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The GSMA Development Fund Top 20

Research on the Economic and Social Impact of Mobile Communications in Developing Countries

This report was prepared for the GSM Association by HMS Wireless, a global consulting firm based in Washington, D.C. and Santa Clara, California. HMSW works with network operators and service providers, equipment vendors, financial institutions, development agencies, and local and regional authorities to facilitate the introduction of low-cost communications services and mobile applications in emerging markets, with a particular focus on the unique opportunities available in underserved rural areas.

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Executive Summary

The positive implications of landline telecoms infrastructure and, more recently, of mobile communications on economic growth in the developed world have long been acknowledged, with numerous studies analysing the issue. Now that most of the developed world has reached high penetration levels of mobile phones, both current growth patterns and future projections suggest that virtually all of the mobile industry's new customers in the coming years will come from developing countries. In fact, as of 2007, there were more mobile customers in developing countries than in the entire developed world (ITU).

What impact are mobile phones having on developing countries and are user experiences and overall impacts unique or similar to those of developed countries? While it might seem intuitive to just extrapolate from the results of earlier studies in developed countries, the developing world is in fact leap-frogging the developed world when it comes to mobile communication and its many uses. The implications of this technology on daily life in developing countries appear to be more far-reaching than they were in the earlier developed country rollouts. For example, studies have demonstrated that mobile technology is driving improvements in social links, the creation of social capital, improved market information flows and productivity, as well as increases in GDP and Foreign Direct Investment.

This report surveys recent research and highlights the top studies in this area based on content, relevance, originality and credibility. While it is not an exhaustive and scientifically developed list, it illustrates the work that we feel is most important at the moment and highlights key conclusions on the impact of mobile technology in developing countries.

Further, while the existing research is valuable in understanding the impacts, the literature is still limited in its coverage and scope. We therefore recommend additional research to expand evidence and knowledge, particularly with respect to basic economic studies, prospective applications and the needs of users around financial services. We also call on stakeholders such as mobile operators, governments, industry groups, foundations and development organisations to play their part in improving information sharing, increasing research and driving developments in these countries.

Finally, we provide information on additional research on impacts and policy issues, as well as other literature reviews and case studies, which are presented in an appendix at the end of this document.

Overview of the Social and Economic Impacts in Developing Countries

Social Impacts

A key impact that is commonly found as a result of mobile phone use in the studies cited in this report is a general **improvement in social links,** with both family and friends, whether they are nearby or located some distance away, particularly back in people's home villages (Frost & Sullivan 2006; Goodman 2005; Samuel et al 2005; Sinha 2005). The improvement in rural-urban relationships was particularly noted amongst users, although there is also some question as to whether the access to a mobile phone to check on family is possibly resulting in fewer trips back to the village (Morawczynski 2008). Nonetheless, urban users felt that their relations with family and friends in the rural areas were improved by the fact that they had a mobile phone.

A more interesting facet of the social benefits of mobile phone use seems to be the **creation of "social capital," or social empowerment,** for those with cell phones (Goodman 2005; Kwaku Kyem, Kweku LeMaire 2006; Sinha 2005). This was particularly noted in the case of the "phone ladies" of Grameen Phone in Bangladesh, who achieved not only a new source of income by renting out their mobile phones, but who gained new status within their villages as a result (Aminuzzaman, Baldersheim, Jamil 2003). One other source of social capital cited was the use of airtime transfer in Egypt, where most users felt the service was more beneficial from a social aspect than from an economic perspective (Goodman, Walia 2006).

Another positive impact that users mention is their **ability to use the mobile in emergencies,** as well as access doctors for information and help without needing to travel long distances to do so (Frost & Sullivan 2006; Souter et al 2005). This issue of a **reduced need to travel** was cited in several studies, as users were able to gain access to the information they needed without incurring the cost, in time and money, of travelling via often-poor roads.

Microeconomic Impacts

With regard to economic impacts, a few key studies have outlined the benefits of **improved market information flows** as a result of mobile phones, for example in the fishing industry in Kerala, India, as well as the grain markets in Niger. In both studies the authors described how the use of cell phones to check prices across several markets led to **reduced price discrepancies** for various commodities, as well as **less spoilage** as a result of improved demand information. In the study of the fishing village in Kerala, India, both consumer and producer welfare increased, with reduced waste (6% of the fish were unsold before cell phones), fishermen's profits up by 8% and consumer prices going down by 4%, directly driving a 20 rupee/person/month consumer surplus, the equivalent of a 2% increase in per-capita GDP from this one market alone (Abraham 2007; Jensen 2007). In another similar study looking at grain markets in Niger, the evidence showed that cell phones reduce grain price dispersion across markets by a minimum of 6.4% and reduce intra-annual price variation by 10% (Aker 2008).

Besides smoother price information, entrepreneurs who were interviewed generally felt that having a mobile phone provided them with **more business opportunities,** in terms of improved business contacts, better weather and market information for farmers, greater sales for small businessmen, and the ability to conduct business via a "mobile office," thus **improving productivity** and allowing some of the entrepreneurs to remain in the "informal" sector (Donner 2005; Kwaku Kyem, Kweku LeMaire 2006; Lane et al 2006; Molony 2005).

Users also cited the assistance mobile phones gave them in **finding employment,** whether in terms of finding out about job opportunities without having to travel long distances, or being available and accessible via mobile phone should prospective employers or customers need to reach them (Frost & Sullivan 2006; Samuel et al 2005).

Macroeconomic Impacts

In terms of general macroeconomic impacts, there are only a couple key studies that have demonstrated the positive influence of mobile phone penetration in developing countries. One well-known study found that while mobile phones in less developed countries are playing the same crucial role that fixed telephony played in richer countries in the 1970s and 1980s, the growth impact of mobiles is around twice as important in developing countries, where there is also a critical mass effect, and that a rise of ten mobile phones per 100 people **boosts GDP** growth by 0.6% (Waverman, Meschi, Fuss 2005). Another reported that the impact of mobile phone penetration is **positively linked to Foreign Direct Investment (FDI),** and that this impact has grown more significant in recent years, with a 1% increase in mobile penetration rates associated with 0.5-0.6% higher rates of FDI and GDP (Williams 2005).

One aspect of mobile phones in the developing world that is being looked at with some anticipation is the introduction of mobile financial services and transactions. Many if not most rural users in less developed countries have no access to financial services of any kind, and getting these "unbanked" citizens linked somehow into the formal banking sector is a priority for many governments. However, the evidence to date of initial efforts in this regard is mixed. While users are employing the mobile banking systems to make payments for things such as airtime and pre-paid electricity, and many are using them for sending remittances back to friends and relatives in their rural villages, there is little evidence to date of an increase in the number of users registering for more formal banking services via mobile phone, such as savings and credit services (Ivatury, Pickens 2006; Morawczynski 2008). Initial analysis seems to indicate that while today's mobile banking systems are providing good money transfer and payment services to early users, there will need to be better marketing and training involved to help consumers understand what the systems are capable of, as well as improved policy measures to ensure that the benefits of mobile banking are evenly distributed across all banking and consumer sectors (Ivatury, Pickens 2006; Williams, Torma 2006).

Recommendations for Further Research

While the studies noted here provide a good initial overview of the social, employment, entrepreneurial and micro- & macro-economic impacts of mobile phones on users in developing countries, the literature is still limited in its coverage and scope. More information on the basic economic impacts of mobile phone coverage is needed, particularly by government agencies trying to determine rural investment targets, as well as a better understanding of the types of applications that users really want to access and will pay for. In particular, applications that provide access to financial services need to be further reviewed and developed to ensure they meet the unique needs of developing country users.

For purposes of identifying further topics of study, we would recommend three specific areas be targeted.

1. **Additional basic economic studies to confirm initial research and to expand the evidence across sectors and regions.**

   In particular, studies of the economic impact of mobile access in Latin America and Asia would be useful, as would a study of the impact of mobile banking in the Philippines, the country with the most extensive experience. Additional research subjects of interest might include: the economic impact of extended business and social networks that mobile phones enable; whether and how mobile ownership empowers women; and whether and how mobile phones are impacting urban/rural relationships and migration patterns in Asia. Greater segmentation of research by income levels would also be useful, as would research on alternative business models that can lower the cost of—and increase access to—mobile communications for very low-income users.

