depict the range of opportunities for enhancing openness socially, politically and economically even beyond the national borders.

Indeed, the functionality of the MPIS hinges very much on the critical actors - the mobile phone companies, the investors, the regulators and specifically the National Communication Authority (NCA), the policy makers and the consumers of mobile phone services. These are the critical actors in the innovation processes which this paper discusses. The NCA was established in 1996 by an Act of Parliament (Act 524 of 1996). Overtime, this Act outlived its usefulness and was repealed. The NCA currently operates under Act 769 of 2008 which now defines the legal framework for the establishment of the NCA and regulation of communications in Ghana.

The NCA is an independent institution with the mission to regulate the communications industry, set and enforce high standards for service delivery in the industry. The NCA has a crucial role to play in promoting an enabling environment for mobile phone services. For example, section 14 (2a) of the NCA Act and Regulation 108 of the LI.1719, mandates the Authority to ensure that operators of public communications services interconnect their networks either by mutual agreement or as determined by the Authority. Such interconnection must be of adequate quality for purposes of transmitting traffic between subscribers of different networks (National Communication Authority, 2009a). This is an important function in terms of contributing to openness and creating the liberal climate for access and utility. Even though NCA has achieved some degree of success in getting this done, there are still challenges boiling down to the limits

within which mobile phone comes would want to interconnect in order to protect their business turfs.

Mobile phone companies have become some of the leading critical economic actors in the last decade. Over the last five years, at least one mobile phone company shows us in the top ten of Ghana's Club 100, which is a listing of the top 100 enterprises in Ghana adjudged on the basis of turnover, net profit, market share, among other things. The Ghana Investment Promotion Council publishes the Ghana Club 100 annually. Clearly, the remarkable diffusion of mobile phones in the country is the result of the aggression in the businesses of the mobile companies. Thus each of the critical actors shown in Figure 1, has a key role to play to ensure an innovative use of mobile phones. For the micro or small entrepreneurs the role comes with socio-cultural and economic constraints. Still, there are opportunities for the handicapped in mobile telephony which must be teased out for strategic policy actions.

3. The Dynamics of Mobile Phone Innovations

Literature is fraught with examples of how the MSEs and others have used the technology to impact on socio-economic development. The mobile phone revolution has resulted in various innovative applications of the communication technology. Their applications have increasingly improved socio-economic, political, educational and cultural activities. This section illustrates a few of such innovative applications and usage of mobile phones.

3.1 Governance Innovation

Mobile phones are employed in governance, political discourse, social mobilisation and integrated into early warning systems. In several developing countries, mobile phones are part of the e-government infrastructure. From a handset one can send SMS texts to make enquiries about government policies, decisions or seek general public information. In the same view important government information can be passed through SMS to the populace. Again mobile phones have increasingly been integrated into the election mechanisms. Results from constituencies and wards can easily be collated and transmitted through mobile telephones to radio stations, election offices, party headquarters, NGO monitoring offices, etc. With this application, election fraud reduces as one can easily monitor the results as they come in. For example, over the past years, international and local election monitors used short message system (SMS) technology to report on elections in Ghana, Sierra Leone, Montenegro, Indonesia and the Palestinian Authority (Electionwatch, 2009). Another dimension is the use of the communication technology for social mobilization. For example, in May 2001 anti President Estrada campaigners mobilized over one million people in Manila through SMS to protest against the Philipino President for corruption and demanded his resignation (Suárez, 2005).

3.2 Business Applications

As will be discussed later in this paper, mobile phones are occupying innovative open spaces in business activities. It has become an important strategic tool to bolster competitiveness and growth (Frempong, 2009). Literature is replete with examples on how MSEs have increasingly

used mobile phones for business purposes. Abraham (2007) found that the use of mobile phones contributed to reducing uncertainty and risks within the fishing industry of Kerala. The fishermen were able to access market information and this helped them to make definitive choices in determining where to land their catch for good returns. In that case uncertainty about the market situation for the demand of their products is reduced. Mobile phones are contributing to the effectiveness of onion trade in West Africa which spans the northern Ghana, Burkina Faso, Mali, or Niger. According to Overå (2006) most of these traders have subscribed to the mobile phone services and they use these services to transact business and monitor the transportation of onions across the sub-region. Generally, Donner (2008) provides a comprehensive review on innovative applications of mobile phones by MSEs from developing countries.

