Global travellers on the digital dirt road: international mobility, networks and ICT diffusion in Ghana

Linnet Taylor

Submitted for the degree of Doctor of Philosophy

University of Sussex

September 2012

UNIVERSITY OF SUSSEX

Linnet Taylor

Thesis submitted for the degree of Doctor of Philosophy

Global travellers on the digital dirt road:

international mobility, networks and ICT diffusion in Ghana

This thesis focuses on the intersection of human mobility and technology diffusion in Africa. With Ghana as a case study, it looks at how the diffusion of internet access and use are influenced by international mobility. The research is based in the literature on the diffusion of innovations, international knowledge transmission, migration and development, and Information and Communication Technologies for Development (ICT4D). It begins from the hypothesis that international mobility may contribute to lowering barriers to internet penetration in developing countries by facilitating flows of resources, including equipment, finance, skills and knowledge.

The research is based on four different datasets: a survey of the internet cafes in the North of Ghana and in Accra; an online survey of users in northern internet cafes; a network study incorporating internet cafe owners and managers in higher-value-added areas of the IT sector, and in-depth interviews with policymakers and donor organisations involved in ICT4D interventions. The data was analysed using a combination of fuzzy-set Qualitative Comparative Analysis (QCA) and network analytic techniques including visualisation, statistical analysis and qualitative analysis.

The findings show that international mobility makes an important contribution to the base of adoption capacity for new technologies in poor and remote regions. It enables entrepreneurs and IT workers to address market gaps that restrict access to material and financial resources; by providing access to international circuits of knowledge and ideas which help individuals gain a foothold in the IT sector, and by facilitating local private-sector provision of the internet through internet cafes which serve the hardest-to-reach populations. The thesis concludes by suggesting potential entry points for ICT4D and migration policy in developing countries regarding the efficiency and effectiveness of ICT4D interventions, the role of the private sector in promoting internet usership, and the role of mobility in building adoption capacity in low-income areas.

Acknowledgements

This thesis could not have been written without the help and support of a group who deserve my everlasting gratitude. First my two main supervisors, Richard Black and Rachel Sabates-Wheeler, for their support, insight, kindness and patience during a four-year journey that has taken several unexpected turns. They have been generous and demanding in equal measures, and I have been extremely lucky to work with them both. Thanks also to Allister McGregor who stepped in at the last minute and provided valuable feedback and insights.

My thanks also to those in Ghana who helped me produce this research. Abdul-Latif Issah, a brilliant, brave and dedicated research assistant, set me the ultimate example of *takashi*. Without him I would have been lost. Ken Kubuga, Karl Kubuga, John Paul Tanye, Vitus Achagituni, and Kobby Dadzie provided me with guidance, insights and practical help in the research. Without Doris Acharibia I would have never ridden a motorbike through the middle of Bolgatanga market, and without Cesare Poppi I would not have ridden one around Wa with malaria. In Accra, Kwaku Ofosu Appea, Herman Chinery-Hesse and, of course, Auntie are good friends who went to great lengths to help me find both interviewees and my footing.

For help and feedback I am indebted to Andres Mejía-Acosta, Jamie Goodwin-White, Ismael Rafols, Benoît Rihoux, Oliver Bakewell and participants at the 2011 workshop run by Jon Kvist and Patrick Emmenegger on QCA methodologies.

I would not have reached this point without Terry Buckley, who taught me the value of evidence, and how to seek the individual processes involved in historic changes, one action at a time. His understanding of the democracy of good scholarship has always informed my search for the right questions.

My gratitude also to my fellow DPhils at Sussex and IDS, with special thanks to Hannah, Christina, Inês, Fran, Siobhán and Thea.

Finally, I thank my family. My parents, Elwyn and Simon, for their unwavering support and love, and also my new Dutch family, who have been kind and generous in welcoming me to a new country. Last of all Dennis and Olivia, who inspire me both to do, and to be, better, and to whom I dedicate this work.

Acronyms

AISI	African Information Society Initiative
ANT	Actor-Network-Theory
BPO	Business Process Outsourcing
CIC	Community Information Centre
(fs)QCA	(fuzzy-set) Qualitative Comparative Analysis
GASSCOM	Ghana Association of Software and IT Services Companies
GDP	Gross Domestic Product
GINKS	Ghana Information and Knowledge Sharing Network
GNI	Gross National Income
GoG	Government of Ghana
HR	Human Resources
ICT	Information and Communication Technologies
ICT4D	Information and Communication Technologies for Development
IICD	International Institute for Communication and Development
ISP	Internet Service Provider
IT	Information Technology
ITU	International Telecommunications Union
NGO	Non-Governmental Organisation
OECD	Organisation for Economic Cooperation and Development
R&D	Research and Development
ROI	Return on Investment
SME	Small and Medium Enterprises
SMS	Short Message Service
SNA	Social Network Analysis
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
URL	Uniform Resource Locator
WB	World Bank

Contents

Table of Figures

1 The scope of the research: ICT diffusion, development and human mobility

1.1 Research problem

1.1.1 ICTs in developing countries

Over recent decades a huge amount of policy attention and funding has been invested in the diffusion of Information and Communication Technologies (ICTs) in developing countries. After the arrival in the 1990s of mobile phones and broadband internet, interest rose among international organisations, donor nations and NGOs worldwide regarding the potential of these technologies to influence economic and social development in the global South (Heeks 2009). Various organisations have invested heavily in ICT-related development initiatives: one of the largest, the World Bank, has placed nearly US$10 billion into projects focusing on or involving ICTs in developing countries since 2003 (World Bank 2012). These investments, which are also being made by developing nations themselves, are based on certain assumptions about the way that people adopt and use ICTs. Central to these are two ideas: first, that this is a process that is responsive to strategic interventions and can therefore be driven and shaped by policymakers and donors; and second, that such interventions are necessary if adoption and dissemination are to occur, given that markets are operating imperfectly (UNCTAD 2005, Tambo 2005, UNECA 2007). This research examines this and related assumptions critically by looking at the processes by which ICTs are diffused in Africa, specifically to poor and remote areas.

Understanding the diffusion and adoption of digital communication technologies in the world's poorest regions is essential in order to understand their potential impacts. These impacts have received wide attention (e.g. Infodev 2005, OECD 2003). Understandings of the way that ICTs can impact development range from the normative notion of the 'digital divide', where developing nations are seen as needing to 'catch up' to the industrialised countries' standard of technology use (UNCTAD 2008, ITU 2010), to the more inclusive 'ICT for Development' or ICT4D movement, which conceptualises ICTs as a tool with diverse potential for poverty alleviation and social change (e.g. Kleine 2010). Overall, a growing body of research by scholars such as Unwin (2010) and Heeks (2010) demonstrates that these technologies can positively affect both economic and social wellbeing, although these effects are not uncomplicated.

The attention given to ICTs as a tool for development has, so far, been largely biased toward mobile phones rather than the internet. There is hope that smartphones may provide the benefits of the internet in developing countries, but so far these are beyond reach for the majority in developing countries for reasons of cost and connectivity (Carmody 2011). Research in developing countries has focused principally on mobile technology both because of its startling increase in usership and because it presents some very clear, large-scale successes, such as quick and easy money transfers for the unbanked (most notably 'M-Pesa' in East Africa). Critics, meanwhile, note that the discourse on ICTs' development potential can often involve more cheerleading than analysis (Avgerou 2010, Gillwald 2010, Carmody 2011). This is especially true of the internet: a scan of the literature shows that the internet tends to be either ignored or dealt with as an add-on to this success story involving mobile phones, even though the influence of the internet in industrialised countries demonstrates that its effects on developing ones are likely to be profound.

The reason why the internet is still missing from much research on ICTs' contributions in developing countries may be because it presents a more complicated story than mobile phones. While cheap, easy-to-use mobile telephony and SMS messaging has diffused like wildfire across the African continent in particular, with usership standing at 45.2 per cent in 2010 and having risen faster than it did in industrialised countries, the mobile internet is taking a much slower path, with 3G networks that can transmit data still rarely available from African providers, and the broadband internet is having significant trouble gaining traction (ITU 2011b). In 2009, Africa had fewer broadband subscribers than Australia, a country of 21 million people (Smith 2009), and as of 2010 only one Sub-Saharan country (South Africa) ranked among the top 100 in the ITU's ICT development index with a broadband penetration rate of more than one per cent (ITU 2011a). Rather than an international digital highway, the majority of Africans may be considered to be travelling a digital dirt road where most lack access to the internet, and for those who have it, connectivity is slow and ineffective.

Internet diffusion in Africa has met much higher barriers than in other developing regions so far. A lack of infrastructure, high prices for connectivity and widespread lack of understanding of the potential benefits of the technology have led to the involvement of international donors and African governments in interventions to make the internet more available to the poor, and in turn to extensive public-sector involvement in promoting connectivity (ITU 2011a). Despite this, where the internet is available, it is popular. Sub-Saharan Africa shows the world's largest disparities between the numbers of users and subscribers (those with an individual connection), with one of the greatest being in Ghana where the ratio of users to subscribers (i.e. those reported to be using the technology

versus those who have their own connection) is 43:1 (ITU 2010). This disparity supports the view that publicly available computers are an important element of the internet's diffusion in Africa.

Like mobile technology, the internet is a potential solution to a range of important market and resource gaps. However, it has the potential to go beyond mobile technology in its ability to fill these gaps by answering problems such as the lack of reliable postal services, lack of access to information through print and broadcast media, and lack of transport and business infrastructure. On the national scale, Unwin (2010) shows that the technology has multiple potential applications for development including digital platforms for government services; 'e-health' applications such as telemedicine and distance education services. In the commercial sphere, Esselaar et al. (2007) suggest that the internet can help businesses by reducing transaction costs, and by increasing customer awareness, access to new products and services and financial platforms. Other researchers, notably Kleine (2010) explore the internet's potential to expand individual-level freedoms and capabilities, and its effects on culture.

How to realise these potential benefits, however, is still a focus for research. The evidence base for the internet's contribution to development is still relatively thin (Heeks 2010, Mansell 2010) as is the research on the relative importance of different actors in this process (Gillwald 2010). This makes a strong case for research focusing on the mechanisms and processes involved in the diffusion and adoption of internet technology, and on issues of agency in those processes. The internet's different rate of penetration and potentially wider-ranging impacts also argue for addressing this technology separately from mobile phones.

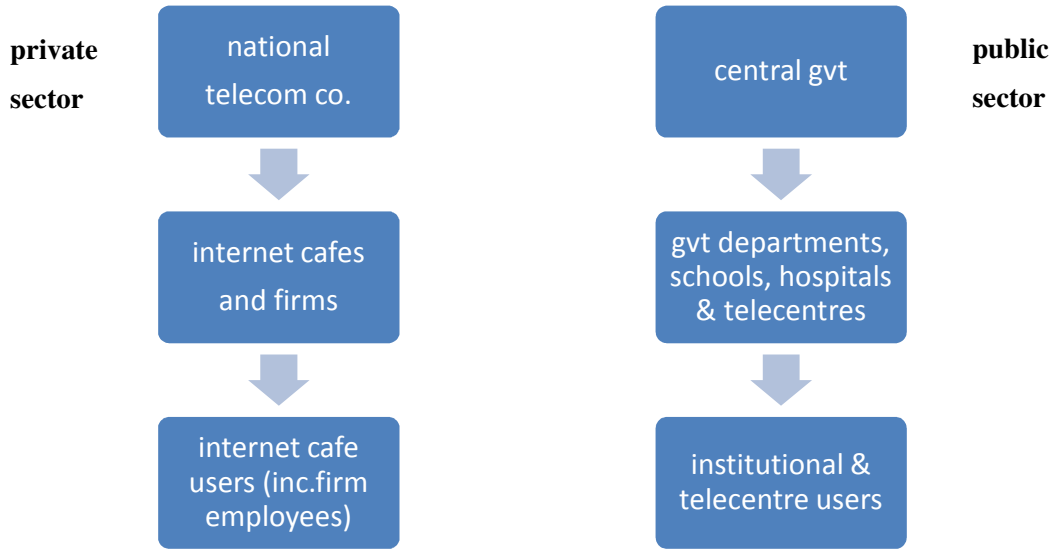
1.1.1 Private vs. public internet provision

There are relatively high barriers to the adoption of internet technology in developing countries. These include market gaps, where various necessary elements of the technology such as hardware and software are either not available or are not available at affordable prices, credit is hard to access, and a range of problems that could more broadly be called 'resource gaps', comprising a lack of the surrounding enabling factors for technology adoption. These 'resource gaps' include the inadequate provision of connectivity, and lack of knowledge and skills to do with digital technologies. These constraints have led to various strategies designed to make the internet more available to the general public. These exist on three levels. First, there are many institutions attempting to aid the process through large-scale interventions, among them the World Bank, UNCTAD, bilateral aid donors and, increasingly, national governments of developing countries (Kenny 2000, Gillwald 2010, Heeks 2010). These efforts focus almost exclusively on public-sector

provision through national-level initiatives such as broadband infrastructure projects and telecentres (UNCTAD 2005, UNECA 1999; 2007). Second, international technology transfer and diffusion is occurring through international firms (Steinmuller 2001, Ramanathan 2011), where their branches in less developed countries are responsible for spillover effects involving new technology. Third are local, micro-level processes involving individuals in developing countries personally adopting new technologies because of their perceived value, as occurred with mobile phones. In contrast to the first two areas, there is a dearth of research on this third dynamic and the mechanisms that underlie it.