2. **Research on prospective applications for users in developing countries.**

   The studies noted here all seem to demonstrate that users aren't fully aware of what can be done with a phone and have limited grasp of potential application areas, such as financial services, and the value proposition they might offer. A series of extended interviews and focus groups with users in developing countries, both urban and rural, would provide a solid base of information on the basic needs and interests of users, not to mention the efficacy of current marketing and training efforts, and would form the basis upon which to map potential demand for future applications targeted to these particular markets. One area in particular that may be useful to explore is that of voice-based applications, which would have a particular relevance to the many rural users who are illiterate and unfamiliar with technology. Another area of interest would be in providing urban users with some form of mobile internet, followed by a series of focus groups in which to better understand the value that developing country users place in such an application and how it might be better tailored to their interests. Field-based prospective studies of the potential of mobile phone applications in health care and education would also be extremely interesting.

3. **Research to understand the needs of users with regard to financial services, both for improving the systems already in place but also to determine new service offerings.**

   In developed markets, mobile banking serves as a compliment to already well established financial banking and payment services; in the developing world, mobile banking will likely serve as the primary means of accessing financial services for many new users, and in order to make this scenario a successful reality, there needs to be a much better understanding of user needs and effective modes of user education. Well-documented small-scale pilots could usefully explore the potential user benefits from phone-based or phone-accessed savings accounts, as well as look at security enhancements such as biometric ID to enhance user trust in mobile transactions.

Required Stakeholder Actions

Additional research is critical in expanding the knowledge base and in providing evidence that can guide policy decisions, especially as mobile communications advances into rural areas, increases its penetration into low-income population segments, and adds new applications such as mobile banking with significant potential to improve economic and social conditions. But academic research by itself is not sufficient. Many stakeholders have a role to play. Among the actions that would advance understanding of the impact of mobile communications, as well as help further its economic and social utility are:

Mobile Operators	More information sharing on the part of mobile operators about their customers, the ways in which they use mobile communications services, and trials of new services. To date this has been a challenge for researchers and analysts, as mobile operators consider this data to be not only confidential, but a source of competitive advantage. There's no reason that generic data about customer experience and behaviour can't be shared for purposes of furthering our collective knowledge about this important topic.
Governments	More information sharing and collaborative research by governments, especially in terms of household survey data on low-income populations; most such surveys do not collect much data on access to, expenditures on, or perceived benefits from mobile or other communications. Additionally, governments should be pursuing more open and collaborative policy arrangements for cross-sector service development, particularly with regard to mobile banking services; until the uncertainty around regulation between the telecommunications and banking sectors is clearly addressed, new service introduction will be hampered.
Industry Groups	Greater efforts to organise information sharing and access to knowledge, by industry groups such as the GSMA and CTIA, as well as by trade journals and conventions. The recent GSMA "Mobile Money Summit" was a good example of industry and government stakeholders coming together to share learnings from their respective activities around mobile banking and mobile payments. More events of this nature should be organised.
Foundations & Development Organisations	Expanded willingness by foundations and development organisations interested in alleviating poverty to fund research, pilots, and capacity-building activities that can assist policy formulation. It's important that such organisations be open to supporting not just other NGOs, but also entrepreneurial and for-profit activities aimed at advancing our knowledge base on how mobile technologies can assist the poor. As so much of the current development debate is illustrating, genuine economic growth will come from trade, investment, and an environment that supports entrepreneurial activities, not just foreign aid, and the approaches taken need to reflect this broader environment.

Top 20 Research Reports

The following is a list of the top studies in this area based on content, relevance, originality and credibility. While it is not an exhaustive and scientifically developed list, it illustrates the work that we feel is most important at the moment and highlights key conclusions on the impact of mobile technology in developing countries. As this is not a scientific ranking, **the studies are not displayed by rank, but rather in alphabetical order according to author.** Links to the top 20 studies are provided in this report. If you have problems accessing the links from the document, you can alternatively access the reports from the News & Resources section on the Development Fund website www.gsmworld.com/developmentfund/

1 "With the widespread use of mobile phones, fishermen are able to respond quickly to market demand and prevent wastage"

Abraham, R. 2007.

Mobile Phones and Economic Development: Evidence From the Fishing Industry in India
Indian School of Business, Hyderabad, India. Information Technologies and International Development, Volume 4, Issue 1 (Fall 2007).

New data from Kerala, India on the transition that occurred with the advent of mobile phone service. Abraham reports the results of a series of focus groups conducted at 12 locations in Kerala India and interviews with nearly 200 local people associated with the fishing industry. He reports that, using mobile phones at sea, fishermen are able to respond quickly to market demand and prevent unnecessary wastage of catch – fish being a highly perishable commodity – a common occurrence before the adoption of phones. At the marketing end, mobile phones help coordinate supply and demand, and merchants and transporters are able to take advantage of the free flow of price information by catering to demand in undersupplied markets. There is also far less wastage of time and resources in all segments of the fishing community. Fishermen spend less time idling on shore and at sea, whereas owners and agents go to the landing centers only when they receive information (via mobile phones) that their boats are about to dock. He finds that with the widespread use of mobile phones, markets become more efficient as risk and uncertainty are reduced. There is greater market integration; there are gains in productivity and in the Marshallian surplus (sum of consumer and producer surplus); and price dispersion and price fluctuations are reduced. **Link to the Study**

2 "Cell phones reduce grain price dispersion by a minimum of 6.4%"

Aker, Jenny C. 2008.

Does Digital Divide or Provide? The Impact of Cell Phones on Grain Markets in Niger
UC, Berkeley. January 15, 2008.

This study provides evidence that cell phones reduce grain price dispersion across markets by a minimum of 6.4% and reduce intra-annual price variation by 10%. Cell phones have a greater impact on price dispersion for market pairs that are farther away, and for those with lower road quality. This effect becomes larger as a higher percentage of markets have cell phone coverage. The primary mechanism by which cell phones affect market-level outcomes appears to be a reduction in search costs, as grain traders operating in markets with cell phone coverage search over a greater number of markets and sell in more markets. The results suggest that cell phones improved consumer and trader welfare in Niger, perhaps averting an even worse outcome during the 2005 food crisis. **Link to the Study**

3 "Grameen's Village Phone has given new status and image to women"

Aminuzzaman, S., Baldersheim, H., Jamil, I. 2003.

Talking back! Empowerment and Mobile Phones in Rural Bangladesh: a Study of the Village Phone Scheme of Grameen Bank
Contemporary South Asia, Volume 12, Issue 3 September 2003.

The study assesses the efficacy of the Village Phone (VP) scheme in ameliorating the 'information poverty' of the villages that have obtained access to mobile phones in Bangladesh. More specifically, the study has sought to describe the ways in which the VP is operated, how the service is utilised and by whom, and the impacts of the service in terms of economic and social empowerment of individuals (especially phone ladies) and communities. The study found that at the individual level, the VP has indeed contributed significantly to income generation. Socially, it has given a new status and image to those women who are getting Grameen Bank's support to start this venture both at the family and community levels. Moreover, at the community level, it has narrowed gaps between cities and villages by enhancing more communication between family members. Economically, it has increased business transactions and dissemination of information. **Link to the Study**

4 "A 10% increase in mobile penetration leads to a 1.2% increase in the annual growth rate in GDP"

Deloitte. 2007.

Global Mobile Tax Review 2006-2007
On behalf of the GSM Association.

This report makes the case for addressing taxation policy and levels to support the extension of this essential franchise to the poorer sections of society. Based on analysis and modelling the following key findings are found in the report:

- Reducing mobile specific taxes and general consumer taxes such as VAT leads to substantial increases in mobile penetration and usage.
- A reduction in the price charged to the end customer.
- Increased penetration boosts economic activity. In developing countries a 10% increase in penetration leads to a 1.2% increase in the annual growth rate in GDP.
- Turkey levies the highest taxes on mobile consumers in our sample set, totalling 44% of each $ spent by consumers. This position is consistent with the last GSMA report on this issue.
- Taxation of mobile consumers in East Africa is almost twice the 17.4% global average, potentially limiting mobile expansion in the region and the associated benefits.
- 20 jurisdictions levy higher taxes on mobile consumers than fixed.
- A reduction in mobile specific taxation could approach revenue neutrality in 14 of these 16 countries, as reductions in government taxation revenue would be counterbalanced by greater VAT, corporation tax and economic growth.
- Case study evidence from Kenya suggests that cutting mobile specific taxes can have a revenue positive impact for the government in the medium term in countries where mobile penetration is still low.
- Of the countries surveyed, 16 still have mobile specific taxes. Such taxes are regressive in developing countries, in that they are proportionally greater on the poorer members of society who use mobile phones as their source of universal access.
- On average, tax accounts for 24.8% of total handset costs and 45 countries (nearly half of those surveyed) impose specific import duties on handsets. **Link to More Information**

5 "Mobiles are allowing microentrepreneurs to develop new business contacts"

Donner, J. 2005.