However, by far the best known experience of mobile phone application in business in West Africa is that of the MISTOWA Project in which, farmers access market information via mobile phones. The project "Strengthening Regional Networks of Market Information Systems for Traders' Organizations in West Africa (MISTOWA)" sought to address also the peculiar challenge of low intra-regional trade in agricultural produce in eleven West African countries including Ghana. It covered fourteen commodities such as rice, maize, cassava, tomatoes, onions, cashew, shea nut/butter and cattle. Sponsored mainly by USAID/West Africa, the project involved the development of an ICT-based platform – TradeNet services - which enabled the farmers either by themselves or their trade associations to find buyers using their mobile phones. Farmers who used TradeNet services, reported receiving 45% of the final retail price as compared with 22% for those who did not use TradeNet indicating a 100% increase (Debrah, 2009).

3.3 Health

Generally, ICTs have the potential to support the effective delivery, monitoring, control and the provision of improved health services in developing countries (Kimaro, 2006). In relation to mobile phones, innovative ways have developed to use the service to support health delivery and monitoring systems. For example, a SIMpill system based on SMS infrastructure is being used to monitor regular medication of TB patients in South Africa in 2007. In the pilot, 90% of patients complied with their TB medication compared to 22% to 60% who were not part of the pilot phase (Computerweekly, 2009a). In Uganda, SMS text has been used to provide and improve awareness of HIV Aids treatment and prevention. This has chalked some success and led to 40% increase of people who responded voluntary testing for HIV (Computerweekly, 2009b).

3.4 Education

The innovativeness of mobile phones has found a place in the educational sector. For example the Ghana government has introduced the Computer School Selection Placement System (CSSPS), which enabled the admission of students into the second-cycle educational institutions through a computerized selection process in 2005. Previously the selection of students at this level was done by the heads of those schools and there were many reported cases of abuse of the process on the part of the heads as well as the guardians of the students. Generally things changed with the computerization of the process opening up for better scrutiny, coordination and access. Now, students can send SMS to find out about their school placements. This departs

from the situation where students can only check their placements from schools where they completed their basic education. Students in universities and some other tertiary educational institutions use the mobile phone to access relevant information such as examination results.

3.5 Other Applications

Enhanced services built on the mobile technology and network effect have contributed to the growth of the technology. Caller identification, SMS, multimedia services and recently internet have largely contributed to the service deployment and exploitation in the country. From a handset, one can listen to radio, play music, take pictures, do video recording, watch television and access internet. All these applications and others have made mobile telephones an integral plank in the communication infrastructure for social-cultural and economic interaction in the country.