Figure 1.1 illustrates the different ways of looking at the distribution of internet connectivity in sub-Saharan Africa. Two separate hierarchies exist around private sector and public sector provision. In the private sector model individuals mainly access the web through internet cafes (as shown by the user-to-subscriber ratio); smaller businesses access it either through a dedicated connection or by sending their employees out to internet cafes to check their email, and larger firms have dedicated connections with higher capacity via national-level broadband provision. The public sector, however, offers a completely separate alternative. Individuals connect at government or donor-funded telecentres, where internet connectivity is bought from national providers but is subsidised or otherwise mediated by international institutions and donors. At a higher level of aggregation, public sector workers connect through the government's network, and at the highest, the central government is both the country's largest consumer of internet connectivity and controls the distribution of connectivity through its regulatory influence over the national provider. It may be because this public-sector model of provision and usership has been so dominant in the early period of ICT use in Africa that research on the market-driven aspects of technology use there is still catching up, and relatively few studies have looked at how internet technology is diffused and used within the private-sector model.

Figure 1.1 Private and public sector internet provision



In the diagram, the largest share of potential users by far can be expected to access the internet through internet cafes – at least in the majority of countries where home broadband connections are still unavailable for most people. This makes a case for studying these small-scale private-sector providers in order to see how provision is occurring and how it may be increased. The public and private-sector models need to be addressed differently by research, because those operating within the private sector model of provision face much more serious obstacles than those in the public sector. For instance, although the continent's hardware and software industries have been working during the 2000s to overcome infrastructural and capacity challenges (Bamiro 2006) new computers and essential software must still predominantly be imported and are taxed on arrival, which makes them approximately twice as expensive as in industrialised countries. Furthermore, even for those who can afford to, a lack of financial infrastructure adds to the difficulty of buying equipment from overseas. The skills and knowledge necessary for handling hardware and connectivity, and particularly for providing them commercially to others, are also a challenge because they are concentrated in clusters where most do not have access to them – particularly the small-scale entrepreneurs likely to set up internet cafes. The next section sets out the choice of case study that was made in order to explore these limitations and how people are overcoming them.

1.1.2 Country case study: Ghana

This thesis uses Ghana as a case study to explore the problem of ICT diffusion. This choice was made because the country is representative of a number of the challenges facing developing countries, and African countries in particular, as they build public usership of the internet. Ghana is at a relatively early stage in building this usership: Africa as a region has the lowest internet penetration in the world, and Ghana is currently 28th out of 56 in Africa in terms of internet penetration. Despite this, the country has an economy which is growing, with GDP rising 6.3 per cent annually on average since 2000 (World Bank 2011a), and has an active ICT policy which aims to involve these technologies at every level of development. This ICT policy also focuses chiefly on the internet, the subject of this study.

The country also presents significant poverty, and thus is a good case study for exploring technology diffusion under conditions of scarcity. This poverty is concentrated in the North, which has not been reached by the economic growth of the last decade, and where large areas of which remain without electricity or roads. Literacy levels in the North are low. These conditions have acted as a constraint on the development of a formal private sector in the North, and although there is a thriving population of small traders, more sophisticated formal or semi-formal businesses such as internet cafes are a relatively recent arrival there. The North's remoteness from the ports and capital make it difficult for businesses to gain access to imported goods, a scarcity that has kept the private sector small there, as is confirmed by the fact that around 75 per cent of the country's tax revenue comes from Kumasi and the South.[1] The next section reviews the country's history of ICT provision and the obstacles that face potential users of ICTs.

1.1.3 Barriers to ICT access in Ghana

Ghana has a strong history of public-sector ICT provision and has an evolving commercial IT sector, but outside its main cities, and in the North in particular, internet usage remains relatively low. Whereas mobile phone penetration grew exponentially during the 2000s, from 12 per cent in 2005 to 71.5 per cent in 2010 (ITU 2010), internet penetration has not followed. Although Ghana was the first African country to introduce the internet, and among the first to gain access to broadband, diffusion lags behind that of other countries, with its internet use rate lower than the sub-Saharan African average (9.6 per cent in 2010, compared to 11.3 per cent across the region (World Bank 2011a)). In 2010 just 0.2 per cent of the population were broadband subscribers (ibid).

[1] Interview with Victor Adadjie, Ministry of Communications, 15.9.09

These rates hide a significant disadvantage for rural users, who comprised 2 per cent of those connected, in contrast to urban dwellers' 10 per cent. Usership is highly geographically and socioeconomically uneven. This is because the availability of broadband is similarly uneven, as shown by figure 1.2 below. The white path on the map shows the new fibre optic communications network, which has relatively good coverage in the country's main centres of economic activity comprising Accra, the coast and Kumasi. North of this area, however, a single line extends only up the centre of the country via Tamale to Bolgatanga and Navrongo, and on into Burkina Faso. This single line represents a lack of redundant capacity, also known as 'looping', and means that the system is easily overloaded. More importantly, it is only available to those living in the towns along the fibre backbone, with no way for other areas to access the country's broadband service. These other areas either rely on dialup services or contract satellite providers from overseas at rates reported by owners to be approximately US$ 400 per month – far beyond the capacity of many internet cafe startups.

Barriers to internet usage for ordinary Ghanaians remain high. As in other sub-Saharan countries import costs and taxes make computer hardware extortionately expensive. Computer hardware and software are both taxed at 25 per cent (Ghanaweb 2002), which in combination with the cost of transport makes for a high markup on computers. This tax is waived for computer hardware for local assembly, and for computers imported for educational purposes by organisations registered as NGOs (GoG 2002c: 12). Internet cafes cannot use this loophole, so that entrepreneurs wanting to start internet cafes in the private sector must travel to the main port, Tema, and buy second or third-hand imported hardware (Pentium II computers from the mid-1990s are common) which frequently breaks down in the tropical heat. Software is also subject to high import taxes, and free versions are often impossible to download due to slow connection speeds and frequent outages of broadband service and electricity. Connectivity is seasonal, failing frequently for weeks at a time in the rainy season, and a monopoly on broadband provision awarded by the government when Vodafone bought the national telecom

Figure 1.2 Ghana's fibre-optic network

company in 2007 has kept prices up for small-scale providers. Remoteness from the country's ports and major cities, Accra and Kumasi, make it difficult for businesses to gain access to imports, which has also impacted people's access to ICTs. They also have difficulty gaining access to credit, which Ghanaian banks will not generally give to small businesses. The new sector has not yet given rise to cooperative models of credit, and small-scale providers lack access to micro-credit programmes which are aimed at more rural and usually female-owned businesses. Knowledge and skills are also scarce resources: at the time of this research there were no specialist ICT training institutions operating north of Kumasi. Those with hardware or networking skills work as consultants, but entrepreneurs looking to enter the sector can seldom afford their services.

Ghana's ICT policy history stands out among African countries due to the early push to include ICT use in poverty alleviation and civil society objectives. It was the first West African nation to connect to the internet in 1995, and was held up during the 1990s as an example of strong ICT policy and achievement (Minges 1998). ICTs were at the centre of the country's push to achieve middle income status by 2015, with the country evolving an 'ICT for Accelerated Development' (ICT4AD) plan. The objectives laid out were those of 'leapfrogging' the country to a knowledge-based economy despite its lack of industrialisation, and using ICTs to achieve a set of objectives beginning with economic growth through private sector development (IMF 2006), but also including human development objectives such as better health services (telemedicine), strengthening the link between government and citizens (e-government), and increasing access to education (distance learning) (GoG 2003). To achieve this objective of 'transforming Ghana into an ICT literate nation' (GoG 2003), international donors helped the government put in place a system of telecentres in rural and remote locations and worked to digitise government services. The 2000s have left a legacy of a strong ICT policy, a network of telecentres and various national organisations devoted to networking and promoting the cause of ICT literacy to combat poverty.

In fact, this ICT-based vision was superseded by the discovery of oil, which made Ghana Africa's sixth largest producer when the oil started to flow in 2011. Through commercial oil production rather than through ICTs, Ghana reached middle income status ahead of schedule. The country's GNI more than doubled between 2000 and 2010 to US$40.55bn (World Bank 2011a), and FDI increased over the same period from US$166m to US$2.5bn. Despite this, however, nearly a third of the country still exists on less than $1.25 per day and inequality has risen substantially over the decade (Kenny and Sumner 2011).

Ghana's North-South divide is the main determinant in the distribution of wealth, opportunity and ICT access. Although in the South 2.5 million people rose out of poverty from 1992 to 2006, in the North the number of poor increased by nearly a million (World Bank 2011c). Economic growth over the last decade has not yet reached the North, large areas of which remain without electricity or paved roads. The country's Gini coefficient rose from 41 in 1998 to 43 in 2006 (World Bank 2011a), demonstrating an unequal distribution of income that is spatial as well as class-based. The failure of the new resource wealth to reach the North suggests that the aims of the ICT4D agenda – the digitisation of the public sector, private sector diversification, and creating pro-poor development – remain relevant and may become even more so, given that greater equality of economic opportunity is key to transforming the new oil wealth into more than a resource curse.

1.1.4 International mobility in relation to ICT diffusion

Given the barriers to acquiring technological resources and knowledge domestically as outlined in the previous section, it is challenging for small-scale entrepreneurs to become providers of connectivity without the financial and material advantages conferred by the public-sector system. This suggests that in order for private-sector provision to occur, entrepreneurs in particular must have developed strategies to deal with this scarcity and the obstacles to accessing resources. Overall, the factor linking public and private sector provision is access to resources from overseas. The entire system as visualised in Figure 1.1, both public and private, entails transfers from overseas: equipment, infrastructure, skills and knowledge all flow into Ghana from elsewhere. The lack of facilitation for this process in the private sector, however, suggests that individuals may be exercising significant agency in seeking out these resources. If so, we should look to human mobility for insights into how ICTs are brought into Ghana, and into the Ghanaian private sector specifically.

Various avenues in migration research have indicated ways in which this may be happening. Human movement has historically had a reciprocal interaction with trade and knowledge transfer (Anarfi et al. 2003; Raj 2010), and channels of mobility and communication are recognised as having a similarly reciprocal relationship with development (Skeldon 2008). These reciprocal relationships may be playing out in the field of ICTs as well, given that those who travel to industrialised countries for work or to visit family are likely to find themselves using forms of technology that are more advanced than those available at home. This use may then give rise to migrants either bringing new ICTs home with them, or to a greater readiness to use such technologies when they become available in their country of origin.

Migration has also been found to have an association with various activities that may prepare the ground for the availability of new technologies. It may do so financially, by financing investment and business formation on the local and sometimes the national level through remittances (Ketkar and Ratha 2001), and thus creating new firms that may need ICTs to conduct their business. It may also do so by stimulating the development of human capital through the transfer of knowledge and skills via education and work abroad (Williams 2007; Williams and Balasz 2008). This may lead to a greater propensity to understand and adopt new technologies on the part of migrants, and (as noted above) to their acting as demonstrators of new ICTs for those back home. Furthermore, migration is associated with cultural exchange and 'social remittances' (Levitt 1998) which can shape people's activities both in terms of leisure and entertainment, and in terms of civil society. In a population where migration is a frequent occurrence, as it is in Ghana, non-migrants may be involved in constant exchange with family members and friends who have travelled abroad, and may adopt new means of communication as a way to stay in touch, or as a way to share in the culture of destination countries.

Ghana's environment of scarcity for ICT entrepreneurs can be expected to emphasise the role of mobility. Research conducted in a range of countries including Mexico (Massey and Parrado 1998), the Philippines (Yang 2006), China (Zhongdong 2002) and Somaliland (Ahmed 2000) has found that mobility is an important factor in forming businesses because it enables entrepreneurs to gain access to goods, finance and resources from abroad. This can be expected to be especially true for businesses such as internet cafes, in a situation where access to almost all the necessary inputs is heavily restricted by location and financial constraints. Migration thus has implications for various types of development on the local and national level, for instance where new businesses are formed and engage with ICTs as a way of increasing efficiency and profits, or where human capital levels in the home country rise enabling people to earn more, improve their professional abilities or educate their children better. Time spent abroad may influence people's engagement as citizens in civil society, and may change their expectations of accountability and governance in the home country.