The Use of Mobile Phones by Microentrepreneurs in Kigali, Rwanda: Changes to Social and Business Networks
Information Technology and International Development, Winter 2005, Volume 3, Number 2.

A 2004 survey in Kigali, Rwanda, suggests that mobiles are allowing microentrepreneurs to develop new business contacts. The results detail the impact of mobile ownership on the social networks of microentrepreneurs in low-teledensity areas, focusing on the evolving mix of business and personal calls made by users. The study differentiates between the contacts amplified through mobile ownership (friends and family ties) and those enabled by mobile ownership (new business ties). The exercise identified four distinct perspectives on mobile use among the participants. One perspective sees it as a device for the pursuit of instrumental business goals. A second perspective uses mobiles to satisfy emotional or intrinsic needs. Two other perspectives mix instrumental and intrinsic elements, seeing mobiles as productivity enhancers, or as simply indispensable. Taken together, these distinct perspectives illustrate a range of intended uses and gratifications among SME (small and medium scale enterprise) owners, and suggest numerous paths for future research. The article discusses applicability of the results to settings beyond Rwanda. **Link to the Study**

6 "Users consider the mobile phone to be a necessity, not a luxury"

Frost & Sullivan. 2006.

Social Impact of Mobile Telephony in Latin America
On behalf of the GSM Association.

A study to analyse the impact of mobile telephones on rural and semi-urban areas in Latin America.
Key results are:

- One of every four persons contacted use mobile phone, with most using it for voice communications only, and both genders using the service equally.
- Penetration of mobile service reaches practically all social levels.
- Mobile phone used daily to make and receive calls by more than 40% of users.
- Fundamental value was possibility of being located at any time or place.
- Mobile devices very important when looking for work or finding new work opportunities.
- Communications with family or friends are positively affected by common use of mobile phones.
- Use of the mobile phone to make or receive long distance calls is frequent in regions characterised by a strong migratory movement, such as the state of Bahia in Brazil.
- Mobile telephony services have revolutionised the perception of users in emergencies.
- Mobiles represent an important means of communication between students and teachers.
- Users don't consider the mobile phone to be a luxury, but a necessity, especially for work and other economic activities.
  Link to the Study

7 "Mobiles are enabling people to invest in and draw on social capital"

Goodman, J. 2005.

Linking Mobile Phone Ownership and Use to Social Capital in Rural South Africa and Tanzania
Featured in Vodafone Policy Paper Series, Number 2, March 2005.

Looks at the implications of survey results for social capital, or the strength of social networks and contacts in rural communities. Mobile phone ownership in the communities surveyed was positively linked to life satisfaction and a willingness to help others. 97% of people surveyed in Tanzania said they could access a mobile phone, while only 28% could access a landline. Income, gender, age, education and even absence of electricity do not create barriers to mobile access in rural communities, and mobiles are one of the most widely-owned consumer assets. Mobiles save people living in rural communities the financial costs and time involved with travel. As a result, 85% of people in Tanzania and 79% in South Africa said they had greater contact and improved relationships with families and friends as a result of mobile phones. **Link to the Study**

8 "Balance transfer primarily used as a social resource to share airtime with existing family and friendship networks"

Goodman, J., Walia, V. 2006.

A Sense of Balance: A Socio-Economic Analysis of Airtime Transfer Services in Egypt
December 2006.

This study analyses the social and economic impacts of airtime transfer in Egypt. The report is based on data gathered through focus groups and a quantitative survey. The study finds that, at present, airtime transfer's social aspects are more visible than its economic benefits. These benefits include reinforcing existing family and friendship networks and building social capital. The service has yet to deliver its full potential for enabling economic activity, either directly through creating income earning opportunities, or indirectly, through allowing more low-income individuals to access mobile services or as an enabler for improving access to financial services for underserved groups. The study concludes by outlining some potential options to increase the positive impacts of airtime transfer in Egypt. **Link to the Study**

9 "M-banking users conduct more banking transactions per month using the service than non-users conduct at all other channels combined"

Ivatury, G., Pickens, M. 2006.

Mobile Phone Banking and Low-Income Customers: Evidence from South Africa
CGAP November 2006. Summary report of a study conducted by CGAP, in partnership with the United Nations Foundation, the Vodafone Group Foundation and with contribution from South Africa's FinMark Trust.

The study looks at how low-income people view and use m-banking, finding that low-income WIZZIT customers value the m-banking service for its affordability, ease of use, and security, as compared to the use of bank branches and ATMs. As of a result, WIZZIT users conduct more banking transactions per month using the service than non-users conduct at all other channels combined. WIZZIT customers prefer to use their mobile phone over other channels to pay for pre-paid electricity, transfer money, buy pre-paid airtime, check account balances and pay store accounts. While the study shows that m-banking services are valued by poor people in South Africa and may be more affordable than traditional banking, it also suggests that m-banking providers must build greater awareness of their services and must find the right balance between a human touch and technology to appeal to more low-income customers. **Link to the Study**

10 "With mobile phones, fishermen's profits are up 8% and consumer prices are down 4%"

Jensen, R. 2007.

The Digital Provide: Information (Technology), Market Performance and Welfare in the South Indian Fisheries Sector
Kennedy School of Government, Harvard University. Quarterly Journal of Economics, August 2007.

Between 1997 and 2001, mobile phone service was introduced throughout Kerala, a state in India with a large fishing industry. Using microlevel survey data, the study shows that the adoption of mobile phones by fishermen and wholesalers was associated with a dramatic reduction in price dispersion, the complete elimination of waste, and near-perfect adherence to the Law of One Price. Both consumer and producer welfare increased: waste (~6% of the fish were unsold before cell phones) has been eliminated; fishermen's profits are up 8% and consumer prices are down 4%, directly driving a 20 rupee/person/month consumer surplus, the equivalent of a 2% increase in per-capita GDP from this one market alone. Other impacts noted, beyond the price of fish: the advent of cell phones also led to a 6% increase in educational enrolments and a 5% increase in the probability of using of healthcare when sick. **Link to the Study**

11 "Mobile technology is changing the way many Africans live and work"

Kwaku Kyem, P. A., Kweku LeMaire, P. 2006.

Transforming Recent Gains in the Digital Divide into Digital Opportunities: Africa and the Boom in Mobile Phone Subscription
Central Connecticut State University, USA, Electronic Journal of Information Systems in Developing Countries, Volume 28 (2006).

This paper discusses the mobile phone boom in Africa and examines the potential impacts of mobiles on the socio-economic development process in African countries. Drawing on data from case studies, the paper explains that mobile phones may not just help create new jobs and new sources of revenue to the state but can also contribute to economic growth by widening markets, creating better information flow, lowering transaction costs, and becoming substitute for costly transportation that is lacking in rural Africa. On the social front, the paper contends that the mobile phone can help create unique personal identities and status symbols for some users. The technology also facilitates the democratic process as groups can use the enhanced communication tools for political and community action thereby reducing the reliance on conventional and often government controlled media. **Link to the Study**

12 "Mobile services contribute US$650 million to the economy every year"

Lane, B., Sweet, S., Lewin, D., Sephton, J., Petini, I. 2006.

The Economic and Social Benefits of Mobile Services in Bangladesh - A Case Study for the GSM Association
Ovum. April 2006.

Key findings from the study are as follows:

- Almost a quarter of a million Bangladeshi depend on the mobile industry, directly and indirectly, with the poorest citizens benefiting most from mobile services.
- Mobile services contribute US$650 million to the economy every year.
- Mobile services are good value for money when compared with other countries.
- Mobile communications allow businesses to operate with greater efficiency.
- For every additional 10 percentage points of mobile penetration, the annual GDP growth rate is increased by approximately 0.6%.
- Higher mobile penetration will assist Foreign Direct Investment (FDI). Increasing penetration by 1% increases FDI as a proportion of GDP by 0.5%.
- Mobile services improve social cohesion, assist in reducing the digital divide, improve access to healthcare and can help improve users' quality of life.

At the same time a number of concerns are presented that need to be addressed to fully realise the benefits of mobile services, specifically around tax and interconnection policy, with recommendations for addressing these issues. **Link to the Study**

13 "Official indicators underestimate the thirst for digital consumption, especially mobile"

Molony, T. 2005.

Food, Carvings and Shelter: The Adoption and Appropriation of Information and Communication Technologies in Tanzanian Micro and Small Enterprises
Dissertation, University of Edinburgh.