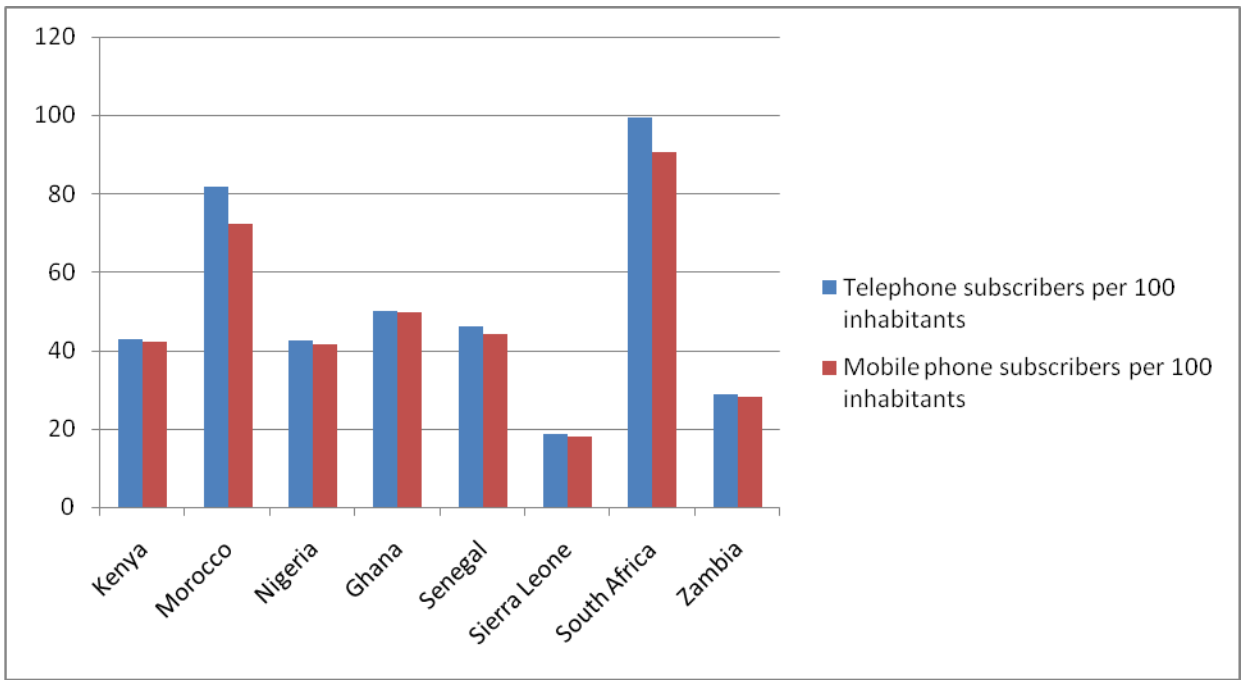
4. The Mobile Phone in Ghana and Africa

As in most parts of the world, mobile phone subscription has increased phenomenally in the country. From a subscription level of 383,000 in 2002, it increased to 10,242,916 at the end of 2008, whilst the fixed line total actually decreased from 389,483 to 279,324 (ITU, 2009a). The total telephone penetration at the end of 2008 was 52.4% of which 99% was mobile phones and only 1% was fixed telephones. At the end of the third quarter of 2009, there were 11,570,430 mobile phone subscribers, while fixed telephones were 143,900 (NCA, 2009b).

Ghana has six mobile phone companies of which one is yet to commence business. The number of mobile phone companies makes Ghana one of the most liberalized countries in ICT. A number of factors have accounted for the growth in mobile telephones in Ghana. One of the factors was the slow deployment of fixed line telephones in the country. For example, under the duopoly introduced as part of the reform of the telecommunication sector, the two national network operators (the then Ghana Telecom and the then Westel) were to deploy a total 275,000 fixed lines as part of their obligations under the five years exclusivity privilege granted them. This target was never achieved when the exclusivity expired in 2002. Given the poor performances of the two national network operators, mobile telephone became the key service to meet the huge demand for telephone service in the country. The ease of subscription is one of the facilitators of growth of mobile telephones. One can easily purchase a starter package from any street corner and within few minutes of installation, the handset is ready to be used. Also the rapid growth in the industry is attributable to increased competition in terms of sale of SIM cards and airtime, better and increased coverage, improved quality of service on most networks and introduction of cheap phones thereby increasing the ability of more people to own phones (NCA, 2009b). There are also more aggressive marketing promotions and the introduction of innovative call packages such as discounted calls. From the perspective of policy-makers, the Minister of Finance and Economic Planning, Dr Kwabena Duffuor attributed the growth in mobile phones to 'the creation of an enabling environment and the positive sustenance of competition in the sector' (ITU, 2009a). This refers to some of the policy initiatives the Ministry of Communications undertook in the past such as the completion of 39 Common Telecom Facilities in 2008 which enabled telecommunication operators to extend their services to about 273 communities under the Ghana Investment Fund for Telecommunication development (GIFTEL)

(ITU, 2009a). The good progress made compares well with what obtains on the continent as illustrated in Figure 2.

Figure 2: Telephones Statistics of Selected African Countries – 2008



Source: International Telecommunications Union (ITU), 2009

Figure 2 illustrates the penetration of telephones in the eight selected African countries. South Africa has the highest penetration of 99.51 total telephone subscribers per 100 inhabitants with Sierra Leone, a country recovering from war, having the lowest with only 18.71 total telephone subscribers per 100 inhabitants. What is striking about the statistics is the fact that the average percentage of mobile phone subscription of the total telephone subscription for the selected countries is 95.6; only about 4.4% of the total telephone subscriptions are landlines (ITU,

2009b). It is a worldwide phenomenon especially in the developing countries. Almost two thirds of mobile users are located in developing countries. As of December 2007, there were 3.3 billion mobile subscribers – 2.8 mobile subscribers per each fixed-line subscriber. By the end of 2008, the total number of mobile subscribers worldwide had reached 4.0 billion. Between 2001 and 2006 fixed lines grew at an average of 2.5 percent per year, whereas mobile subscribers grew at a rate of 22.8 percent per year – almost ten times the rate of the fixed lines (Muente-Kunigami & Navas-Sabater, 2009).