Ghana's level of international mobility has developed over recent decades from a principally intra-regional flow to an international one with Europe and the US as main destinations. The country has a long history as a regional centre of trade, and more recently international mobility beyond Africa has become important in building the private sector and in exchange of ideas and knowledge, with the US, the UK, Germany, Italy and Canada receiving among the most Ghanaian migrants (World Bank 2011b). Today the country has a migration rate of 6.59 per cent, well above the African and

world averages (IOM 2009). Ghana's real rate of mobility is much higher, but consists principally of internal movement. For example, Ackah and Medvedev (2010) find that 43 per cent of Ghanaian households have at least one migrant, but that 80 per cent of these are travelling within Ghana. Five hundred or more Ghanaian hometown associations exist worldwide (Orozco & Rouse 2007), and international remittances to Ghana have grown steadily over the last decade, from $400,000 in 2001 (allafrica.com) to $4.2bn in 2010 (Odoi-Larbi 2010).

These levels of mobility and remittances suggest that international migration is playing an increasingly important role in local and family livelihood strategies. This is likely to continue rather than decrease with the current oil boom, as Ghana grows wealthier in terms of per-capita income and more outward-looking in terms of global consumer culture (Adams and Page 2003; de Haas 2007). It is, in turn, likely that these migrants are experiencing ICT use in their countries of destination and that they are bringing back both knowledge of and demand for ICTs, and the internet in particular when they return to Ghana. Thus migration can be posited to be driving both the availability of internet technology and the demand for internet connectivity.

These potential connections between mobility, ICT diffusion and development form the central nexus of this thesis. The aim is primarily to examine and broaden the base of evidence and theory regarding mobility's relationship to the diffusion of ICTs, rather than the highly nuanced and diverse body of research on mobility and development more broadly. This research will explore the micro-level dynamics of diffusion and how they are influenced by international mobility, and will also situate them within the larger structural and policy context. It will thus look at how the public and private spheres interact, or fail to interact, and what lessons may be drawn for the system as a whole in terms of efficiency and equality of access. The next section lays out the research questions which lead from these ideas.

1.2 Research questions

The main research question of the project is whether international mobility is a significant catalyst for the diffusion of internet access and usership in Ghana. My hypothesis is that mobility is an important factor in increasing access to the internet because it helps people overcome the market and resource gaps necessary to provide local internet access. Through this process, international travel and connections make it more likely that the internet will become available in rural and remote locations, and thus lead to increased equality of access. International mobility is also hypothesised to be important for the higher-value-added IT businesses which contribute to

expanding opportunities within Ghana's IT sector overall. Within these parameters, the thesis aims to answer three sub-questions, as listed here.

> Sub-Question 1: What is the importance of international mobility for the formation and viability of commercial internet cafes?

My hypothesis is that international mobility and transnational connections are important factors in the formation and viability of internet cafes. (Viability is defined here as the ability to break even on a monthly basis during the year in which data collection for this research was conducted.) Mobility facilitates entry to the sector, leading to increased opportunities for access and usership among remote and marginalised populations. The mechanism envisaged for this change is that these international connections open up new business opportunities, facilitate flows of information and goods, and stimulate international and local knowledge transfer.

> Sub-Question 2: How does international mobility influence Ghana's IT sector as a whole?

My hypothesis here is that although international contacts and movement are a feature of the IT industry worldwide, for developing countries such as Ghana there are two particular features of productive mobility in the IT context. First, that mobility can create opportunity for those with lower social status, less business experience and/or fewer resources. Second, that temporary migration and informal work often provide these advantages, as much as long-term migration and formal study or training. Thus international mobility may have the potential to extend the benefits of entry into the IT sector beyond the highly skilled and educated who have the resources and skills to be early adopters of internet technology.

> Sub-Question 3: Does the private sector's contribution to diffusion have implications for Ghana's ICT policy strategy, and how can understanding that contribution make this strategy more effective?

This question addresses the governance aspects of internet diffusion in Ghana, and the extent to which policy is facilitating or forming a barrier to ICT-led development. My hypothesis is that better understanding the roles of all the different actors in diffusion may lead to gains in efficiency and inclusiveness in extending ICT diffusion to poor and remote populations.

1.3 Conclusion

This chapter has laid out the goals of the research, which are to analyse technology diffusion in Ghana with specific attention to the ways in which it may be influenced by international mobility. There are some gaps in the literature around diffusion and mobility which this thesis aims to fill: first, there is little research available on the micro-level or informal dynamics of internet diffusion, second, processes of adoption among those in poor and remote areas have not yet been well explained, and third, it is not known to what extent human mobility influences both of these processes. The chapter has provided an overview of the research problem, showing that while there is wide agreement as to ICTs' importance for developing countries, our understanding of how the internet fits into this picture is still developing and more research on this is needed. The private sector is here identified as an important provider of connectivity and access, yet most of the research on how the internet reaches poor or remote areas focuses on public sector provision and leaves out the private sector almost entirely.

The barriers to the adoption and use of internet technology in Ghana have been reviewed, including infrastructure, human capacity and financial barriers to do with import taxes, financial infrastructure and access to credit. International mobility is put forward as a way to get around these obstacles by raising the level of human capital and facilitating international transfers of knowledge and goods which may fill these market and resource gaps. Individual mobility is also worth studying in the context of technology diffusion because it occurs on the micro-level and informally, and has therefore been under-researched in the context of a diffusion literature that focuses largely on firms and formal transfers.

This research will explore three spheres of provision in which mobility is hypothesised to be important. First internet cafes, where entrepreneurs must gather the resources and equipment necessary to provide internet connectivity to local consumers. Next, the wider business context in Ghana's IT sector, where higher-value added businesses complement the work of internet cafes in extending access and usership. Finally, the research looks at how policy processes visualise and implement internet provision, and asks how insights regarding mobility and micro-level processes of diffusion may be useful on this level. This research strategy assumes that individual agency on the local level has important insights to contribute to the successful operationalisation of national-level policy, and that the dialogue between the two can be facilitated by better evidence. It also assumes that this evidence should be spatially and socioeconomically specific, taking into account sub-national digital divides and local-level dynamics.

1.4 Thesis outline

To outline the rest of the thesis: the second chapter lays out the conceptual framework for the research, combining a review of the literature on the key issues covered with a discussion of how the issues relate to each other, and the possible practical and theoretical areas where which the outcomes of the research may be useful. Chapter 3 explains the methodological choices made. These involve a multi-method strategy with multi-level data-collection that aims to address Ghana's economic, social and spatial diversity. They also take into account a range of mobilities, and the practical ways in which these mobilities may be playing out in the groups studied, and may therefore be captured. The methodology is based on a triangulation strategy and designed to allow cross-category comparison.

Chapter 4 is the first empirical chapter of the thesis and focuses on small and micro-businesses in the IT sector. Addressing the first of the research sub-questions, this chapter deals with a study of internet cafe enterprises in the North of Ghana, with a subgroup in Accra, and looks at the ways in which entrepreneurs are using mobility to form and sustain their businesses. It analyses the relative importance of different forms of mobility and other, non-mobility-related factors in successful entrepreneurship, using Qualitative Comparative Analysis (QCA) to look at how these mobility-related and non-mobility-related factors operate in different combinations to produce particular types of enterprise formation and viability. Chapter 5, the second empirical chapter, addresses the second of the sub-questions by taking a social network perspective on the group studied in Chapter 4, adding in another group of IT managers in Accra. Moving from the enterprise-level perspective of the previous chapter to the individual level, it goes into greater detail on the structures and practices that increase individuals' relative opportunity in the sector and enable them to participate in higher value-added businesses. It focuses particularly on the opportunity structures which constrain or facilitate individuals' entry into, and advances within, the IT sector, and how these structures are influenced by different forms of international mobility and networking.

Chapter 6, the final empirical chapter, aims to answer the third of the research sub-questions. It relates the enterprise-level and individual-level perspectives to the national policy landscape, looking at how these local-level mechanisms and outcomes are, or are not, taken into consideration in the country's ICT4D strategy. Looking at this national strategy's achievements and failures so far, it asks to what extent this local level is lacking from the national ICT4D vision, what may be behind this lack of consideration, and what potential these private-sector, local-level dynamics may have for remedying current problems with ICT diffusion in Ghana. Chapter 7 concludes, drawing

out the broader lessons from this research on the policy and theoretical levels, and discussing the extent to which these conclusions may be applicable elsewhere in Africa.

2 Perspectives on technology diffusion: adoption, access and implications

2.1 Introduction

Chapter 1 has established that the central question of this thesis is about the role of mobility in the diffusion of internet technologies in Ghana. Despite several decades of research, much remains unpredictable about the effects of ICT diffusion in poor regions. Aside from gains in communication capacity and efficiency, which are some of the simplest functions of the technology, much will depend on who gets access, what degree of access they get, and how their skill-base develops to use the new technology in innovative ways. So far, the evidence base for the development impacts of the internet in the poorest regions is largely anecdotal, and leaves important theoretical gaps on both diffusion and its influence on development. There is thus an open question as to how the technology takes root in these new areas, and how different uses may develop among the general populations of developing countries.

In the case of the internet, low levels of penetration in Sub-Saharan Africa demonstrate that there are still high barriers to usership and adoption there. Although these barriers have been clearly documented (e.g. Gillwald and Stork 2007), including infrastructure, education and overall poverty, they are complex and socially embedded, and research has not yet set out a clear and actionable agenda for lowering them. This thesis takes an alternate view of diffusion as occurring on the micro level, and argues that facilitating it involves deepening our understanding of the specific ways in which technologies are translated from place to place and from user to user. The current low rates of penetration and the repeated failure of international interventions to diffuse ICTs in the poorest regions (Heeks 2009) suggest that theories of diffusion may not apply uniformly worldwide, but may need to be adapted to take into account specific obstacles in specific conditions. It is therefore necessary to look at the components of these theories in the light of regional dynamics and challenges, and to explore which processes are most effective in particular locations.

This chapter explores various bodies of literature that offer insights into this process. First it will review the theories regarding technology diffusion and consider their limits with regard to developing countries and to poor and remote areas in particular. Second, it considers the research on the effects of ICTs in poor and remote areas and their implications for economic and human development there, noting the areas of research where contributions might be made by studying processes of diffusion. Next, international mobility is put forward as a factor that may help explain micro-level diffusion. Theories on the processes and impacts of human mobility are addressed, with

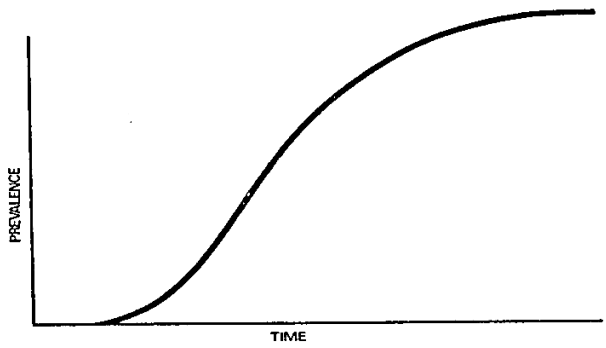
particular attention to social networks as conduits for flows of knowledge and resources. Finally, possible linkages between these theories of diffusion and mobility are discussed, along with how one may build on them.

2.2 The diffusion of technological innovation in developing-country environments

The diffusion of innovations has been studied on different levels: micro, meso and macro. Classic theories concerned with the general dynamics of the diffusion of innovations, such as those of Tarde (1903) and Hagerstrand (1967), involve models based on social networks, and predominantly adopt a micro-level perspective. These approaches share a starting point in the classic 'S-curve' model proposed by Tarde (1903: 127, Figure 2.1), where innovations spread outward in a concentric pattern through networks of interconnected individuals, groups and nations who copy each other in a semi-conscious way. According to Tarde, this begins with the interaction of elites and proceeds outward in concentric circles through society until it encounters environmental or cultural barriers, including the onset of a competing invention. This model was further developed by Sorokin (1941), who posited that certain individuals, especially those who travel, are more important in spreading innovations than others, and that diffusing technologies transform as they move back and forth between core and periphery areas.