African countries have recently experienced an extraordinary and largely unanticipated boom in the uptake of mobile phones, and increasing rates of access to the internet. This thesis investigates how and why these technologies are being adopted for use in Tanzanian micro and small enterprises (MSEs), and explores the changes they are bringing about to the existing business culture of marginalised economies. Various ingenious and at times unconventional methods of access to, and appropriation of, information and communications technologies (ICT) is uncovered. Together these suggest that official indicators underestimate the thirst for digital consumption, especially for mobile phones, and help explain the flourishing informal economy of handset acquisition. Internet penetration and uptake for use in business, on the other hand, is revealed to be far slower. The 'mobile office' effectively allows poorer entrepreneurs to operate without premises, thereby saving costs on rent and allowing the enterprise to remain informal. Mobile phones are also seen to play a crucial role in improving the exchange of supply-and-demand information domestically, while a combination of applications (particularly e-mail) appear to act as tools with which to refresh relationships with sources of market information outside the country. **Link to the Study**

14 "M-PESA is becoming a tool for maintenance of urban-rural relations"

Morawczynski, O. 2008.

Surviving in the 'Dual System:' How M-Pesa is Fostering Urban-to-Rural Remittances in a Kenyan Slum
University of Edinburgh.

A study using ethnographic data collected in a Kenyan slum to show that M-PESA is becoming a tool for the maintenance of urban-rural relations. It further asserts that because the system is helping migrants to maintain such relations, it is facilitating survival in what is called the 'dual system'. **Link to the Study**

15 "Mobiles have reduced travel needs, assisted job hunting and provided better access to business information, while greater ease of contact with family and friends has improved relationships "

Samuel, J., Shah, N., Hadingham, W. 2005.

Mobile Communications in South Africa, Tanzania and Egypt: Results from Community and Business Surveys
Featured in Vodafone Policy Paper Series, Number 2, March 2005.

Report of community surveys which assess the factors affecting mobile use, and the range of potential impacts, in relatively poor, rural African communities. The surveys suggest that mobile telephony is frequently accessed by the poorest people, thanks in part to widespread sharing. The surveys suggest that gender, age, and education do not present insurmountable barriers to access – nor even the absence of electricity. Individuals surveyed in rural communities highlighted savings in travel time and costs and easier communication with family and friends, in addition to access to business information and easier job search. A majority of small businesses reported increased sales and profits, time savings and greater efficiency, and for many black-owned businesses in Cairo, a mobile phone was their only means of communication available. **Link to the Study**

16 "A mobile phone in developing countries is a source of economic growth potential, social networking, and heightened political awareness"

Sinha. C. 2005.

Effect of Mobile Telephony on Empowering Rural Communities in Developing Countries
International Research Foundation for Development (IRFD) Conference on Digital Divide,
Global Development and the Information Society, November 14-16, 2005.

Several studies have documented the increased proliferation of mobile handsets among poorer communities in developing countries. This paper discusses the motivation and nature of this trend, as well as its effect on enabling marginalised communities to realise opportunities, be they social, economic, or political. The potential empowering effects of mobile phone penetration is shown through a nuanced picture of both the benefits and challenges mobile phones can bring to individuals, groups and communities in poor developing country communities. It begins by providing a brief outline of the communication challenges that are present in developing countries; then moves on to analysing general mobile penetration trends, innovative approaches to mobile use, the positive and negative effects of mobiles on social networks and the creation of social capital, and finally considers how mobiles can be leveraged to generate economic opportunities and political mobilisation. Through a succinct examination of both the positive and negative aspects of mobile telephony adoption, this paper argues that mobile phones are quickly becoming an affordable, germane, and accessible tool to many poor communities around the world to create economic opportunities and strengthen social networks. **Link to the Study**

17 "33% of those without a phone said they wanted to acquire one within the next year"

Souter, D., Scott, N., Garforth C., Jain R., Mascarenhas, O., and McKemey, K. 2005.

The Economic Impact of Telecommunications on Rural Livelihoods and Poverty Reduction:
A Study of Rural Communities in India (Gujarat), Mozambique and Tanzania
Commonwealth Telecommunications Organisation for UK Department for International Development.

This research assesses the impact of the telephone, whether fixed or wireless, on the lives of the rural poor in three developing countries – in the state of Gujarat in India; in Mozambique; and in Tanzania, based on surveys conducted in the second half of 2004. Taken together, the sample includes about 2300 interviews across the three countries. This is one of the largest surveys of telephone behaviour and attitudes to be undertaken in the developing world. Key findings from this study of the use of telephony were strongly consistent in all three research countries. The research showed that there was a consistent pattern of telephone behaviour in the three countries. Telephones were: considered very important for use in emergencies; extensively used to maintain social networks, especially contact within the family; valued more for saving money than for earning money; valued more by richer and better educated people than by the poorer, less educated or more marginal members of society – especially where financial value was concerned; and considered unimportant for information gathering. Telephone use fell into a pattern of communication flows and communications behaviour which was also consistent in all three countries. Telephone use was most important for emergencies and social networking. Broadcasting was most used and most valued for obtaining general information. Face-to-face communications was much the most important communications medium for specific information on issues such as farming, business and education. Hardly anyone in the sample populations had yet used the internet. **Link to the Study**

18 "A rise of 10 mobile phones per 100 people boosts GDP growth by 0.6 percentage points"

Waverman, L., Meschi, M., Fuss, M. 2005.

The Impact of Telecoms on Economic Growth in Developing Countries
Featured in Vodafone Policy Paper Series, Number 2, March 2005.

The authors explore the impact of mobiles on growth, finding that mobile phones in less developed countries are playing the same crucial role that fixed telephony played in the richer economies in the 1970s and 1980s. Mobile phones substitute for fixed lines in poorer countries, but compliment fixed lines in rich countries, implying they have a stronger growth impact in poor countries. Through empirical study, they confirm that the growth impact of mobiles is large in both developed and developing countries, but is around twice as important in the latter group, where there is also a critical mass effect, and that a rise of ten mobile phones per 100 people boosts GDP growth by 0.6 percentage points. The authors also found that own-price and income elasticities of mobile phone demand are significantly above 1; that is, demand increases much more than in proportion to either increases in income or reductions in price. **Link to the Study**

19 "Mobile transactions enhance the outreach of financial services, reduce information asymmetries and provide low cost financial products"

Williams, H., Torma, M. 2006.

Trust and Fidelity: From Banking Under the Mattress to Resting on the Mobile Phone
Written for Nokia/Vodafone SIM panel.

The paper discusses the role mobile technology can play in providing access to financial services. The paper also looks at some of the evidence on how mobile technology is playing a part in delivering financial services to large segments of unbanked population in developing countries. The paper also assesses some of the impacts mobile financial transactions have on individuals, SMEs, and government services. It is argued that in countries with less developed banking systems, mobile technology can facilitate the development of banking platforms that provide alternative access to financial services. The paper observes that the realisation of the transformational potential of mobile banking is dependent on both creating synergies between telecommunications and banking regulatory frameworks, and, rather obviously, the increased penetration of mobile telecommunications into all households. Moreover, the paper argues that the benefits of mobile banking will not be evenly distributed across all banking services; in some instances such as transactional systems the advantages of mobile banking may well be overwhelming; but for "cash in and cash out" services a more complex terrain exists. **Link to the Study**

20 "A 1% increase in mobile penetration rates is associated with 0.5-0.6% higher rates of FDI/GDP"

Williams, M. 2005.

Mobile Networks and Foreign Direct Investment in Developing Countries
Featured in Vodafone Policy Paper Series, Number 2, March 2005.

A study into the relationship between Foreign Direct Investment (FDI) and the penetration of mobile phones in developing countries. It found that both fixed and mobile communications networks, in addition to other characteristics including openness of the economy, GDP and infrastructure, are positively linked with FDI; and that impact of mobile has grown more significant in recent years. The authors found a statistically significant relationship between mobile networks and FDI flows in the latter part of the sample (i.e., 2000-2002 and 2002 alone), indicating that a 1% increase in mobile penetration rates is associated with 0.5-0.6% higher rates of FDI/GDP. **Link to the Study**

Appendix: Categorisation of the Top 20 Research Reports

In order to enable this document to be used as a reference tool, we have categorised the top 20 research reports according to their focus on macroeconomic, microeconomic or social impacts.

Macroeconomic Studies

The following studies focus on the broader economic benefits of mobile communications on society.

Deloitte. 2007.
Global Mobile Tax Review 2006-2007
On behalf of the GSM Association.