Indeed mobile penetration in Africa experienced cumulative average growth rate (CAGR) of 49.3% between 2002 and 2007 and represented 89.6% of total telephone subscription on the continent. In the case of Ghana, mobile telephone subscription formed 95.3% of the total telephone subscription with CAGR of 81.4% for the same period Muente-Kunigami, & Navas-Sabater, (2009).The challenge in all this accelerated diffusion is how innovations emerging from the application of mobile technology can drive competitiveness in the productive segments of the economy such as the MSEs

5. The Study of Mobile Phone Usage in MSEs in Ghana

The importance of the MSE sub-sector of industry in Ghana is highlighted in various national development policies and programmes such as the Growth and Poverty Reduction Strategy (GPRS II – 2006-2009) (Ghana Government, 2005). MSEs are widely distributed in both the urban and rural districts and overlay the poorer segments of the population. Currently Ghana is implementing the World Bank-sponsored Micro, Small and Medium Enterprises (MSME)

Project under the auspices of the Ministry of Trade and Industry to enhance the competitiveness of the MSEs. The dynamic role of MSEs in developing countries as growth engines through which the development objectives of these countries can be achieved has long been recognized (Beck, T., Demirguc-Kunt, A. and Levine, R. 2005). However, there are constraints which hamper MSE operations in particular market information and access, low capabilities, input scarcity and inefficient technologies (Science and Technology Policy Research Institute, 2007).

A study on the adoption and application of mobile phones by MSEs in Ghana was carried out in 2007. The study assembled data from purposively selected MSEs from less urban and rural communities regarding the use of mobile phones by the entrepreneurs (Frempong, Essegbey & Tetteh, 2007). The study divided the country into three belts namely Southern, Middle and Northern belts. A total of 600 MSEs were selected randomly from the less urban and rural communities in these belts based on the International Standard Industrial Classification (ISIC). Data were obtained through questionnaires and augmented with focus group discussions based on indicators, such as contact with suppliers and customers, reduction of transportation cost, contributions to profit margins, and access to m-banking services (Frempong et al, 2007). The findings of the study typified the open spaces which the MSEs had found and used the mobile telephone to enhance their business development. These findings fairly well point to trends which are known generally with respect to mobile phone diffusion and also some unique characteristics interpreted more in terms of the innovation system concept. Table 1 illustrates the distribution of the sample across the selected ISIC categories.

Table1: Distribution of Sample by ISIC Classification and Mobile Phone Owned

ISIC Classification	No. of MSEs sampled	% mobile phone owned
D. Manufacturing	115	82.6
F. Construction	26	88.5
G. Wholesale& retail, repair works	218	77.5
H. Hotels & restaurants	100	72.0
I. Transport, storage and communications	76	84.0
M, N & O. Education, health, social work, social & personal services	65	69.0
Total	600	

Source: Field Data, 2007

The ownership of mobile phones observed in the sample was generally high averaging about 79.3% for the six sub-sectors. The MSE operators in the ISIC categories of manufacturing, construction, transport, storage and communications showed a relatively higher percentage. Manufacturing activities include small-scale food processing activities, production of textiles and garments and some metal products. It appears in these categories there is greater need to exploit the advantages of mobile phone usage in relation to the interaction between suppliers of products and services and the respective customers.

5.1 Contacts with Suppliers and Customers

An important advantage in the usage of mobile phones is the easy access it gives to the MSEs to link up with suppliers and customers. From the data, about 60% of the MSEs assessed the use of mobile phones to contact suppliers and customers to be very good, while almost 21% assessed contacts to be good. In effect, the greater majority of the MSEs recognized the catalytic role mobile phones play in maintaining that important segment of business operations – constant contact with suppliers and customers. As Jagun, Heeks & Whally (2008) have argued, business relation becomes quicker as the required business information necessary for decision making can be fast-tracked through increased application of mobile phones in business cycles. Jagun et al (2008) argued further that intermediaries who normally add to the cost of doing business can be eliminated or curtailed and ensure direct relationships with their clients through the mobile phone communication.

However, the work of Molony (2006) among the MSEs in Tanzania underlined the value placed on face to face interactions by retailers. According to Molony (2006), the direct physical interaction bolsters trust which is very important in the activities of the MSEs due to their predominant informality. Though, personal relations cannot entirely be eliminated in the operations of MSEs in Africa, mobile phones provide spaces which can affect the traditional way of doing business and introduce some openness into their operations.