Figure 2.1 Tarde's S-Curve model for the diffusion of innovations

FIGURE 1



The S-curve of adoption of an innovation

Source: Tarde, 1903

More recent models have sought to specify how this works empirically, again taking a micro-level perspective. These models are underpinned by a social systems approach (Rogers 1983) where adoption is a socially mediated process involving norms, influence and networks. They also have a value perspective (e.g. Gurbaxani 1990), where as people adopt, the value of adoption grows since the technology becomes more important as more people use it – a phenomenon known as a 'network consumption externality'. These have led to a conceptualisation of diffusion as consisting of several central components (Rogers and Scott 1997): 'relative advantage', where an innovation is perceived as better than previous ones; an innovation's compatibility with existing values and needs; its degree of perceived complexity; 'trialability', or openness to limited experimentation, and 'observability', or the degree to which the results of adoption are visible to potential other adopters. Metcalfe adds a caveat that there are also barriers to diffusion relating to uncertainty regarding the value of adopting, and also to production capacity (1982:11-12). Together, these models add up to an account of diffusion as both an economic and social process whose rate is determined by adopters' developing understanding of the technology and by the ability of producers to provide access to it.

This 'technology acceptance' approach, as originally developed by Rogers (1962), has evolved into two aspects: first, the way in which a technology spreads from early adopters to the more cautious as its utility is demonstrated, and finally to the majority of people as it becomes indispensable. Second, the technology's perceived ease of adoption and use (Davis et al. 1989), which is argued to influence the initial rate of uptake. An alternate perspective on adoption is offered by Fishbein and Ajzen (1975) in their theory of reasoned action, where rather than a direct relationship involving the individual and their perceptions of a technology, individual attitudes and beliefs and social norms all intersect to contribute to the way individuals decide to act. Each of these theories, as discussed in the following section, is less useful to this research than the less-developed theory on adoption capacity itself, since adoption decisions do not come into play if the technology is not available in the first place, or if it is not provided inclusively so that people have access to it.

In contrast, macro-level theories of international technology diffusion (e.g. Findlay 1978) deal predominantly with formal transfers organised by firms and governments. These models focus on international exchanges around R&D (research and development), whereby scientists and businesses adopt and adapt advanced technologies (e.g. Xu 2000, Glass and Saggi 2002, Park et al. 2007). This perspective is based on the idea of technology diffusion as a negotiation between governments and multinational enterprises occurring on the international level. It visualises developing countries as competing to attract branches of multinationals that will then automatically

result in technology transfers. The specifics of those transfers, however, are less the focus of these models than the overall processes.

For a study of developing-country technology diffusion, micro-models arguably have more to offer than macro-theories. This is because studies have shown that the kind of technology transfers visualised by the latter tend not to take hold in developing countries (Xu 2000), largely because of a lack of human capital, and that these countries thus constitute a different environment for diffusion which must be studied differently. Research on dissemination in developing countries has mainly taken a micro-perspective, and within that has focused on adoption, or 'absorptive', capacity, since increasing this is the key to moving from earlier to later stages of technological development. However, many of those studies have tended to focus on technological 'catch-up' countries such as South Africa and Malaysia rather than lower-income countries such as Ghana where obstacles to adoption are much higher (e.g. Soete 1985, Steinmuller 2000, Criscuolo and Narula 2008).

Those studies which do focus on ICT adoption in developing countries tend to look at publicly funded telecentre projects, often in Latin America. Prado et al. (2011) studying telecentres in Brazil finds that important factors in adoption are education, youth and a desire to improve professsional skills. Parkinson & Lauzon (2008) studying telecentres in Colombia find that adoption usually occurs at school, suggesting that location is an important factor in access. Heeks and León Kanashiro (2009), studying Peruvian telecentres, find that nonadopters are those with poor language skills in the dominant language, older community members, those with lower self-efficacy and those who had tried and failed to find information they needed. They, too, acknowledge that distance is a factor: 'non-adopters' are frequently those who live in the remotest areas, and might therefore be termed those without access, rather than those who have chosen not to use the technology – an important difference which this study takes especially into account. In India Rangaswamy's study of telecentres in comparison with commercial internet cafes (2008) suggests that simple access is the most important factor in people's adoption of the technology. All these studies, however, tend to skip over the factors leading up to the provision of access, since they focus on telecentres where equipment and connectivity are provided through public-sector intervention – leading to the question addressed by this study: where public sector provision is too minimal or is failing, what is the alternative, and how does it function?

Thus although the literature on diffusion offers a basic framework for approaching a study of such processes in Ghana, it has some drawbacks. First, studies of diffusion mainly deal with formal contexts and processes, either within firms or other large institutions. In contrast, the smaller scale

and lower level of development of Ghana's private sector means that the processes studied in this research will be far more informal: international activities involving knowledge transfer are much less likely to happen under the auspices of firms, and more likely to happen on the initiative of individuals. Furthermore, there is difficulty in applying much of the diffusion literature to Ghana because it is based almost exclusively on high-income countries and a specific set of middle-income 'catch-up' countries which are mainly Asian 'tiger' economies (Malaysia, Singapore etc). South Africa is an emerging focus for research on diffusion and technology transfer, but as this is the world's 27th largest economy (World Bank 2011) its context has little in common with Ghana's. Therefore although it is possible to use these frameworks as a starting point for this research, Ghana's lower-income setting and largely informal private sector mean that this research must bridge some theoretical gaps.

2.2.1 Adoption capacity in developing countries

Adoption capacity (or absorptive capacity in some of the literature) is marked out as a key issue in technology dissemination in poorer countries. Similarly to diffusion overall, researchers have predominantly studied this process within firms (Soete 1985; Cohen and Levinthal 1990, Steinmuller 2001). In this literature, the ability to adopt new technology is determined by prior knowledge of that technology and management support for adopting it (Zahra and George 2002). Horowitz (2010) calls this support 'organisational capacity' and contends that it is central to making a new technology generally available. On the individual level, Park et al. (2007) define adoption capacity as the ability to understand a technology, to assimilate it and to exploit it, claiming that a pre-existing base of skill and knowledge is necessary to develop relevant uses for it. This question of adoption is central to the main research question of this study regarding how the processes of diffusion and access to technology operate, since adoption constitutes the basis for diffusion.

These established perspectives on adoption capacity raise questions as to how such capacity can be built in developing countries where a base of technological understanding may be lacking – as is the case in many of the areas that are the focus of this research. It is important to address these questions, since adoption is key to realising any benefits from new technologies. Mowery and Oxley (1995) identify acquiring and using 'tacit knowledge' (i.e. knowledge as understanding rather than merely information) as central to adoption capacity, a type of knowledge which Park et al. (ibid) show that social networks of peers and professional associates are important in transmitting. In terms of this study, this translates into a transnational social network perspective, since both the new technologies and the knowledge necessary to adopt them have, by definition, been developed elsewhere.

The literature on how this process may occur in developing countries is thin, because most studies focus on areas where a prior base of technological knowledge exists. In very poor or remote regions, early adopters also need to overcome infrastructural, financial, linguistic, cultural and geographic constraints. These constraints suggest approaching adoption as a form of invention and reconfiguration, both of a technology and of the knowledge necessary to use it. There is a basis for this in the innovation literature, which suggests that adoption capacity itself can be a form of innovation, and can be addressed using similar methods of inquiry. Freeman (1994) argued that dissemination was more important than innovation because the processes involved themselves constituted innovation, In this he followed Rosenberg, who argued that 'there is no reason to believe that the optimal path in the development of a new technology is the same as the optimal path for transferring and adapting that technology, once it has been developed' (1970:551). More recently, Jensen et al. (2007) introduced the notion of 'DUI' (doing–using–interacting) as a mode of innovation separate from R&D processes, and Lorentzen (2009) similarly claimed that the diffusion of technologies into new areas constitutes a process allied to that of innovation. Taking this further, other researchers such as Ray and Kuriyan (2011) and Edgerton (2006) have claimed that for the poorest countries, the repurposing of technologies may be more important than entirely new innovation. One researcher who offers an indication of how adoption capacity may be built in the poorest regions is Raj (2010), who explores technology transmission in a historical context and shows how transnational connections are important in reconfiguring technology for use in new places. His work provides a useful starting point for this study, but considers these connections mainly in formal contexts (such as collaboration between British and overseas functionaries in the British Empire) and thus leaves unaddressed the question of informal contexts and usership among the general public.

Despite this increasing flexibility of perspective among researchers, Avgerou (2010) still contends that we have so far addressed technology adoption in developing countries with a fairly narrow set of assumptions. She distinguishes two prevailing perspectives: a universalist viewpoint that is interested in generalisable dynamics of 'transfer and diffusion' and a socially situated viewpoint that prioritises the social embeddedness of technologies and which sees usage as entirely dependent on local culture. Arguing that these approaches are too limited, she identifies a third path for research which transcends what she calls 'the ICT/culture fit or conflict' by looking at 'the mutual re-constitution of IS [information systems] innovation and the cultures that influence it'. According to these ideas, a study might address technology adoption as a dialectical and evolving relationship

between local people and the technologies they adopt, which includes flexibility on the part of both people and technologies.

As Avgerou points out, this approach has something in common with the Actor-Network perspective (Law 1992, Latour 2005), a way of looking at interactions in the modern world which asks how they are configured and mediated by people, technology and objects. Research conducted from the actor-network perspective sees interactions as networks formed around particular activities and asks how these groupings are configured, and how power circulates within them. Taking on the fundamental assumptions of this actor-network (AN) perspective – specifically the neutrality and heterogeneity of interactions – implies a willingness to be agnostic about how processes such as technology diffusion into new areas may work, and about what their outcomes may be. The study of ICTs' role in developing countries is characterised by strong viewpoints which are often dominated by policy positions and investments (Mansell 2010), but by relatively thin empirical literature on how the role of ICTs is actually configured and the means by which it plays out. For this reason Heeks and Stanforth (2007) have advocated the use of ANT in studying the processes involved in the adoption of new information systems in developing countries. They argue that this is a useful starting point for a study of technology adoption because it reminds the researcher that the process is actively configured through the interactions of people, technology and places, and that the possible uses of the technology may be shaped according to who, when and where the users are.

This study thus focuses on a question which constitutes a gap in the adoption literature: how significant differences in technological understanding and resources can be bridged in order to allow technology to diffuse to extremely poor locations. Current research does not have a clear explanation for how technology adoption can occur in new areas with very few resources in terms of knowledge and existing technological expertise, nor is it clear how such an explanation would fit within the picture of the larger processes of diffusion already outlined by researchers. As such, this study aims to gain insights from the middle way identified by Avgerou, starting from the idea that dissemination is itself a form of innovation and that it constitutes a reciprocal process of evolution between people, place and technology. It will also take on some of the assumptions of the actor-network perspective, visualising technology adoption as a networked process where each interaction between adopters, technology and their surroundings represents a new configuration for analysis.

2.2.2 Market gaps and ICT access

Along with adoption capacity, a second important barrier to technology diffusion in developing countries is availability of the technology. This issue relates to the first research sub-question

regarding how mobility may facilitate entry to the ICT sector by allowing flows of information and goods which are lacking in developing-country ICT markets. This is a particularly important issue in a developing-country context because in these places, unlike industrialised countries, this barrier does not merely relate to people's ability to buy the technology or businesses' ability to provide it to their workers. Instead it relates to a more fundamental scarcity of its components, in this case computer hardware, software and internet connectivity. A market for these components does exist in Ghana, but is limited by high prices which are unaffordable for most consumers. The International Telecommunications Union (ITU 2011c: 1.3.3) analyses this type of problem with provision in developing countries, categorising the issues into two distinct types of gap. The first is a market efficiency gap between the service that would be achieved by an efficient market and what is actually achieved given current economic and regulatory barriers. The second is what they term a 'true access gap', where diffusion of ICTs is beyond commercial viability even when the market efficiency gap has been solved, and government subsidies have been added. Mariscal (2009) demonstrates that these true access gaps in developing country ICT provision have usually been solved by wholesale intervention by government in collaboration with outside authorities such as donors, in order to provide a parallel publicly-funded and run system.

2.3 Links between ICTs and development

It is important to understand how ICTs diffuse to new regions because the extent of their diffusion determines the impact of their use. This section therefore looks at what is known about the impacts of new ICTs on developing countries. The literature on ICTs' role in development has progressed from seeing the technology as a source of efficiency in development agencies to reconceptualising it as an instrument of development in itself (Heeks 2010). Two different approaches have been taken to the question of how ICTs impact on developing countries: ICTs *as development*, i.e. their contributions as an economic sector and to productivity in other sectors; and ICTs' *contribution to development* more generally, including – but not limited to – increases in productivity and growth. This research addresses both of these viewpoints, since it studies the processes involved in building various elements of the ICT sector (internet cafes and IT firms) but also aims to understand the influence of this sector on development more broadly. For this thesis both perspectives are equally important. The following sections therefore review both the literature on ICTs' influence on economic development and their potential for developing human capital and capabilities in general.