Lane, B., Sweet, S., Lewin, D., Sephton, J., Petini, I. 2006.
The Economic and Social Benefits of Mobile Services in Bangladesh - A Case Study for the GSM Association
Ovum. April 2006.

Waverman, L., Meschi, M., Fuss, M. 2005.
The Impact of Mobile Phones on Economic Growth in Developing Countries
Featured in Vodafone Policy Paper Series, Number 2, March 2005.

Williams, M. 2005.
Mobile Networks and Foreign Direct Investment in Developing Countries
Featured in Vodafone Policy Paper Series, Number 2, March 2005.

Microeconomic Studies

The following studies focus on the economic benefits of mobile communications to individual users and communities.

Abraham, R. 2007.
Mobile Phones and Economic Development: Evidence From the Fishing Industry in India
Indian School of Business, Hyderabad, India. Information Technologies and International Development, Volume 4, Issue 1 (Fall 2007).

Aker, Jenny C. 2008.
Does Digital Divide or Provide? The Impact of Cell Phones on Grain Markets in Niger
UC, Berkeley. January 15, 2008.

Donner, J. 2005.
The Use of Mobile Phones by Microentrepreneurs in Kigali, Rwanda: Changes to Social and Business Networks
Information Technology and International Development, Winter 2005, Volume 3, Number 2.

Ivatury, G., Pickens, M. 2006.
Mobile Phone Banking and Low-Income Customers: Evidence from South Africa
CGAP November 2006. Summary report of a study conducted by CGAP, in partnership with the United Nations Foundation, the Vodafone Group Foundation and with contribution from South Africa's FinMark Trust.

Jensen, R. 2007.
The Digital Provide: Information (Technology), Market Performance and Welfare in the South Indian Fisheries Sector
Kennedy School of Government, Harvard University. Quarterly Journal of Economics, August 2007.

Williams, H., Torma, M. 2006.
Trust and Fidelity: From Banking Under the Mattress to Resting on the Mobile Phone
Written for Nokia/Vodafone SIM panel.

Social Studies

The following studies focus on the qualitative benefits of mobile communications, which improve daily life.

Aminuzzaman, S., Baldersheim, H., Jamil, I. 2003.
Talking back! Empowerment and Mobile Phones in Rural Bangladesh: a Study of the Village Phone Scheme of Grameen Bank
Contemporary South Asia, Volume 12, Issue 3 September 2003.

Frost & Sullivan. 2006.
Social Impact of Mobile Telephony in Latin America
On behalf of the GSM Association.

Goodman, J. 2005.
Linking Mobile Phone Ownership and Use to Social Capital in Rural South Africa and Tanzania
Featured in Vodafone Policy Paper Series, Number 2, March 2005.

Goodman, J., Walia, V. 2006.
A Sense of Balance: A Socio-Economic Analysis of Airtime Transfer Services in Egypt
December 2006.

Kwaku Kyem, P. A., Kweku LeMaire, P. 2006.
Transforming Recent Gains in the Digital Divide into Digital Opportunities: Africa and the Boom in Mobile Phone Subscription
Central Connecticut State University, USA, Electronic Journal of Information Systems in Developing Countries, Volume 28 (2006).

Molony, T. 2005.
Food, Carvings and Shelter: The Adoption and Appropriation of Information and Communication Technologies in Tanzanian Micro and Small Enterprises
Dissertation, University of Edinburgh.

Morawczynski, O. 2008.
Surviving in the 'Dual System:' How M-Pesa is Fostering Urban-to-Rural Remittances in a Kenyan Slum
University of Edinburgh.

Samuel, J., Shah, N., Hadingham, W. 2005.
Mobile Communications in South Africa, Tanzania and Egypt: Results from Community and Business Surveys
Featured in Vodafone Policy Paper Series, Number 2, March 2005.

Sinha. C. 2005.
Effect of Mobile Telephony on Empowering Rural Communities in Developing Countries
International Research Foundation for Development (IRFD) Conference on Digital Divide, Global Development and the Information Society, November 14-16, 2005.

Souter, D., Scott, N., Garforth C., Jain R., Mascarenhas, O., and McKemey, K. 2005.
The Economic Impact of Telecommunications on Rural Livelihoods and Poverty Reduction:
A Study of Rural Communities in India (Gujarat), Mozambique and Tanzania
Commonwealth Telecommunications Organisation for UK Department for International Development.

Appendix: The GSMA Development Fund Literature Review

Additional Reading on Mobile Communications in Developing Countries

Literature Reviews and Case Studies

Donner, J. 2008.
Research Approaches to Mobile Use in the Developing World: A Review of the Literature
The Information Society, Volume 24, Issue 3, May 2008.

This paper reviews roughly 200 recent studies of mobile (cellular) phone use in the developing world, and identifies major concentrations of research. It categorises studies along two dimensions. One dimension distinguishes studies of the determinants of mobile adoption from those that assess the impacts of mobile use, and from those focused on the interrelationships between mobile technologies and users. A secondary dimension identifies a subset of studies with a strong economic development perspective. The discussion considers the implications of the resulting review and typology for future research. **Link to More Information**

Makhaya, G., Roberts, S. 2003.
Telecommunications in developing countries: reflections from the South African experience
Telecommunications Policy, Volume 27, Issues 1-2, February-March 2003.

South Africa has embarked on a process of privatisation of telecommunications while at the same time aiming to extend telecommunications services to a larger proportion of the population. The article reviews the debates on privatisation and international experience with a particular emphasis on issues of economic development and regulation. The experience of South Africa is then analysed in terms of different indicators of performance, the regulatory record and the progress on service extension. The findings indicate that there have been undoubted gains in the quality and range of services. However, in common with other countries, the South African case also highlights the importance of strong capabilities in regulation, and the problems of service extension under a shift to private-sector imperatives. **Link to More Information**

de Silva, H., Zainudeen, A., Ratnadiwakara, D. 2008.
Perceived Economic Benefits of Telecom Access at the Bottom of the Pyramid in Emerging Asia
LIRNEasia, May 2008.

Takes a new look at the effect of mobile phones on the lives of people at the so-called 'bottom of the pyramid.' The report states that although anecdotal evidence shows that mobile phones are economically beneficial to base-of-the-pyramid users, there is little empirical evidence to reinforce this claim. The authors conducted a study on mobile phone usage in five Asian countries and used the results to analyse the benefits -- economic and otherwise -- of mobiles on users at the bottom of the pyramid. **Link to More Information**

Sullivan, N. 2007.

You Can Hear Me Now

Jossey-Bass, Pub. ISBN-10: 0-7879-8609-7, ISBN-13: 978-0-7879-8609-4, February 2007.

Sullivan's tale of entrepreneur Iqbal Quadir, the visionary and catalyst behind the creation of GrameenPhone in Bangladesh. GrameenPhone—a partnership between Norway's Telenor and Grameen Bank, co-winner of the 2006 Nobel Peace Prize—defines a new approach to building business opportunities in the developing world. GrameenPhone's successful effort to provide universal telephony in a country that had virtually no phones, using microloans generated by Muhammad Yunus, co-winner of the 2006 Nobel Peace Prize, confirms the power of bottom-up development, which is creating millions of income opportunities for the rural poor and billions of dollars in national income. With similar success stories in other poor countries—such as those of Celtel, MTN, and Vodacom in sub-Saharan Africa, and of Globe Telecom and Smart Communications in the Philippines—cell phones are spreading like wildfire across the South and are helping to bridge the digital divide. You Can Hear Me Now describes an inclusive capitalism that engages and enables many of the three billion people living on $1 a day, at the base of the economic pyramid. **Link to More Information**

Wei, C., Kolko. B.E. 2005.

Studying Mobile Phone Use in Context: Cultural, Political, and Economic Dimensions of Mobile Phone Use

IPCC, Proceedings, International Professional Communication Conference.

This paper discusses the need for studying mobile phone use within the context of a society, with consideration of the cultural, political, and economic factors that influence phone use. Such contextual study is especially valuable in a culture that sharply differs from the industrial, predominantly Western perspective in which mobile phones and applications are developed. This paper presents a case study of mobile phone use in Uzbekistan, a Central Asian republic with a unique socio-political environment that is experiencing growing mobile phone use. A review of literature related to mobile phone use in developing, non- Western countries are presented. Some results of interviews about perceptions and use of mobile phones in Tashkent are discussed. **Link to More Information**

Additional Studies of Social and Economic Impact

Ellwood-Clayton, B. 2006.
All We Need is Love—and a Mobile Phone: Texting in the Philippines
Cultural Space and Public Sphere in Asia 2006, Seoul, Korea.