5.2 Reduction of Transportation Costs

The impact of mobile phones on reducing transportation component of business expenditures was assessed in the Ghana study. The overwhelming majority (91%) emphasized the cost effectiveness of using mobile phones for transactional purposes, which invariably contributed to the reduction in the cost of doing business. The findings reflected earlier study by Samuel *et al*. (2005) that *spaza* shop owners in Tanzania have reduced physical travel to contact suppliers or place orders by relying on their mobile telephones to perform these activities.

In Africa business setting, one cannot entirely rule out physical travels, but travels may only be made when very necessary e.g. to collect orders which had previously been negotiated and concluded through mobile phone intermediation. Courier system which would have enabled a supplier to send a consignment to a buy is not well developed in Africa. So MSE operator only travels to the supplier when consignments are ready for delivery. This reduces the cost of transaction for the entrepreneur. In the Ghana study, MSE respondents mentioned this as an important factor in the use of the mobile phone.

5.3 Contribution to Profit Margins

It is difficult to assess the margin of profit arising from the use of mobile telephones since financial figures from MSEs are speculative – most of them do not keep proper records on operations. In the study a qualitative assessment was, however, made and close to 60% of the MSEs emphasized the positive impact of mobile phones to their business profitability. The contribution to profitability could be realized in terms of reduced transportation cost where the

savings could contribute to the reduction of cost of doing business and, therefore, add to the profits of the MSEs (Frempong, 2009). Placing calls to make these contacts result in some expenditures, but in relative terms, it is cost-effective and further, prevents the loss of customers due to closed shops when the entrepreneurs travel to make and take orders (Frempong, 2009). In a study by Donner (2005) in Rwanda, a micro operator estimated an increase of 30% in business activities, which he ascribed to the use of mobile telephones**.** During the focus group discussion in the Ghana study, participants were very emphatic about the contribution of the service to increased profitability of their businesses.

5.4 Access to m-banking services

The massive growth of mobile phones in Africa and technological developments have provided enormous opportunities for the provision of innovative financial services based on mobile phone platforms, and these services, as argued by Cracknell (2006) provide flexible and convenient financial services. These services typify the openness of the technology to transform the financial sector. Financial services based on mobile phone platforms are very prevalent in East and Southern Africa. A mobile banking solution such as M-Pesa has been introduced in Kenya, while Wizzit exist in South Africa. In Kenya, the MSEs are using M-Pesa as a bank. They lodge in their extra incomes and retrieve such savings from accredited agent of M-Pesa. They also make payments through transfers of their e-cash to their suppliers or debtors as m-banking can be used for person to person, remittances, payments of utility bills, airtime, microfinance loans and disbursements (Mobileactive, 2008).

The introduction of m-banking in West Africa is still in its formative stage and an attempt was made in the Ghana study to identify the extent to which the MSEs knew about the service. Analysis of the survey data revealed that only a few of the entrepreneurs had knowledge about m-banking. Only 13% of the MSEs had any knowledge of mobile phone banking and 70% categorically stated that they had no knowledge. On the actual usage of the facility, less than one percent actually did use the service. This suggests that there is a lot more work for banks to do by way of educating the public on the practical applications of mobile telephones. It is also important that the mobile phone companies partner the financial institutions to exploit the potential of the mobile phone infrastructure to provide innovative financial services in the country.

During the focus group discussion, security concern was the main militating factor raised about mobile banking. More importantly the availability of the service in the country was limited. For example, it was only in mid 2009 that MTN introduced mobile transfer in the country. The type of mobile banking services provided through SMS include request for cheque book, statements of accounts, information on loans, balance enquiries, transaction details, etc. (Frempong, 2009)

6. The MSEs and the Policy Imperatives

In most developing countries, MSEs constitute almost 90% of enterprises. Their role as engines of endogenous development is increasingly recognized in development theory and global development discourse (Tetteh & Frempong, 2009). They have been credited for introducing innovations into the market to serve as a catalyst for societal development (Reijonen &

Komppula, 2007). MSEs are mainly located in rural areas and in the deprived areas of urban communities. The typical MSE is characterized by informality, scarce capital, a lack of access to scientific knowledge, limited access to market, limited innovation, sometimes seasonality and even risk of collapse of business (Obirih-Opareh & Essegbey, 2008). Yet MSEs, given the critical segments of the population they cover, constitute a means of addressing key national socio-economic goals. The operations of MSEs stand to gain with greater openness to access to input factors and markets in a variety of ways. This is where mobile phone by itself is a revolutionary innovation.