2.3.1 ICTs as an instrument of economic development

Just as with the literature on diffusion, much of the existing evidence focuses on more technologically and economically advantaged environments than those of West Africa. For these

more advantaged environments, two models have been conceptualised (Mansell 2010): first, an exogenous model which originates in the work of neoclassical economists such as Solow (1956, 1957), and sees technology as a modernising force that introduces new uses for capital and labour. Second, the endogenous model (e.g. Arrow, 1962, Romer, 1990, Rosenberg, 1982) which focuses on the growth effects of national-level innovation, facilitated by subsidies for research and development and investment in education. This endogenous model has given rise to the notion of 'leapfrogging' as a strategy for poor countries to use technological innovation to bypass certain stages of industrial development (Soete, 1985; Steinmuller, 2001), something Ghana has proposed in its ICT-for-development policy (GoG 2002).

Despite this theory that developing countries can use ICTs as a shortcut to economic success, there is mixed evidence regarding these technologies' relationship to growth. Although Qiang et al. (2009) find that ICT penetration indicators are positively and significantly associated with GDP growth their model does not include poor countries, and moreover the authors acknowledge a potential endogeneity problem where the impact of rising per capita GDP might be creating increased demand for telecommunications rather than the other way around.[2] Moreover, these researchers point out that the classical growth model may fail at estimating the growth effects of ICTs in developing countries due to a lack of good data, our current inability to disaggregate the benefits of ICTs from the applications and practices they give rise to, and a bias in data collection due to the fact that many reports and studies have been commissioned by institutions with an interest in ICTs' economic success. Pro-poor growth related to ICTs is even harder to demonstrate, although evidence is beginning to accumulate. The OECD (2005) notes that while there is evidence of a link between ICTs and economic growth overall, there is 'little convincing evidence on the links to pro-poor growth'. Some research in Africa (Donner 2007; Hughes & Lonie 2007) has found economic benefits from ICT use specifically among micro and small enterprises (MSMEs), but these are not representative studies. Torero and Von Braun (2006) find that the growth effects associated with ICT's in poor countries are only seen in the presence of strong infrastructural support (such as reliable connectivity and electricity supply), which is currently lacking in Ghana.

[2] A test for this form of endogeneity was performed, instrumented with telecoms penetration in 1980, the baseline year for the model. However the forms of ICT that are potentially most important to growth in poor countries – mobile phones and the internet – were not in commercial existence in 1980, while those that were – fixed telephone lines – are not an appropriate proxy for internet or mobile access in terms of cost. Therefore this test, and thus the endogeneity and validity of the model are, at the very least, open to contestation.

It is important to note that much of the evidence regarding ICTs' influence on pro-poor growth in particular comes from studies of mobile phones. Theory suggests that mobile phones reduce information disparities and allow small-scale farmers and fishermen to access markets at a fairer price (Aker, 2010) and to reduce information search costs (de Silva and Ratnadiwakara, 2009). Frempong (2009), focusing on Ghanaian rural and peri-urban small businesses, finds that mobile phones increase ease of contact with customers and suppliers and reduce the cost of transportation and profitability. The success of the MPesa platform in Kenya, which allows financial transactions through mobile phone accounts, is also cited as evidence that ICTs can have pro-poor economic effects in Africa (Jack and Suri 2009).

There is much less evidence on the subject of this study, the internet. This is mainly because the technology is only now beginning to achieve meaningful penetration in most of Africa, including Ghana. The most recent figures show that internet penetration rates in Sub-Saharan Africa are still extremely low, at 10 users per 100 population, compared to 20 per 100 in the Middle East/North Africa region (World Bank 2011a). However the literature on mobile phones suggests that the internet's benefits, once they become available, may be exponentially greater. All the platforms that have made mobile phones an important tool for the poor (e.g. M-Pesa, or Esoko, a mobile-based agriculture information system in Ghana), have been developed using computer-based internet access and programming, so that as Frempong (ibid) notes, innovative platforms for mobile technology which might serve either businesses or the poor can only be developed using computers rather than phones themselves. Thus if Africans are to develop ownership of such platforms and continue their evolution computers and broadband internet are essential. This indicates that in order to study the next steps in ICT-based development, the internet must become a focus of research rather than mobile phones.

2.3.2 Contributions to human development

Beyond the economic aspects of ICT-based development, there is reason to believe that the internet may impact as much, or more, on human development as on economic growth and productivity. Numerous studies have looked at the empowerment effects of ICT use on women (e.g. Khan and Ghadially 2010, Bure 2006 and Macueve et al. 2009), and at its potential to aid the development of civil society (Kleine and Unwin 2009) by making possible more democratic forms of interaction and knowledge production via open-source software, and by enabling a freer media environment. Researchers (e.g. Liang 2009, Kleine 2010) are increasingly taking a broader perspective on the internet's potential for human development, influenced by Sen's capability approach (1980, 1993). This approach aims to measure the extent to which an individual can realise their potential, and in

order to do so looks at what Sen terms functionings, which are the components of capabilities. For instance, in order to have the capability to live to old age, people need the functionings of having enough to eat and having adequate healthcare.

The capabilities perspective has recently begun to be expanded to include the internet as a necessary evolution of the essential freedoms identified in its original conception (Sen 2005). Nussbaum (2003) has formed a list of functionings which includes several which could concern the internet as an instrument of personal and imaginative freedom: the ability to use one's imagination, to seek out experience and to be able to conceptualise what is good, and for people to have 'the chance to figure out what culture and form of life they actually want'. Although Nussbaum does not conceptualise these specifically in relation to ICTs, it is easy to link them to ICT access. For instance, Liang's research (2009) shows that internet access may play an important role in offering the poor a new intellectual space and thus positively influencing their aspirations and their subjective perceptions of their freedom to achieve change.

Kleine (2010) operationalises the capabilities approach in the field of ICT research by adding the idea of opportunity frameworks which form the environment in which people's agency and resources can or cannot lead to functionings. These frameworks can be brought together with Vertovec's notion of 'opportunity structures' (Vertovec 2010), explored in his work on transnational social structures, which determine an individual's chances of personal, intellectual and social progress. Kleine researches how the internet in particular affects these opportunity structures, using the idea of a 'resource portfolio', which includes 'informational assets' and 'cultural resources', both of which may be accessed through internet use. Kleine suggests that the role of ICTs in promoting freedom and human development is to be defined by users, and terms ICT use 'one of multiple possible entry points into complex and systemic development processes'. Similarly Mansell (2010) uses the idea of emerging value to describe the internet's contribution to development, noting that people may define its uses iteratively and subjectively.

All these processes of human development require equality of access to technology. Researchers such as Mansell (2010) and Heeks (2010) caution that ICTs are not a shortcut to development or democratisation since other changes must take place for them to become useful tools. Many studies fall into the trap of what these researchers term 'techno-progressivism': assuming that ICTs are an end in themselves, and that general access automatically follows their introduction to a new region. For this reason this study will address the spatial aspect of diffusion, which was fundamental to early diffusion research (Hagerstrand 1967) but has not been used enough in thinking about how

technology diffusion may lead to more equal development instead of reinforcing existing inequities (Gillwald & Stork 2007).

These two sections have looked at the body of theory regarding ICTs' contributions to economic and human development. It is found to be fairly well developed, but with drawbacks in terms of reliable evidence about smaller firms and the poorest countries. It has also focused more on mobile phones than the internet as a source of development potential. Several of the foci of the literature apply to Ghana: the country is pursuing a 'leapfrogging' economic policy with regard to ICTs, and has a growing ICT sector. However the drawbacks referred to by the literature also apply: Ghana has high levels of poverty, unreliable infrastructure and a largely informal private sector, all of which can be expected to make it harder to evaluate the potential contributions of ICTs as a sector. The human development effects of ICTs may be easier to evaluate in this research, since these are theorised to be observable anywhere the technology is used. This study therefore aims to use the literature on economic impacts to guide the assumptions about where ICTs' effects may be seen, and the literature on functionings and opportunity structures in particular as a framework for the analysis of ICTs' contribution to human development.

2.4 International mobility and its relationship to technology diffusion

In countries with little access to technology and technological knowledge, these must arrive from elsewhere through processes of international transmission. The first two research questions of this project are focused on understanding this process of international transmission, in that they ask how information and goods flow into developing countries from overseas, and how individuals use these flows to gain a foothold in the IT sector. Existing research does not tell a clear story on how such transfers from overseas may operate, particularly at the micro-level. Criscuolo and Narula (2008: 63) chart two phases in the development of absorptive capacity in 'catch-up' countries, each involving international interactions. In the first, knowledge enters from abroad through formal transfers; in the second it is acquired 'largely through independent knowledge creation and actively accessing foreign-located technological spillovers'. However, this research focuses on applying the lessons of the meso-level (firms) to the macro-level (countries), and does not address how this process may play out on the micro-level. Nevertheless, Criscuolo and Narula's findings inform one of the main arguments of this study: that although international organisations and firms can begin the process of technology diffusion, for it to continue and take root, a different form of agency must become involved and technology must be 'actively accessed' from abroad – something which, if translated to the micro-level, would point to human mobility as an important factor in diffusion. This is a new branch of enquiry, however, since the research on absorptive capacity in developing

countries, as outlined in section 2.2.1 above, does not directly address the role of individual agency in building that capacity, or how this process operates.

There are several routes by which mobility has been linked to processes of economic and human development, all of which relate to Criscuolo and Narula's idea of agency and accessing resources located abroad. These can be broadly categorised into several bodies of theory. First, migration's impacts on business formation, both through remittances and through investment after return from abroad; second, transnational commercial activities where entrepreneurs use their contacts in the country of origin as a competitive advantage in their destination country, as in the case of ethnic entrepreneurship (Portes 1995); and lastly international processes involving transfers of knowledge and skills, where migrants bring home learning gained from working or living abroad which may then circulate within their home country.

The economic impacts of migration on origin countries have been primarily studied through the lens of remittances, with research demonstrating that these can lead to business formation and investment in productive assets (Ketkar and Ratha 2001, Ammassari and Black 2001). Kugler and Rapoport (2005) show that migration plays a role in attracting capital from abroad by making information available about investment opportunities in the country of origin. There is also some research focusing on the effects of migration on innovation: Herstad et al. (2008) find that international linkages within the value chain are associated with superior innovation performance.

This study is particularly interested in migration's benefits for business, given that firms are identified by the diffusion literature as an important site of adoption and knowledge transmission. Research on migration and business frequently focus on transnational and circular mobility, where migrants move to and fro using networks that also provide economic advantages (e.g. Gardner 1995, Massey and Parrado 1998, Gardner and Ahmed 2006). Portes (1995, 2001), in particular, highlights the importance of transnational entrepreneurship between Latin America and the US and the economic opportunities generated by ethnically based networks, as do Saxenian and Hsu (2001), who find that the transnational 'astronaut' migrants who work in R&D in both Silicon Valley and Taiwan owe their success principally to their freedom to remain mobile. Black and Castaldo's study of migrant entrepreneurship in Africa (2007) similarly suggests that the way migrant investments influence development may be linked to integration in the receiving country and the networks built there.

Many of these economic benefits can be linked to migration's facilitation of international knowledge transfer. Central to theories on knowledge transfer is the work of Polanyi (1967) who

distinguishes two different levels of knowledge, the proximal (particular) and the distal (comprehensive). Both these types of knowledge are conceptualised by Polanyi as having both 'tacit' and 'explicit' elements. While explicit knowledge can be taught, and therefore presumably conveyed by online as well as in-person contact, tacit knowledge is built up through contact and practice and therefore requires co-presence. Blackler (2002) develops this theory further to distinguish between 'embodied', 'embrained', 'encultured' and 'embedded' knowledge. He posits that the first two types can be gained by being in the presence of the teacher or practicant, or by reading, but that the last two are 'grounded in shared understandings... and are socially situated'. This view implies that some knowledge and skills cannot be learned without cultural embedding, i.e. personal experience of the culture in which the knowledge was generated.

Williams (2007) expands this theory to explicitly include the notion of migration, positing that this knowledge acquisition can occur at the edges of productive activity, and that no matter what activities migrants pursue in a destination country, there is the potential for knowledge transfer. Andersen and Lorenzen (2007), similarly looking at the international aspects of knowledge transfer, find that 'tacit knowledge is considered best exchanged through relations of close proximity and thus the transfer is assumed to be sensitive to geographical distance'. One example of this process is found by Ammassari (2003) in her study of Ghana and Cote d'Ivoire, where she identifies return migrants as having acquired increased human capital in terms of increased technical and management expertise, communication skills, and new working practices learned abroad – all of which might be assumed to be 'encultured' and 'embedded', according to Blackler's classification.