This paper provides an overview of the author's anthropological fieldwork and explores the intricate relationship between different types of love—platonic, familial, romantic, erotic, secretive, humanitarian and religious—and cell phone use in the Philippines. She concludes that the introduction of the mobile phone has had an enormous impact in facilitating each of these areas. **Link to More Information**

Ford, M., Leinonen, T. 2006.
MobilED – A Mobile Tools and Services Platform for Formal and Informal Learning
(http://mobiled.uiah.fi), presented at mLearn 2006, the 5th World Conference on Mobile Learning, Banff, Canada.

A presentation on MobilED, an initiative aimed at designing teaching and learning environments that are meaningfully enhanced with mobile technologies and services. The first phase of the project included the design, development and piloting of a prototype platform where multimedia and language technologies (voice, text, images) are used via the mobile phone as tools in the learning process. The first 2 pilots focused on the use of low-cost mobile phones, which are readily available in the developing world. It consisted of the development of a mobile audio-wikipedia, using SMS and text-to-speech technologies to enable access to information as well as the contribution of information using voice. The application was tested and results compared between a poor, rural school environment and an affluent private school environment in South Africa. The second phase of the project looked at the use of more advanced mobile phones with multimedia capabilities. It consisted of a joint project between the "advantaged" and "disadvantaged" schools, called "Street Memory" which enabled learners to gather multimedia (sound, voice, video) information and make the results available to the community.
Link to More Information

Forestier, E., Grace, J., Kenny, C. 2002.
Can information and communication technologies be pro-poor?
Telecommunications Policy, Volume 26, Issue 11, December 2002.

This paper examines cross-country evidence to discover if teledensity (the number of telephones per capita) has a pro-poor growth impact—fostering increased average incomes while reducing inequality. It also examines the impact of telecommunications rollout on quality of life variables including infant mortality and literacy. It finds that, historically, telecommunications rollout has had a positive and significant impact on increasing inequality and little impact on quality of life variables. A reason for this is tested and preliminarily confirmed that rollout has (historically) only benefited the wealthy. The paper then turns to emerging evidence on the role of the Internet in poverty relief and statistics on the access gap in provision between rich and poor, suggesting that this new ICT will also be a force for income divergence. Using the results of the cross-country analysis on telecommunications, the paper concludes with a discussion of potential policy responses (such as sector reform and universal access programs) to turn telecommunications from a source of growth that also increases inequality to a source of growth that diminishes it. **Link to More Information**

Horst, H., Miller, D. 2005.
From Kinship to Link-Up: Cell phones and social networking in Jamaica
Current Anthropology Volume 46 Number 5, December 2005.

On the basis of lists of numbers saved on individuals' cell phones and other evidence, it is argued here that low-income Jamaicans use the cell phone to establish extensive networks, a practice identified as "link-up." Link-up has many of the same characteristics as those found by R. T. Smith in a classic study of Jamaican kinship and genealogy. However, the new evidence suggests that kinship merely exemplifies a pattern that may be found in a wider range of Jamaican networking strategies including the creation of spiritual and church communities, the search for sexual partners, and the coping strategies adopted by low-income households. Link-up also accounts for the rapid adoption of cell phones and the patterns of their use by low-income Jamaicans and highlights the importance of understanding the local incorporation of cell phones and local forms of networking enacted through new communication technologies. **Link to More Information**

Idowu, Bayo; Ogunbodede, Eyitope; Idowu, Bimbo. 2003.
Information and Communication Technology in Nigeria The Health Sector Experience
Journal of Information Technology Impact. Vol. 3, no. 2.

This paper presents a study that identifies the ICT indicators, such as mobile phones, Internet hosts and personal computers that are in use in Nigerian teaching hospitals. The study explores the impact of mobile phones and the Internet on the health care delivery system in Nigeria. Findings reveal that only mobile phones are available in the hospitals. Medical experts use mobile phones but none of the Nigerian teaching hospitals is connected to the Internet. Internet access is facilitated at the personal level via commercial Internet providers. **Link to More Information**

Kaba, B., et al. 2006.
Explaining the Factors Influencing Cellular Phone Use in Guinea
Electronic Journal of Information Systems in Developing Countries, Volume 28 2006.

Technical and financial factors and the deregulation of the telecommunication field are often used to explain both the use of the cellular phones and the satisfaction of end-users in developing countries. Little attention, however, has been paid to factors such as perceptions, motivations, and social variables which directly influence the decision of an individual to adopt and use a cellular phone. This study aims at better understanding the effect of these factors on the utilisation of cellular phones. A questionnaire survey was conducted among cellular phones users in Guinea. Results obtained from a sample of 463 respondents show that familiarity, social influence, and the needs for mobility required by the task are key determinants of cellular phones' use. **Link to More Information**

Kinkade, S., Verclas, K. 2008.
Wireless Technology for Social Change: Trends in Mobile Use by NGOs
UN Foundation - Vodafone Group Foundation partnership, Access to Communication Publication Series Volume 2.

Between December 10, 2007 and January 13, 2008, 560 non-governmental organisation (NGO) workers participated in a survey designed to demonstrate how NGOs are using wireless technology to help reach various social, civil, economic, and political goals. This report examines innovative uses of mobile technology by various NGOs and identifies emerging trends in "mobile activism" through 11 case studies. Areas looked at were global health, humanitarian assistance, and environmental conservation. **Link to More Information**

Lehr, D. 2007.
Going Wireless: Dialing for Development – How Mobile Devices are Transforming Economic Development at the Base of the Pyramid
Acumen Fund Working Paper December 2007.

Paper describing the emerging trends and possible constraints in the area of mobile phones and development. It addresses the implications and opportunities for social sector organisations, development experts, technology innovators and service providers, looking at versatility and accessibility for service delivery, lessons learned for mobile application development and implementation, and the future of mobile applications.
Link to More Information

Lewin, D., Sweet, S. 2005.
The Economic Impact of Mobile Services in Latin America
A report for the GSMA, GSM Latin America and AHCIET, by Ovum and Indepen, UK, December 2005.

An assessment of the economic impact that the mobile industry has had on Latin America over the past five years and the likely impact it will have over the next five years. Over the past few years cellular mobile services have had a major impact on the economies of Latin America:

- Investment in mobile services leads to take up of services, which in turn leads to further investment as demand outstrips supply. Take up of mobile services also generates free cash flow. Part of this is then reinvested in expanding the mobile networks.
- The mobile industry itself generates substantial economic benefits, in terms of its contribution to GDP, generation of employment, and generation of government revenues through payment of various taxes.
- Use of mobile services also leads to productivity gains for the businesses whose staff are cellular mobile users.
- The growth of the mobile industry has led to increases in the flow of foreign direct investment (FDI) into Latin America.
- The combination of these effects has boosted GDP growth in Latin America. **Link to More Information**

Ling, R. S. 2004.
The Mobile Connection: The Cell Phone's Impact on Society
ISBN: 1558609369 (Morgan Kaufman, pub.).

This book, based on worldwide research involving tens of thousands of interviews and contextual observations, looks into the impact of the phone on our daily lives. The mobile phone has fundamentally affected our accessibility, safety and security, coordination of social and business activities, and use of public places. Based on research conducted in dozens of countries, this book examines the once unexpected interaction between humans and cell phones. **Link to More Information**

Lynch, K., Poole, N., Stone, A. 2003.

A Case for Using Mobile Internet and Telephony to Support Community Networks and Networked Learning in Tanzania

In Proceedings of International Conference on Online and Open Learning, ICOOL 2003, Mauritius.

This paper brings together the results of research undertaken from two complementary, yet distinct, sources and proposes a framework for which mobile internet and telephony may be able to facilitate capacity building in rural sub-Saharan African communities. Empirical data has been gathered on existing social networks in sub-Saharan African nations, identifying collective acquisition of ICT by rural communities as a potentially significant factor in improving communication and information flows to smallholders. Work has been undertaken to improve these flows, (and examine information constraints) to smallholders in Ghana, Tanzania and Zimbabwe. Mobile telephony is currently the most cost-effective technology for connecting rural areas to urban-based information networks. In the light of this, we present a review of research undertaken which has explored the potential for using mobile telephony to support teaching and learning in developed countries, and make recommendations to its successful implementation in the light of the social and cultural factors identified above. **Link to More Information**

Morawczynski, O., Miscione, G. 2008.

Exploring Trust in Mobile Banking Transactions: The Case of M-PESA in Kenya

University of Edinburgh, University of Oslo.