6.1 Policy formulation, monitoring, evaluation and review

One of the most important challenges is to condition the internal environment for mobile phone application and innovation and enhance openness. The Ministry of Communications is the critical actor in policy formulation, monitoring and evaluation; each ministry in Ghana functions with a Policy, Planning, Monitoring and Evaluation (PPME) Division. The challenge is keeping pace with the dynamics of policy formulation, monitoring, evaluation and review, whilst making effort to match global trends in the telecommunications sector.

The liberalization of the telecommunication sector which began in the early nineties, culminating in the formulation of the Accelerated Development Plan of 1994 set the tone for the current policy environment for mobile phone technology application, usage and development. The prevailing policies of Ghana ICT for Accelerated Development (ICT4AD) of 2003 and the National Telecommunications Policy of 2004 clearly provide important directions for all critical

actors in terms of the spelt out goals and objectives. The Ghana ICT4AD was launched in 2003 with the overall objective of engineering an ICT-led socio-economic development to transform Ghana into an information-rich, knowledge-based, and technology-driven economy and society (Ghana Government 2003). The strategic focus of the policy is to target simultaneously the development of the ICT sector and industry as well as use ICT as a broad-based driver of developmental goals with emphasis on the development, deployment and exploitation of ICTs. The National Telecommunications Policy also aims at among other objectives fully open, private and competitive markets for all telecommunications services, a streamlined, efficient and effective regulation of the telecommunications industry on a fully transparent, technologically neutral, and competitively balanced basis and affordable prices for telecommunications services, particularly for low income citizens.

Of the 14 priority focus areas identified by the ICT4AD, four specifically concentrate on the private sector which includes the MSEs. However, the major challenge facing policy makers is how to put in place the necessary programmes to implement the tenets of the ICT4AD policy so as to enhance the competitiveness of MSEs and the private sector as whole. The competitiveness of MSEs is particularly crucial as they are instrumental in poverty alleviation and wealth creation at the grassroots of society. At the heart of the challenge is implementing policy instruments that will facilitate the achievement of objectives with identifiable segments of the critical actors. For example, many MSEs adopted mobile phones as a tool for business, but there were no schemes to encourage them to go beyond merely using the mobile phone as a business communication tool and social networking platform. As Kotelnikov (2007) observed that many governments have policies focused on both ICT and SME development. This is not to say that one has to elaborate a comprehensive policy which is at par with ICT4AD. But there is need to put in place

the policy initiatives to encourage ICT application in the SMEs and its innovations. This can be done with mobile phones included.

Policy review is a major challenge in Ghana. Often the introduction of a particular policy needs to go with appraisal and adjustments to cater for unforeseen exigencies. A case in point is the CSSPS policy. Key actors in the educational sector have called for some review. For example there was need to allow for a degree of freedom for heads of the schools to grant protocol selection as a means of acknowledging the roles that chiefs, old boys, members of staff and other stakeholders, play in the management of the school (The Ghanaian Times, 2009). In most of the top schools, these stakeholders contribute substantially to infrastructural development and provision of facilities. In terms of openness, featuring these stakeholders in the admission process is positive though it carries certain risks and potential of abuse. Still the CSSPS policy needs fine-tuning including what measures to put in place to address the risks of greater openness.

6.2 Regulation

Regulation is a function of governments to fine-tune the enabling environment for technology application, innovation and competition. The prevailing legislative framework must necessarily define and bring into effect the requisite regulations to guide the operations of the relevant actors. For example, there were the new National Communications Act, 2008, Act 769, Electronic Communications Act, 2008, Act 775, the Electronic Transactions Act, 2008, Act 772,

and the National Information Technology Agency Act, 2008, Act 771. All these new Acts are geared to support the increasing convergence taking place in telecommunications, broadcasting and computing (NCA, 2009b). These legislations however aim at regulating mainly the supply side of ICT services, which is generally good but not sufficient. If MSEs for example must make their contributions in innovating for increased productivity, then regulation should provide incentives for greater integration of ICT in MSEs' operations. A case in point is MSEs and financial services. There are 27 universal and other banks, 45 non-bank financial institutions and 114 rural banks (as of June 2009). Many of these financial institutions offer platforms for mobile banking and yet do not have pragmatic programmes to popularize the service and certainly none of these have targeted incentives for MSEs to engage in mobile banking. Given that most of these entrepreneurs are averse to the bureaucracy in the financial institutions, mobile banking can be an opportunity to engage them and thereby encourage them on the path of formalization of their businesses. To this end, regulations can incentivize financial institutions to innovate specific packages for micro and small entrepreneurs.