These ideas are relevant to this study because they raise the question of how knowledge may be transmitted internationally, and what kinds of co-presence are necessary for learning technological skills and knowledge. There is little research so far that explores the question of whether virtual contact can act as 'close proximity', or at the quality of contact necessary for knowledge transfers to occur. To ask these questions, it becomes necessary to look at the literature on social networks, since this provides much of the empirical evidence on the mechanisms for knowledge transfers. Research on how networks operate as transnational social fields (Kyle 1999, Landolt 2001, Koehn and Rosenau 2002, Portes et al. 2002) and studies relating to knowledge transfer such as those of Greif (1989), Kloosterman et al. (1999) and Vertovec (2003) are particularly helpful in thinking about configurations which may lead to the transmission of technology, and the skills and understanding needed to adopt it, to new places.

This research on the networked transmission of knowledge once again raises the question of co-presence, since most assume that networks involve person-to-person contact. This is an important issue for this research because for individuals in developing countries looking to learn new technological knowledge and skills, it can be expected that transnational networking activities, though begun in person, may be sustained through virtual contact. This brings into question the meaning of co-presence now that virtual communication is frequently the dominant form of international contact, and in turn raises the question as to whether such online interactions are sources of technological learning. This aspect is addressed by some of the more recent studies on learning such as that of Andersen and Lorenzen (2007), which looks at remote modes of learning involving virtual contact, or from virtual records such as video. However this work still addresses transfers between individuals with a similar educational base and level of technological understanding. One question for this study to address is whether these dynamics pertain in a less equal context, where knowledge moves between places with more and less technological understanding and resources. As noted in Section 1.2, the research questions for this study posit that these processes of transmission occur via social networks. The next section explores how social networks in the context of the international transmission of knowledge may be observed and analysed.

2.4.1 Social networks and transnational knowledge transmission

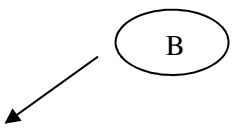
The preceding sections on diffusion theory, adoption capacity and mobility have all highlighted the importance of social network theories to understanding how technological resources, understanding and knowledge are transmitted to new places. Social network analysis uses various analytical tools focusing on network structure and configuration to understand how these processes of transmission may operate, and the incentives and currency that facilitate networked forms of exchange. This section reviews some of the key concepts involved in studies of social networks as transmitters of knowledge and resources and outlines how they may be useful to this research.

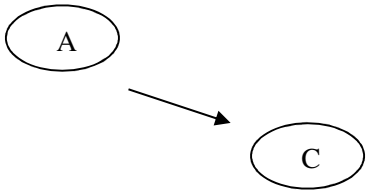
Perhaps the most useful question coming out of the literature on knowledge transfer through social networks is about the relative importance of the positioning and configuration of one's contacts (network structure) versus one's degree of embeddedness (the depth of one's relationship with those contacts). Some researchers focus mainly on the importance of network structure in facilitating flows of knowledge (e.g. Ingram and Roberts 2000, Tsai 2001), while others privilege the type of relationships within the network (e.g. Uzzi 1999, Hansen 1999). Reagans and McEvily (2003) look for potential overlaps between these two approaches, and find that for the transfer of tacit knowledge in particular, both structural diversity (i.e. links to various different circuits of

knowledge) and relational embeddedness (strong ties involving friendship) are important and complementary.

Based on this body of research, this study considers both the type of relationships involved in networks and their overall structure. The first of these is addressed in terms of *relational embeddedness*, which denotes the depth and background of the ties in a network, i.e. how well the person knows their connections. In terms of this study, the closeness of one's relationships with others may be important in gaining the technical support necessary to adopting and reconfigure new technologies. Second, this study uses the notion of *structural embeddedness*, which describes the configurations of contacts in a given network. An individual who is highly structurally embedded has a dense network in which many connections know each other. This kind of network gives rise to a high level of trust based on reputation, and a high likelihood that the individual will be able to access the resources circulating within the network (Borgatti & Foster 2003).

A concept related to structural embeddedness, *closure* provides an individual-level measure of the density of a network, which in turn according to network theorists (e.g. Lin 2001, Burt 2005) is an important factor in determining the amount of social capital one can access. Thus the degree of closure in an individual's network helps to determine their power to create opportunity and to profit from contacts, a process known as *brokerage*. This occurs where social capital is claimed and realised through network contacts: a broker profits from his or her social capital by controlling the flow of information or resources from one group of contacts to another. Where a person's network is loose, connecting groups of individuals who do not know each other, there is an opportunity for that person to act as a broker. By doing so, this individual bridges the 'structural holes' (Burt 2001) dividing groups, and thus circuits of information. A visual example is provided by the diagram below. Here A knows both B and C, who do not know each other. A therefore forms a bridge between these two contacts and controls the flow of information between them. There is a structural hole between B and C, so that if B has knowledge or activities that would benefit C, A can broker contact between them, and will potentially benefit from doing so.





To rework this example in the context of technology diffusion: A is Ghanaian and travels to the Netherlands where he meets B, an ICT expert. Upon returning home, A realises that C, who is trying to set up a new online service, would benefit from B's expert knowledge. A is therefore in a position to broker between B and C, who are separated by both a structural hole and a spatial separation. Thus in the context of migration, the power of brokerage may be intensified by the physical distance between an individual's contacts. The degree of closure in a network is also important: it determines in how many cases within A's network, the person in position B knows the person in position C. Thus networks formed through migration may also influence closure, in that the physical distances involved in migration make it much less likely that an individual's contacts will know each other. Mobility may therefore play a role in determining how new information and practices may be accessed and transmitted. The home context is likely to give rise to dense networks, where people know each other in a neighbourhood or a business sector, and which will tend to be high in trust, reputation, and thus social capital. However the international context gives rise to looser networks and thus creates many opportunities for brokerage, with migrants potentially facilitating contacts between circuits of information formerly separated by distance, a practice which allows new ideas to enter the home network.

Importantly for the question of co-presence noted in section 2.4 above, these features of network structure and relationship depth have been found operating in an online context. An indication regarding whether tacit knowledge can be transmitted online comes from the finding of Reagans and McEvily (2003) that tacit knowledge requires active, rather than passive, transmission – i.e. mutual affinity and interest can fuel such transfers even where the ties involved may be weak. Research on online forms of contact can be related to this finding: for instance, Gee and Hayes' study (2009) of 'affinity spaces', the online groupings that form around shared interests. These spaces, Gee posits, make tacit knowledge transmissible through virtual rather than person-to-person contact, and allow more contact between those of high and low status than occurs in the physical world. This suggests that a common interest may carry more weight in the virtual sphere.

Finally, with regard to the importance of networks in facilitating the flow of new ideas within the relatively small population involved in Ghana's IT sector, we may expect to see networks acting to

regulate behaviour as much as knowledge transfer. Various studies have demonstrated that network structure plays an important role in the way people behave as a group, and especially the way in which they regulate each other's behaviour. Krackhardt (1998) describes the way that this control arises from the features of density and closure discussed above: '"My mortification at cheating a friend of long standing may be substantial even when undiscovered. It may increase when the friend becomes aware of it. But it may become even more unbearable when our mutual friends uncover the deceit and tell one another."' Thus trust and reputation are important results of network density and closure. One of the best examples of how this may inform research on entrepreneurship is Greif's study of mediaeval Maghribi traders (1989), which showed how close ties and high trust among traders enabled them to trade across distance and enforce contracts remotely. These studies suggest that in the context studied here, networks may act in conflicting ways: both as conduits for new knowledge and as an anti-competitive force that privileges the welfare of the group over that of individuals.

Regarding each of these aspects of networks, there is a gap in the literature in terms of contact within developing countries and between developing and richer ones. Specifically, most of the literature is on medium and large firms in industrialised countries, and most of the theory on the role of networks in knowledge transmission, as observed by Reagans and McEvily (2003), deals with transfers between individuals of similar cultural and educational backgrounds. This is a consideration for this study because it is concerned with transfers of knowledge that are occurring between individuals in destination countries and those in countries of origin, who are likely to be from very different backgrounds both culturally and educationally. As these authors note, 'people at opposite ends of a structural hole do not have much knowledge in common, which can impede knowledge transfer'. There is very little theoretical framing for how the transmission of technological resources and knowledge occurs outside the context of large companies, where people can be expected to have more similar levels of education and cultural backgrounds. Therefore the literature on group dynamics in negotiating knowledge transfers – affinity spaces, trust, reputation and ways of dealing with difference through common interests – are important notions to guide this research since they may offer a way to fill this gap.

2.5 Exploring links between mobility and technology diffusion

The preceding sections have identified some gaps in the literature regarding how transfers of knowledge and resources occur across what network theorists term 'structural holes' (Burt 2001). However this research involves several types of 'structural hole' pertaining to technology diffusion in poor and remote areas that go beyond the meaning of the term as it is used in network analysis:

spatial gaps between countries where technology must 'jump' from one region and social context to a very different one; knowledge gaps, where a base of adoption capacity does not yet exist in the destination area; cultural gaps, where technology must be reconfigured to answer different understandings and needs, and resource gaps, where it must arrive in a new country or region in the absence of large multinational firms and formal linkages. In all these cases, there is room for clearer and more specific understanding of how these gaps are bridged.

This research explores whether international mobility is an important factor in bridging these gaps. It provides a framework within which to assess whether the movement of people can account for the movement of knowledge and resources, and can do so on an informal micro-level, in the absence of formal international links and activities. In contrast, most of the literature reviewed in this chapter focuses on formal contexts for knowledge transfer and meso-level processes involving medium and large-scale firms. A perspective based on individual mobility provides a way to fill this gap in the literature. Looking at diffusion within a mobility framework would suggest a cumulative process of individual transfers, where adoption capacity, knowledge and access to resources are built iteratively and informally rather than purposively and formally.

Beyond this lies the research approach of transnationalism, a network-based perspective on multi-locational belonging (Vertovec 2010). This has been adopted as a way to look at multiple dimensions of international movement (Faist 2000) that include studies of social ties (Werbner 1990), economic activities (Portes 2001) and citizenship and agency (Bauböck 2003). In contrast, researchers such as Urry (2007), Cresswell (2006) and Adey (2009) have led a shift toward the terminology of 'mobility' as a way to signify different types of movement, including but not limited to migration as classically defined. Advocates of the 'mobility turn' (Sheller and Urry 2006) argue that for most of the world, international movement has become a central feature of working and social existence, and that ICTs represent both a facilitator of this mobility and a result of it.

For this field of research, mobility can be physical or virtual, and can encompass the movement of people, objects and ideas. It is precisely because of this breadth of possible connections and relationships that international mobility provides a useful and under-researched perspective on internet diffusion in poor countries. It serves as an indicator of the economic and social inequalities affecting diffusion, whether they arise from isolation and related policy or market failures; but it also serves as an indicator of successful diffusion where people's capacity to move either physically or virtually outside their national space.

This multiple set of perspectives on the connections between mobility and ICTs owes much to Urry (2007), who argues for studying 'mobilities' rather than 'migration'. The idea of international mobilities is particularly useful to this study of ICTs' relationship to mobility because it indicates a range of types of international movement rather than the more purposeful idea of 'migration'. Porter (2012) in her review of mobilities and livelihoods in Africa demonstrates the wide range of mobilities which form part of people's livelihood strategies, and the ways in which ICTs intersect with existing mobilities and generate new ones. Urry deals with the new landscape of mobility which includes short-term movements, describing an emerging paradigm of circulation and exchange that is at the conceptual centre of this research. Urry's argument that the 'twenty-first century places interdependent digitized systems of mobility at its core' (2007:15) is important when thinking about the linkages between the internet and people's international movement.

To put forward the ways in which this thesis addresses mobility as potentially connected to diffusion in the practical sense: first, as noted in section 2.4 above, mobility may be expected to play a role in closing market and resource gaps through transfers of remittances and material resources such as computers and software. As Vertovec has observed (2009: 58), 'telecommunications infrastructure is developing in poor areas… largely on the back of transnational migration practices'. International travel and learning through working abroad and establishing ongoing contact with other countries may also be important in transmitting technological knowledge and skills to new environments. In this way, mobility can also be expected to influence adoption capacity by providing ways to acquire and transfer the skills and knowledge necessary for transplanting and repurposing technologies – another way in which this research contributes to filling knowledge gaps on how adoption capacity is generated. The theories on network processes explored above are also important in linking mobility and technology diffusion, since international mobility relies to a great extent on building and sustaining networks (Vertovec 2003).