Examines how trust can emerge and be sustained in the context of mobile transactions, using M-PESA in Kenya. The paper presents research in progress and discusses two main findings. First, interpersonal trust relations between the customers and agents are weak. Customers do not trust the agents with their money. Second, the institutional trust relations between the customer and Safaricom, the mobile service provider offering M-PESA, are strong. This means that customers use the M-PESA service because they believe that their money will be kept safe by Safaricom. **Link to More Information**

Pertierra, R. (Ed.) 2007.

The social construction and usage of communication technologies: Asian and European experiences

Quezon City: The University of the Philippines Press, 2007.

A collection of essays to discuss the new global media with Asia as its main focus. Includes an interesting chapter, "Cellphones in the Rural Philippines," by Itaru Nagasaka. **Link to More Information**

Ramírez, R., Richardson, D. 2005.

Measuring the impact of telecommunication services on rural and remote communities

Telecommunications Policy, Volume 29, Issue 4, May 2005.

The potential benefits that telecommunication services bring to rural and remote communities are generally perceived as beneficial though difficult to ascertain. This article reviews the rationale and elements for measuring the impact of telecommunication services on rural and remote communities, and proposes some concrete ways forward based on current practice. **Link to More Information**

Richardson, D., Ramirez, R., Haq, H. 2000.
Grameen Telecom's Village Phone Programme: A Multi-Media Case Study
TeleCommons Development Group, Canadian International Development Agency, March 2000.

The study reviewed the social and economic development impacts of GrameenPhone Village Phone Programme in Bangladesh. Key findings conclude that the programme yields significant positive social and economic benefits, including relatively large consumer surplus and immeasurable quality of life benefits. The consumer surplus for a single phone call from a village to Dhaka, a call that replaces a physical trip to the city, means real savings for poor rural people of between 2.64% to 9.8% of mean monthly household income. The main reasons members report for using the phone are discussions of financial matters with family, including discussions of remittances (42%) and social calls to family and friends (44%) accounting for 86% of all calls. The income the Village Phone operators derive from the Village Phone is about 24% of the household income on average, and in some cases it was as high as 40% of household income, and Village Phone operators become socially and economically empowered. **Link to More Information**

Rogers, P. Clint; Nian-Shing Chen, Giancarlo Ercoli, Johannes Cronje, Rafik Lataeif, and Rody Klein. 2006.
Mobile Technologies and NGOs: Future Challenges and Opportunities in Suburban and Rural Areas
Paper read at IST-Africa Conference 2006, May 3-5, Pretoria, South Africa.

Examines ways in which ICT and mobile technologies can be used by NGOs for socio-economic development and collaboration. Many NGOs are already utilising Information and Communication Technologies (ICT) for various reasons and to different extents. The objective of this paper is to describe how the increased diffusion of ICT and specifically mobile technologies presents both challenges and opportunities. Specific applications of mobile technologies in meeting these opportunities are discussed. **Link to More Information**

Scott, N., McKemey, K., Batchelor, S.J. 2004.
The Use of Telephones amongst the Poor in Africa: Some Gender Implications
Gamos Ltd., Reading, UK.

Surveys were conducted in Botswana, Uganda, and Ghana with an overall sample of 1,800, stratified by access to ICTs services. Survey data from the countries is gender disaggregated, enabling an analysis of the gender differences in patterns of use of services, and of attitudes that act as barriers and drivers to the use of services. Data shows that the use of services is remarkably similar between women and men. This is true not only of voice telephony (fixed and mobile), but also of points of public access (primarily telephone shops and public booths); it is less true of data services such as the Internet and SMS. However, an analysis of attitudes shows that different priorities and concerns lie behind the use of services by women and men. Many of these differences reflect different gender roles. **Link to More Information**

Scott, N., Batchelor, S., Ridley, J., Jorgensen, H. 2004.

The Impact Of Mobile Phones in Africa

Prepared for the Commission for Africa, November 2004.

There is a growing body of evidence of the indirect impact on the poor arising from improvements in the delivery of pro-poor services that can be achieved through mobile phone based applications (many based on SMS). This paper proposes three key areas where support from high level institutions could help African countries exploit the potential that mobile technology offers to the vulnerable:

- Ensure the poor benefit from expanding access to networks - develop new business models for network investment which reflect the behaviour of African consumers. This includes low cost, low tariff models, and making sure universal access strategies are effective in extending networks to remote areas. Ensure the poor have equity of access.
- Ensure the poor benefit from the phone network through appropriate services. Services relevant to the poor need to be stimulated. Many of the existing commercial services – horoscopes, football results – have little relevance to the poor. Stimulate the development of locally designed, mobile-based solutions to African opportunities by supporting local technology entrepreneurs (both for profit and not for profit).
- Ensure the poor benefit from access to financial services, enabled through mobile phone networks. Integrating mobile phone operators into the reform of financial services will accelerate the introduction of electronic services to the rural poor. Mobile technology lends itself to this application, and phones offer a means of access through voice or text. **Link to More Information**

Skuse, A., Cousins, T. 2007.

Managing Distance - Rural Poverty and the Promise of Communication in Post-Apartheid South Africa

Journal of Asian and African Studies, Vol. 42, No. 2, (2007).

This article examines rural telecommunications access and use among poor village households in the Eastern Cape, South Africa. Discussion is based upon a content analysis of 165 telephone calls, as well as a broader information and communication technology (ICT) ownership, access and use survey undertaken in 50 poor households within a number of rural villages in the Mount Frere district. These data are complimented and supported by qualitative data emerging from a longer-term UK Department for International Development-funded study of ICT use and social communication practices among the urban and rural poor in South Africa. The purpose of the article is to: (i) question existing notions of telecommunications access; (ii) assess the extent to which rural inequalities are exacerbated or ameliorated by telecommunications access; and (iii) examine the extent to which telecommunications are enlisted as a strategic tool by poor households for maintaining kin-based redistributive networks and enhancing livelihood sustainability. **Link to More Information**

Sridhar, K.S., Sridhar V. 2007.

Telecommunications Infrastructure and Economic Growth: Evidence from Developing Countries

Applied Econometrics and International Development, Vol.7-2 (2007).

In this study, we investigate empirically the relationship between telephone penetration and economic growth, using data for developing countries. Using 3SLS, we estimate a system of equations that endogenizes economic growth and telecom penetration. We find that the traditional economic factors explain demand for mainline and mobile phones, even in developing countries. We find positive impacts of mobile and landline phones on national output, when we control for the effects of capital and labour. We discuss the associated policy implications related to improvement of telecom penetration in developing countries. **Link to More Information**

Whattananarong. K. 2004.

An Experiment in the Use of Mobile Phones for Testing at King Mongkut's Institute of Technology North Bangkok

Thailand, International Conference on Making Education Reform Happen: Learning from the Asian Experience & Comparative Perspectives, September 22-24, 2004, Bangkok, Thailand.

The purposes of this study were to investigate and compare the use of mobile phones for testing. The samples were 56 graduate students divided into 2 groups: control and experimental. The control group was tested by the traditional testing method - pen and paper. The experimental group was tested by using a mobile phone. The results indicated that there was no significant difference between the two groups. There was no significant difference between the scores of the experimental group using Audio-phone and the Visual-phone models. There was a significant correlation between the scores tested by the traditional and the mobile-phone methods. It suggests that mobile phones could be used as a part of the utilisation of educational technology as stipulated in the National Education Act and education reform. **Link to More Information**

Miscellaneous Policy Analyses

Buys, P., Dasgupta, S., Thomas, T., Wheeler, D. 2008.
Determinants of a Digital Divide in Sub-Saharan Africa: A Spatial Econometric Analysis of Cell Phone Coverage
World Bank, February 2008.

Although almost all Sub-Saharan countries are poor by international standards, they exhibit great disparities in coverage by cell telephone systems. Buys, Dasgupta, Thomas and Wheeler investigate the determinants of these disparities with a spatially- disaggregated model that employs locational information for cell phone towers across over 990,000 4.6-km grid squares in Sub-Saharan Africa. Simulations based on the econometric results suggest that a generalized improvement in competition policy to a level that currently characterises the best-performing states in Sub-Saharan Africa could lead to huge improvements in cell phone area coverage for many states currently with poor policy performance, and an overall coverage increase of nearly 100%. **Link to More Information**

Chetty, M., Blake, E., McPhie, E. 2006.
VoIP Deregulation in South Africa: Implications for Underserviced Areas
Telecommunications Policy, Volume 30, Issues 5-6 (June-July 2006).