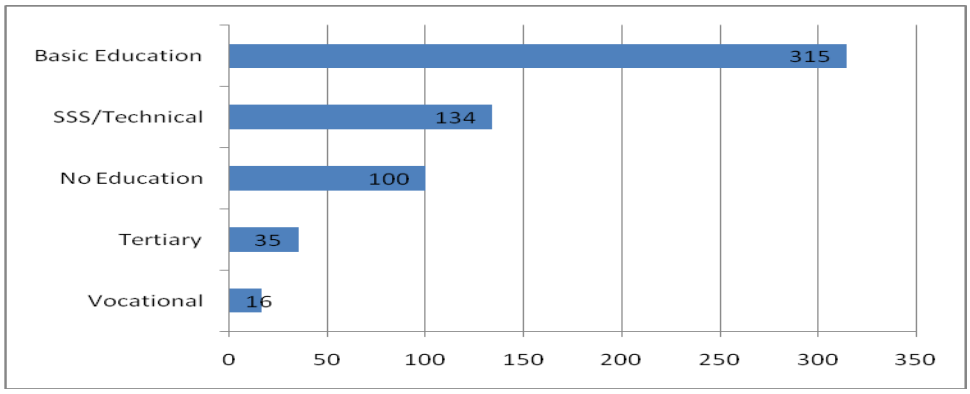
One mobile company has launched money transfer services. Whatever the person's location, one can receive money to be cashed from the nearest service centre. It is an innovation with potential to ease the financial constraints of many MSEs. As Frempong et al (2007) have shown, the main pillar of MSEs' financial support is family. Money transfers sometimes become the lifeline for MSEs' continued existence either directly or indirectly. It is a service which all mobile companies should be encouraged to engage in. However the need for regulation is paramount. Regulation should be flexible enough to facilitate access and usage and thereby not inhibit the

utility of the e-money; both the supplier and consumer of the financial service must see incentives in its use. Yet regulation must be devised in a manner as to maintain public trust and confidence in the use; there must be no room left for anti-business practices such as fraud, money laundering and e-money counterfeiting (Owusu-Darko, 2009). In spite of the risks of the e-money innovation, there is still the need to diversify application further such as transnational transfers via mobile phones with automatic conversion of currencies – American dollars, British pounds or Dutch euros received instantly in Ghana cedis via one's mobile handset. This is an important innovation in an economy in which remittances account for a significant component of foreign exchange inflow. At the household level, international remittances reduce poverty by as much as 88.1% for the receiving households (Adams, Cuecuecha and Page, 2008). Mobile international transfers have great potential to dramatically impact on MSE's business.

6.3 Human resource capacity

Ghana has an illiteracy rate of 45%. The country's universal basic education policy has not yet transformed the populace into a completely literate society. The mobile phone advantage of being primarily insensitive to illiteracy in its use is appropriate – the demand side of the innovation. However, some education or literacy is important for more sophisticated use of the phone. Innovating for further applications demands high level scientific knowledge. The field data in the Ghana survey suggests that MSE actors have the minimum level of education as illustrated in Figure 3

Figure 3: Educational Background of Respondents



Source: Field Data, 2007

More than 50% of the sample has only basic education and almost 17% has had no education. The usage of mobile phones may come with greater innovation with a more educated user population. The sophistication of mobile phones has enabled the handset to be a platform for internet applications. Performing such web-based functions to enhance MSE operations come with some minimum level of formal schooling beyond what is depicted in Figure 3. This is in spite of the fact that every community has at least some literate members who can act as "infomediaries", thus massively multiplying the accessibility of written materials, online or otherwise (Heeks, 2008). Community Information Centres as conceived by the government are also important means of building capacities of MSEs in innovative usage of mobile phones. On the supply side of the mobile telephone services, high level scientific human resource is also important. Ghana has over the years established a fairly good infrastructure for tertiary scientific training with the universities producing annually roughly 5,000 graduates of diverse scientific disciplines including computer science, computing engineering, telecommunications engineering and management information systems. The Kwame Nkrumah University of Science and Technology (KNUST) has a College of Engineering training ICT-related graduates at post-

graduate level. The challenge is in orientating the training to impact on innovation. The supply side of innovation needs scientific skills to relate innovation to the needs of MSEs.