Second, international mobility is increasingly a circulatory and ongoing process which may be expected to lead to iterative learning and change (Saxenian and Hsu 2001, Portes 2001, Newland and Agunias 2007). If there is a reciprocal relationship between technological adoption capacity and level of technological development, as Criscuolo & Narula (2008) posit, then incremental increases in technological knowledge and understanding on the part of return and repeat migrants should increase adoption capacity at home by equalising the knowledge base between origin and destination countries (Reagans and McEvily 2003). This process of mobility should also contribute to closing cultural gaps, making differences in education and background less of an issue in learning

about new technologies. This process should in turn make the internationally mobile an important force for technological change at home.

Third, the connections between migration and entrepreneurship also form a theoretical link between mobility and technology diffusion. Broadly, individual migration can be considered entrepreneurial behaviour, and Dustmann and Kirchkamp (2002) have shown that it is associated with the choice of entrepreneurship upon return, with various country studies confirming this in different contexts (e.g. Kilic et al. 2009, Wahba and Zenou 2009, Démurger and Xu 2011). Studies linking migration to technological entrepreneurship and business formation (Saxenian and Hsu 2001, Acs and Hart 2011) suggest that the technology sector may be a place where migrants experience a comparative advantage upon return due to their experience working in more technologically sophisticated regions. This suggests that migrants are likely to choose technology-related entrepreneurship on their return home, and that when they come from poor or remote regions, they will contribute to increasing equality of access.

The framework offered by Raj (2010) brings together several of the issues identified as important in this chapter within the context of international mobility. His work on historical processes of technological change and evolution explore the interactions between mobility and technology in developing country contexts and proposes that the notion of 'contact zones' (first developed by Pratt (1999)) can explain the global diffusion of scientific knowledge. He posits that historically, this process has occurred through a process of circulation of people among separate but equal circuits of knowledge in industrialised and developing countries. This idea challenges the core-periphery vision of knowledge as created by Western societies from raw data imported from developing ones, and instead suggests a 'complex reciprocity' in the process of knowledge production and reproduction, based on 'contact zones' created by international movement. These ideas reflect those defined by this chapter as central to this research: they suggest that in order to study the movement of technological knowledge and resources, research must focus on the places where different knowledges come into contact. These places, in the context of this research, may be virtual or physical, and may therefore be accessed through physical or online mobility. They may be in Ghana or abroad, and may involve less and more knowledgeable Ghanaians, or Ghanaians and foreigners. The idea of contact zones is a useful framing because it implies co-presence but leaves room for different types of contact, and because it suggests a focus on 'heterogeneous interactions' (as noted in the section on the AN perspective) as the mechanisms of technology and knowledge transmission. The notion of contact zones also implies that knowledge is reconfigured and adapted as it is passed from circuit to circuit, which provides a way to frame the question raised in section

2.2.1 as to how adaptation and reconfiguration occur across gaps in technological understanding, culture and knowledge.

2.6 Conclusion

This chapter has outlined several bodies of theory which come together to inform the perspective of the thesis. Research on the diffusion of technology has evolved from the insight that innovations move outward into society in concentric circles through social networks and via demonstration effects, and has more recently focused on the socially embedded processes and institutions that are necessary to create the capacity to adopt. Adoption capacity is identified as essential to explaining processes of diffusion, especially in developing countries where lower levels of education and income create more challenges for new users of a technology. Researchers therefore argue that in order to understand processes of technology diffusion one must look at how adoption capacity develops, perceptions of the need and uses for the technology in question, and the networked interactions which transmit the necessary resources and knowledge. Next, the theory on different types of market gaps in relation to adopting new technologies was reviewed, as it pertains to ICTs in developing countries. This consists of two types of gap: a market efficiency gap which may be remedied by policies such as government subsidies, and a true access gap which requires intervention beyond what policy can achieve.

The chapter has also reviewed the research on ICTs' impacts on developing countries, looking at two bodies of research: studies that ask how ICTs contribute as an economic sector in themselves and to other sectors, and those that ask what ICTs can offer as tools of human development. The first question, as to the contributions of ICTs to economic growth, has not been conclusively answered due to insufficient data: researchers believe there is a link between ICTs and increased productivity, but cannot yet claim that they know the direction of causality regarding increases in technology penetration and economic growth. Even less is certain regarding their implications for pro-poor growth. Both these bodies of research have so far focused on mobile phones rather than the internet since these have so far achieved much greater penetration in developing countries. Regarding human development, the literature suggests that ICTs can lead to improvements in essential freedoms such as those of association, expression and imagination. The work of Kleine (2010) also outlines ways in which the internet can expand the structures of opportunity within which people operate, an idea which this study explores in relation to mobility.

The literature on ICT diffusion points out a scarcity of technological resources and adoptive capacity in developing countries. International mobility is here posited as a way that individuals may be overcoming the barriers constituted by lack of equipment, knowledge and skills, since studies on migration identify several outcomes which may be relevant to ICT diffusion: business formation, transnational entrepreneurship and the transfer of knowledge and skills. Research on

migrant businesses has shown that they are often formed using remittances or savings gained through working abroad. In terms of transnational entrepreneurship or work, migration is associated with investment from abroad, innovation and a comparative advantage on the part of migrants in terms of technological skills and knowledge.

Importantly, migration has been shown to have a strong association with international knowledge transmission, potentially an important factor in explaining how the capacity to adopt new technologies may be built in developing countries. Researchers have categorised knowledge into the explicit, which can be learned at a distance, and the tacit, which must be learned through co-presence. This raises the question of whether co-presence is necessary in order to learn the skills and practices needed to diffuse technology to new places. This question leads to another about the meaning of co-presence in an age where virtual contact is increasingly common, and to what extent online interactions can serve as conduits of technological knowledge and understanding.

The processes of resource and knowledge transmission outlined here can best be addressed as network processes, dependent on people's socially embedded interactions across international space, and within the home country. The tools of network analysis make it possible to explore these processes of transmission, and suggest paying particular attention to different types of embeddedness – relational and structural - which may influence the way in which people can use their networks to generate resources and transfers. This study's focus on flows of resources also suggests looking at practices of brokerage between groups, and how individuals mediate and control international transfers of various kinds.

This chapter has demonstrated that the literature on the diffusion of innovations and the generation of adoption capacity cannot fully explain the connections between these two processes as they occur in developing countries. So far there is no clear account of how innovations arrive in places that are profoundly unlike their places of origin, for instance in terms of income levels, physical environment or people's prior experience with technology. The available research visualises an incremental process whereby use expands to new regions through linkages involving similarities in activities, understanding and economic and organisational structures. However this incrementalism has been challenged in the case of developing countries, and so far no better explanation has been offered. One way to address this gap is suggested by several studies that explore how technologies are repurposed for very poor regions, and that the translation of technologies from richer to poorer countries may occur in 'contact zones' formed through international mobility where different cultures and technological understandings are brought together.

The idea of the contact zone, as developed by Raj (2010, 2011), is a useful overarching way to conceptualise the kinds of interactions that are the focus of this enquiry, and will be applied as a conceptual tool in each of the following empirical chapters. Raj has developed the idea of a contact zone as a dual space which is defined in two different ways by the types of interaction that take place within it. First, it is constituted by an 'intersection of myriad heterogeneous networks' (Raj 2011 p. 78), and is therefore a fluid space defined by the mingling of relationships, where mobility leads to change through the formation of new contacts. Second, it is 'a node in the transformative circulation of knowledge' (*ibid.*), and is therefore also a space defined by a transfer of knowledge which will cause change at its destination. Raj (*ibid.*) says of the operation of contact zones that:

> 'In this approach, intercultural encounter is conceived as a temporal process, where the conjectural evolution of conditions and institutions provide the framework within which individual actors shape their strategies while at the same time reshaping their institutional and urban environment. It is thus that the 'local' makes it possible to perceive and make sense of the world…'

Chapter 5 of this study in particular will use this idea of the contact zone as space in which individuals can shape their strategies within the structural bounds of their environment. I use Vertovec's 'opportunity structures' (2010) as a tool to explore how individuals purposely shape and strategise their potential through mobility and contacts, while acknowledging as Raj does that these frameworks within which people operate are characterised by both constraints and possibilities based on the local environment.

Importantly, the network-based processes of exchange and transfer described by Raj and explored in this research are underpinned by social capital, a concept which also deserves clarification. Although the idea of social capital has been generally settled as resources arising from an individual's position in his or her social network (Bourdieu and Wacquant 1992: 119), and as defined by its function of producing advantage (Coleman 1990: 302). This study builds on Burt's exploration (2005: 7) of specifically how this advantage is produced, namely that power accrues to those with the ability to increase variation in a group, and that the amount of power is determined by the extent to which the group is closed off from outside influences and contacts. Burt's definition of social capital relies more heavily than earlier conceptualisations on the structural specifics of networks, an issue which leads the analysis in chapters 4 and 5 of this study.

Mobility is an overarching perspective and forms part of each element of the analysis. It is associated with entrepreneurship, the transmission of resources and knowledge, and the filling of

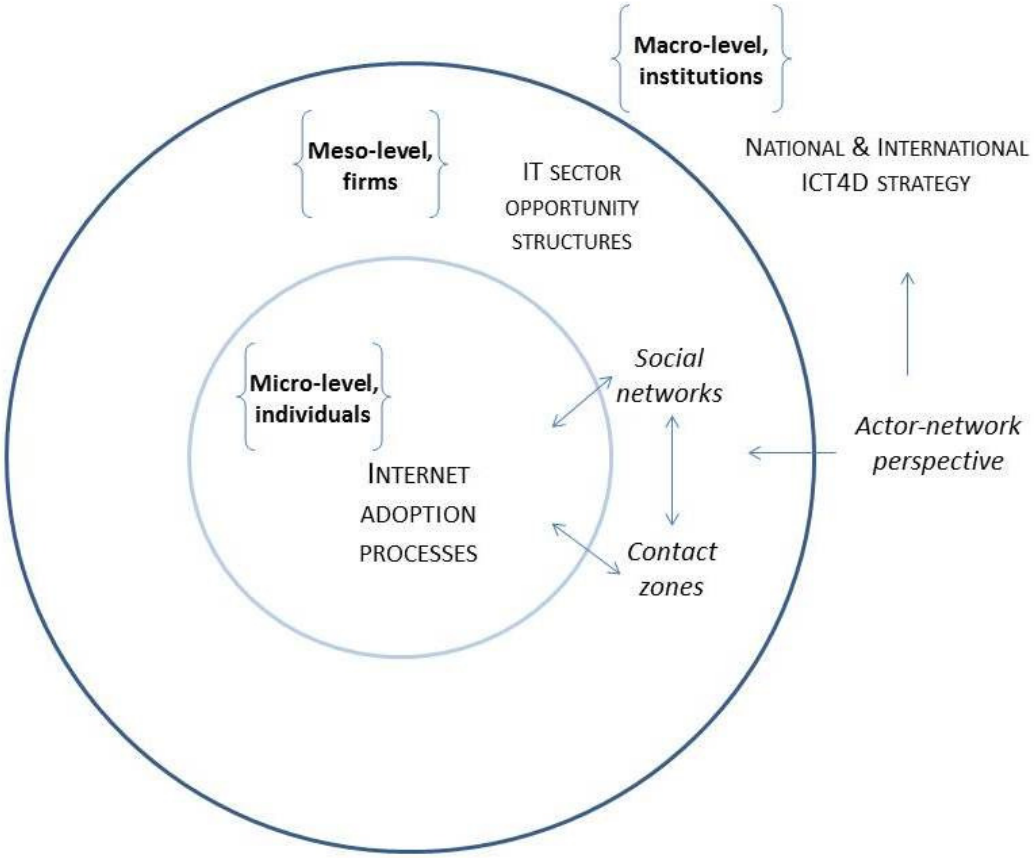
market and resource gaps, all of which indicate that it may be one way to explain processes of technology diffusion on the individual and local level. Mobility also provides a connection to the contact zones and international networks of exchange identified as important to both studies of international migration and historical processes of technology diffusion. A mobility perspective, furthermore, is a way to focus on the individual, informal and micro level processes that are most likely to be important to diffusion in the Ghanaian context.

This study therefore uses mobility as a lens through which to explore processes of technology diffusion. It will first explore connections in the sphere of entrepreneurship, looking at the kinds of transfers occurring through international travel and connections among Ghanaian internet cafe entrepreneurs, and at how this influences their ability to establish and offer internet connectivity to people in the poorest regions of the country. Next it looks at the network aspects of international interactions relating to technology diffusion, asking how contact zones are formed and maintained, and what role co-presence plays in the transmission of knowledge and resources. Finally, it addresses the implications of these dynamics for overall processes of diffusion on the national scale, exploring what links the micro-level to the macro and how (and whether) these local-level mechanisms are playing a role in development thinking.