Several statutory restrictions have recently been lifted on the use of Voice over Internet Protocol (VoIP) in South Africa. Previously, VoIP could only be utilised by the incumbent telecommunications operator, Telkom, the Second National Operator (SNO) and under serviced area licensees (USALs). This means new opportunities and cost savings for both network service providers and consumers. However, in rural and remote regions, further liberalisation is required so that service providers can take advantage of wireless technologies to provide connectivity in these areas. This paper discusses the legislative environment in South Africa and around the world with respect to VoIP and Wireless Fidelity (WiFi). In addition, examples are provided of how these technologies have been combined to provide last mile solutions around the world and particularly in South Africa. The paper concludes that further liberalisation in the telecommunications environment in South Africa is required if the goal of providing affordable access in rural areas is to be attained. Specifically, it is recommended that wireless technologies be deregulated since the combination of VoIP and WiFi may benefit rural areas. Also, the paper finds that USALs may not be the right model for underserviced areas in South Africa. Lastly, it is apparent that applications drive development and dictate which technologies are relevant for rural areas. **Link to More Information**

Frontier Economics Ltd. 2008.
Taxation and the growth of mobile services in sub-Saharan Africa
On behalf of the GSM Association.

This report estimates that between 2000 to 2012, for every dollar invested by the mobile industry in Africa, around $0.80 will be earned in tax revenues by governments. For the same period more than $70 billion in tax revenue will be generated by the mobile industry. But the potential tax revenues could be even greater. This report demonstrates how by lowering and removing mobile specific taxes from the mobile sector, governments will see an incremental increase in tax receipts as millions more people will be able to afford to connect to and use mobile services. **Link to More Information**

Garbacz, C., Thompson Jr., H.G. 2007.
Demand for Telecommunications Services in Developing Countries
Telecommunications Policy, Volume 31, Issue 5 June 2007.

Telecommunications demand is estimated in models for residential mainline and mobile telephone service for developing countries for the period 1996–2003. The paper tests for cross-price effects between mainline and mobile service and its findings have important policy implications. It finds residential monthly price elasticity to be insignificant for developing countries, but the connection elasticity is larger than generally found in the literature. Mobile monthly price elasticities are very large. A new and important empirical finding is that although wireline phones are substitutes in the mobile market, the contrary is not true—mobile phones are not substitutes in the wireline market, and in fact may be considered complements. **Link to More Information**

Gebreab. F. 2002.
Getting Connected: Competition and Diffusion in African Mobile Telecommunications Markets
World Bank 2002.

The report studies the determinants of the diffusion of mobile telecommunications in Africa in a fixed effects model. It uses data from 1987–2000 on 41 African countries that have adopted cellular telecommunications technologies. He finds that competition is the driving force behind the mobile telecommunications explosion in Africa. Duopoly and triopoly markets grow significantly faster than monopoly markets, although growth does not appear to differ between the first two markets. Evidence of preemptive behaviour is found in competitive sequential entries into the market, but the major effect of competition on diffusion occurs after the actual year of entry. The introduction of digital technology has a positive and significant effect on the diffusion of mobile phones. The presence of an incumbent-owned cellular operator has a negative effect on the diffusion of mobiles, suggesting an abuse of a dominant position by the incumbent fixed-line operator. However, privatisation of the incumbent fixed-line cellular operator accelerates mobile growth and mitigates that negative effect. **Link to More Information**

Hodge, J. 2005.
Tariff Structures and Access Substitution of Mobile Cellular for Fixed Line in South Africa
Telecommunications Policy, Volume 29, Issue 7, August 2005.

The phenomenal growth of mobile cellular relative to fixed line phone ownership in Africa has been attributed to a wide range of factors, including institutional factors (such as competition and private foreign ownership), ease of access (low waiting times and no credit history for prepaid access) and of course the mobility. What has not received any attention is how the tariff structures in mobile have influenced consumer preferences. This paper examines how the difference in tariff structures between fixed line and mobile have accounted for the relative popularity of cellular in South Africa. It finds that the balance between fixed monthly and usage fees makes mobile both affordable and cheaper than fixed line for the bottom 50–60% of households that spend relatively little on communication. This is reflected in household behaviour where lower-income households treat cellular as a substitute for fixed line (owning only one or the other), while higher-income households treat the two as complements (owning both). **Link to More Information**

Jayakar. K. P. 1999.

Local Exchange Competition in Early US Network Development: Considerations for Developing Countries

Telecommunications Policy, Volume 23, Issue 5, June 1999.

This paper examines the claim that competition between the Bell system and independent telephone companies, and not AT&T's regulated monopoly, was responsible for the rapid growth in telephone penetration in the United States. A mathematical model is developed to test if competition contributed to network expansion, when alternative explanations such as diffusion and economic growth are also taken into account. The model is estimated with time series data on telephone penetration in the US from 1876 to 1982, using both Ordinary Least Squares (OLS) and Feasible Generalized Least Squares (FGLS). The results indicate that local exchange competition is indeed a significant influence on increase in telephone penetration, even in the early stages of network development. This has clear policy implications for the current transition to competition in developing countries. **Link to More Information**

McCormick, P. K. 2001.

Telecommunications Reform in Botswana: a Policy Model for African States

Telecommunications Policy, Volume 25, Issue 6, July 2001.

Since the mid-1990s, Botswana has pursued a policy of telecommunications liberalisation. This article, based on fieldwork conducted in Botswana in the summer of 2000, analyzes several notable aspects of the process of reform and denotes those worthy of emulation by other African states. The participation and protection of domestic telecommunication users, transparency in decision-making, the creation of an independent regulatory agency, and the introduction of competition in the form of private cellular service providers are among those policy features that are recommended for replication. Various facets of the tendering process and subsequent licences granted to the mobile operators as well as recent legislation are also examined and commended. **Link to More Information**

McDowell, S. D., Lee, J. 2003.

India's Experiments in Mobile Licensing

Telecommunications Policy, Volume 27, Issues 5-6, June-July 2003.

Given India's continued telecommunications policy objective of expanding service availability to all parts of the country at affordable rates, in 2001 the decision was made to allow basic service license holders to use wireless technologies with limited mobility to complete the local loop connections to subscribers. Spectrum used to provide these services was allocated on a first-come, first-served basis, but with the condition that services be introduced simultaneously in rural, semi-urban, and urban regions. India's different licensing arrangements reflect an ongoing negotiation and shifting regulatory bargain among public and private sector providers of India's telecommunications services, the government, and the actual and potential consumers of these services. **Link to More Information**

Porteous, D. 2006.
The Enabling Environment for Mobile Banking in Africa
DFID.

A look at how to enable mobile banking in Africa. He concludes that additive and transformational models of m-banking are emerging, in which banks and telcos play different roles, and that there is considerable potential for transformational models to address unbanked needs. At the same time, however, he also concludes that transformational models are unlikely to emerge spontaneously, that they need sufficient openness and certainty in the operating and regulatory environments, and that a high level roadmap of principles would be a useful starting point in defining this. **Link to More Information**

Rouvinen, P. 2006.
Diffusion of Digital Mobile Telephony: Are Developing Countries Different?
Telecommunications Policy, Volume 30, Issue 1, February 2006.

Factors determining the diffusion of digital mobile telephony across developed and developing countries are studied with the aid of a Gompertz model. After controlling for other factors, the speed of diffusion per se is not significantly different between the two groups of countries. Standards competition hinders and market competition promotes diffusion in both groups. Various factors are, however, more important in a developing country context: having a large potential user base, accumulating network effects, being open, commanding a high (non-telecom) technological level, and introducing innovation(s) complementing mobile telephony. Late entrants experience faster diffusion promoting cross-country convergence. **Link to More Information**

Zainudeen, A., Sivapragasam, N., de Silva, H., Iqbal, T., Ratnadiwakara, D. 2007.
Teleuse at the Bottom of the Pyramid: Findings from a Five-Country Study
LIRNEasia, November 2007.

This paper looks at telecom use at the bottom of the pyramid, or BOP, in emerging Asia, where much of the 'next billion subscribers' are expected to come from. It explores the potential for new customers and issues of affordability at the BOP. The findings reveal potential for more than 140 million new connections at the BOP in Pakistan, India, Sri Lanka, the Philippines and Thailand alone, with almost two thirds being mobile connections; this will have major implications for the uptake of emerging mobile applications. This paper also looks at the benefits, as perceived by current owners, of phone ownership at the BOP, as well as the 'gendered' use of telecom at the BOP, revealing a gender divide in India, Pakistan and to a small extent in Sri Lanka too. The policy implications of the findings are briefly examined. **Link to More Information**

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