6.4 Market Stimulation and Orientation

The economic impact of ICTs on the business sector is generally known to be positive. In various countries, studies have shown that ICTs have enhanced productivity (Oyeleran-Oyeyinka & Rasiah, 2009; UNCTAD Secretariat and Thailand National Statistical Office, 2008). Mobile phones in MSEs offer excellent opportunities to promote what Heeks (2008) described as pro-poor (on behalf of the poor), para-poor (along-side of the poor) and per-poor innovations. The local specific needs constitute the basis for the innovation and the content of innovation takes advantage of local knowledge that exists at the community level. Pro-poor innovations driven by externally sponsored projects often suffer for contextual intricacies and para-poor projects also have their difficulties (Smith et al, 2008). Furthermore, Bhavnani, Chiu, Janakiram, & Silarszky (2008) have shown how mobile phones contribute to sustainable poverty reduction. Ghana therefore needs its own strategic programmes aimed at stimulating impact in MSEs. A sector where this is possible is the financial sector. Access to bank account information via mobile phone benefits both the bank and the costumer population. It decongests banks and frees time for concentrating on other banking services. The costumer also accesses the banking services in convenience. However this needs effective regulation as has already been discussed.

One of the important innovations being contemplated is the provision of access to pension benefits through mobile phones. The Social Security and National Insurance Trust (SSNIT) is in

discussion with a mobile company to transfer their monthly payments through Mobile Money Service in partnership with nine banks. This is going to be a great relief to pensioners who shuttle between their usually distant rural homes and the pension offices almost endlessly before accessing their pension benefits (Ghana News Agency, 2009). Another cause of relief is the minimization of possible graft in efforts to access the pension benefits.

There are situations where government direct action is needed to promote innovation along its path of development. A case in point is mPedigree. This is an innovation by a Ghanaian innovator who created an ICT platform which enabled the use of mobile phones to check the authenticity of drugs (mPedigree, 2009). Fake drugs are reported to be a significant cause of mortality in developing countries where some 25% of drugs are estimated to be counterfeit. About 700,000 deaths annually in Africa are said to be caused by fake tuberculosis and malaria drugs alone (Allafrica.com, 2009). The Food and Drug Administration of the US estimates that worldwide sales of fake drugs exceed US$ 3.5 billion per year (Burns, 2006). The innovation is therefore important as it enables the customer to use the mobile phone to text the inscribed code on the drug to authenticate the drug irrespective of location. The innovator has won awards including the Global Humanitarian Award (Dogbevi, 2009). Yet the government still has not committed itself to promoting the innovation even in the public health care system in Ghana.

6.5 Taking advantage of the external environment

The external environment which is conditioned by the policies, practices and activities of the state and non-state international organizations offer opportunities for creating space for innovation. For Ghana and Africa, the frontier technological innovations which make possible

mobile phone applications are primarily externally originated. What partnerships can be forged to encourage mobile phone technology transfer? Donor agencies offer opportunities for collaboration within multilateral and bilateral arrangements for ICT development and Ghana can take advantage of this. However, soliciting support and collaboration for the relevant actors in the innovation system should be structured and coordinated for synergy. In this regard policy research is essential. Unfortunately, African policy-makers seldom use African-generated policy research when they formulate policies mainly because of the uneven power process between the local sources of policy research results and international organizations (Ajakaiye, 2007). This must change. Governments must know what bilateral and multi-lateral partnerships to forge on the basis of research, to enhance mobile phones usage locally and stimulate innovations.

7. Conclusion

What emerges from the discussion is the amplified need for critical actors in the Mobile Phone Innovation System to function effectively and synergise efforts across the supply and demand side of innovation. In the case of the specific roles of government, there is the need to manage the interface between the supply and demand side of mobile phone services and innovation. Policy efforts should be directed not merely at the supply side of innovation but stimulating demand for innovation. It implies there should be greater efforts at coordination and addressing systemic failures and institutional dysfunctions. The government must ensure that its agencies such as the Ministry of Communication and the NCA play their roles effectively in building knowledge, establishing regulations, enforcing legislations and implementing institutional policies and programmes.

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