Figure 2.2 below illustrates how these concepts are brought together to inform the analysis. Three levels are explored. First, individual-level processes of internet adoption (Chapter 4), using social networks as a tool for analysis and contact zones as the conceptual space within which the interactions of interest – transfers of knowledge and resources which lead to change – take place. Second, meso-level opportunity structures in the larger IT sector are analysed, using firms as the unit of analysis (Chapter 5). This second level includes, but is not limited to, the population studied on the micro-level. Again, social networks are taken as the structures, and contact zones as the conceptual spaces, within which a typology of strategies and processes of change can be formulated. The third element of the analysis takes place at the governance level (Chapter 6), where national and international interventions to create inclusive ICT use are critically examined. In each element, the actor-network perspective is borne in mind, but does not explicitly dominate the analysis. It is useful to this study as a reminder that relationships and networks are configured heterogeneously, and that they must therefore be studied individually. It thus limits the extent to which networks and contact zones typical, and in turn leads to privileging diversity in the QCA analysis in chapter 4, to providing individual viewpoints to inform the network typologies developed in chapter 5, and to breaking down national and international interventions into their

smallest component parts in chapter 6, and searching for the human interactions within them to inform the critique of current policy.

Figure 2.2 Conceptual framework



3 Methodology

3.1 Introduction

This study adopts a mixed-method strategy with the aim of providing both new data on the diffusion of the internet and its usership into the poor and remote areas of northern Ghana, and of analysing whom the technology is reaching and to what effect. The methodology adopted involved nesting qualitative approaches within more quantitative ones in an effort to use multiple perspectives to triangulate the information gathered. Most of the existing literature on ICT diffusion in Africa is either quantitatively systematic, but at a high level of aggregation (e.g. ITU 2010, 2011a) or is qualitative (e.g. Kiri & Menon 2006, Khan & Ghadially 2010) and does not aim to assess the extent of ICTs' impact on a national level. This choice to adopt elements of each approach was made with the recognition that a systematic analysis of factors in ICT diffusion – one that can be justified as replicable, representative and ideally generalisable – is important, but is most useful when combined with an appreciation of the social and political conditions within which that diffusion is taking place (Gillwald 2010; Avgerou 2010). Avgerou (ibid) has also pointed out that although international statistics on ICT in development are now being collected, there are still gaps regarding developing countries. A mixed methods approach can therefore contribute to filling this gap.

No systematic IT sector survey has previously been conducted in Ghana. It is a country where data collection is logistically challenging (especially in some regions) and little is known about the current rate of diffusion of internet use. Among the most important challenges in the data-gathering stage were the lack of a sampling frame for internet cafes; the question of whether to use a comparison group, and if so, its composition, and the issue of researching internet provision and mobility in a place where both are complex and often irregular processes that often evolve informally with little record-keeping.

The overall research question for this project is whether, and how, international mobility acts as a significant catalyst for the diffusion of internet access and usership in Ghana. The hypothesis is that migration mediates the process of increasing access to the internet by allowing entrepreneurs to overcome market and resource gaps, and that it does so specifically by enabling flows of knowledge and resources to areas of scarcity. Mobility is also posited to contribute to higher-value-added IT businesses and thus to expand opportunity for participation in the sector. Given this hypothesis, I chose to look at mobility in three different contexts within the Ghanaian IT sphere, first in order to assess its relative importance in accessing goods and knowledge, and second in order to distinguish

how its effects differed according to geographic, social and economic contexts within this environment of scarcity. These three contexts were internet cafes; individual users in internet cafes, and a range of IT firms. Thus the study moves from looking at the influence of mobility at individuals level to the firm level, and from the low-income North to the richer area of Accra.

This larger research objective is split into three sub-questions, with the appropriate methodology used to answer each. The first sub-question addresses the formation and viability of internet cafes because (as noted in Chapter 2) Ghana constitutes an environment of extreme technological scarcity where any effects of mobility on the availability of technological knowledge and goods should be most easily identifiable. My hypothesis here was that both international mobility and transnational connections make it possible for entrepreneurs to access the goods and knowledge that allow them to establish internet cafes, and that this access to resources may be most important for those operating in remote and disadvantaged areas. Cafes in the North of the country and in Accra were chosen as the focus of this part of the study in order to understand whether challenges differed by location, since similar research such as that of Rangaswamy on small-scale local internet providers in India suggests that differences in location are less important than differences in social opportunity, since 'ICT configurations in fairly mature urban IT ecologies display barriers to commercialization and immersion not far removed from their resource stressed rural counterparts' (2007: 2). Studying mobility and transnational connections across a range of locations including the most remote should thus provide a balanced perspective on their influence on businesses.

In order to answer this question, a mixture of quantitative and qualitative methods were used. Since the question relates partly to business formation and viability a survey was devised to capture a set of comparable data on business characteristics such as income, expenditure and profit. This survey was conducted with the goal of being as comprehensive as possible in order to cover the full range of entrepreneurs and types of business, and to provide a comparison between businesses where owners migrated and those where they did not. This was done by surveying all the internet cafes in the three northern regions (the Northern, Upper East and Upper West), and in two areas of Accra (Adabraka and Kokomlemle). The survey focused on the formation and viability of the businesses, and also on the owners' history of migration and any international networks they used in their work. However a survey questionnaire was not sufficient to understand owners' social backgrounds, their histories of mobility and the ways in which they were using international contacts. Thus interviews were conducted with the entrepreneurs surveyed in order to capture a broader range of information.

The second sub-question looks at the country's IT companies as a group and asks how people's mobility is a factor in building the sector. My hypothesis was that mobility leads to more opportunities in the IT sector for Ghanaians, and to the entry of people of different backgrounds into the sector rather than only those who afford to access IT equipment and training on the international market. Migration can equalise opportunity for those with lower social status, less business experience and/or fewer resources, and furthermore that these benefits can be conferred by the range of types of mobility rather than only long-term migration involving formal education or training. If this is true, then international mobility may have the potential to extend the benefits of entry into the IT sector beyond the highly skilled and educated who have the resources and skills to be early adopters of internet technology.

To answer this question, it is necessary to understand in greater detail how mobility and contacts abroad were being used by individuals to create opportunity. This in turn requires looking at their travel and connections in depth, and being able to analyse the comparative importance of connections of different kinds, and in different places. This suggested the use of qualitative methods, specifically both interviews and a network study. In practice, interviews asked individuals about their migration histories and how they perceived the importance of their overseas travel and contacts. In addition their networks were mapped by means of a name generator, which involved asking interviewees to name all the members of their professional networks according to various categories. This led to a dataset that represented quite comprehensively the contacts people were using for the functions specific to their professional lives, how these contacts had been generated, and the kinds of inputs they provided to the individuals interviewed.

The third research sub-question asks to what extent a relationship between mobility and ICT diffusion has been addressed by Ghana's national ICT policy, and what the importance of such a relationship could be for ICT policymakers interested in diffusing ICTs to new areas and users. For those government or international institutions working to create greater ICT literacy and usership, better understanding the roles of all the different actors in diffusion may lead to gains in efficiency and inclusiveness in extending ICT diffusion to poor and remote populations.

This question required more of a governance perspective. To answer, it, interviews were conducted with a series of policymakers in the areas of telecommunications and ICT-based business, and with business advocates in the IT sector. It also required an understanding of the national impact of access to the internet among those in poorer and more disadvantaged areas, for which an online survey was conducted among users in the three northern regions, asking how they were learning and

using the internet, what they thought about having access to the technology, and whether they saw it as having relevance for national development.

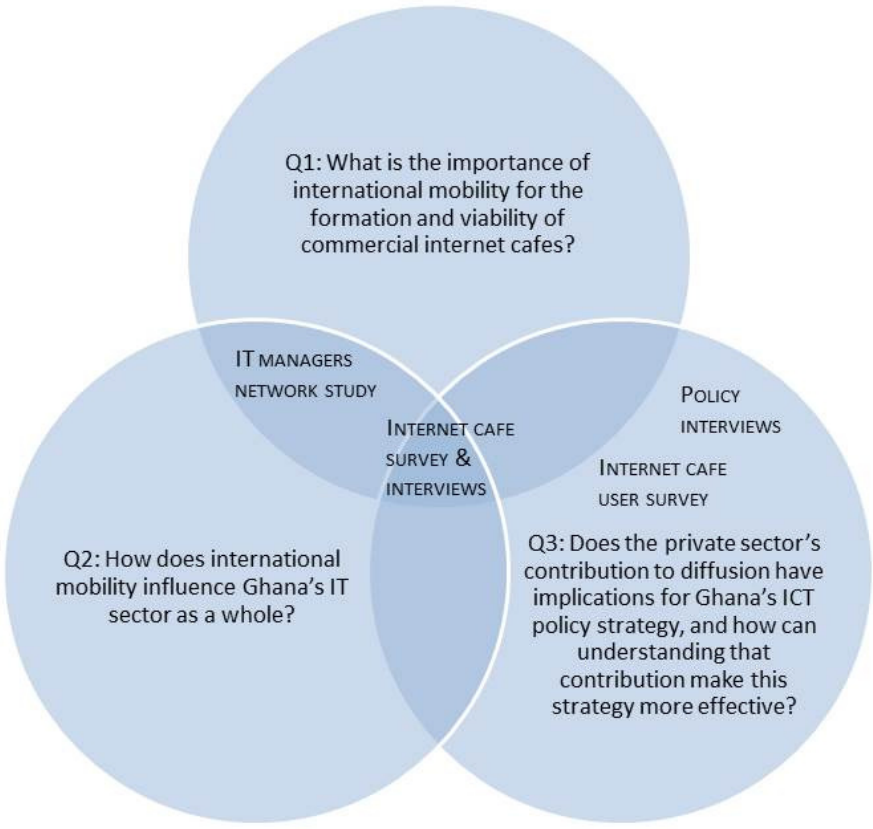
The timeline for the different methods involved in data collection is shown below (Table 3.1)

Table 3.1 Research timeline with methods

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct
Internet cafe survey/ interviews									
IT managers network study									
Internet cafe user survey									
Policymaker interviews									

The way in which each method relates to the research questions is laid out in Figure 3.1 below.

Figure 3.1 Research questions and related methods



The methodology for this study is based on the principle of triangulation, namely that using more than one method to answer a research question will facilitate cross-verification and make it more likely that the data gathered is valid (Denzin 2006). Unstructured interviews were used throughout to pick up on interesting or unexpected information and thus better understand the data gathered in each of the surveys, along with semi-structured ones which were conducted to gain an overall picture of the social and political background to the diffusion of ICTs in Ghana. In terms of the larger structure of the project, the internet cafe study was designed with a comparison group in the form of the Accra cafes in order to better understand the data from the Northern survey, and the network study similarly triangulates these findings by adding another group and comparing the cafe entrepreneurs to the IT managers. Furthermore, the results of the user survey are used as a way of better understanding and critically assessing the data gained from the interviews with policymakers and donor organisations. This design results in multiple datasets collected across different groups, all of which focus from different perspectives on the central question of the influence of mobility on ICT diffusion.

As with data collection, analysis was also conducted in multiple stages in order to capture the diversity of perspectives involved. First, Qualitative Comparative Analysis (QCA) was used to draw conclusions about the influence of mobility and other factors on the internet cafes surveyed. Next, social network analytic methods were used to look at the dynamics of entry into different levels of the internet businesses and the way that individuals used their international connections to operate within each level of the business. Last, the broader policy landscape was addressed through a combination of interview data and grey literature, making it possible to compare and contrast the institutional theory of change with the way that processes of diffusion are playing out at ground level.

The next section looks at how the surveys and interviews were conducted, and the challenges and problems addressed. The third discusses the methods used to analyse that data, and the fourth concludes.

3.2 Data collection

In order to research the questions outlined in the previous section, three quantitative datasets were collected - the first dataset at the level of individual businesses, and involving internet cafes which were all small or micro-enterprises; the second at the level of larger, higher value-added IT-related

firms in Accra, which varied from the country's sole broadband provider to a software startup; and the third from individual internet users in three of the internet cafes previously surveyed, by means of an online questionnaire. Alongside the survey element of each phase, semi-structured interviews were also conducted to gather further qualitative information and to make it possible to take previously unknown issues into account. Table 3.2 shows the interviews and surveys conducted, by group, and Annex 8.2 provides a more detailed list of interviewees and sample transcriptions of interviews.

Table 3.2 Data collected, by survey group

	Internet Cafe Survey	Network Survey	Internet Use Survey	Semi-structured interviews	In-depth interviews
Internet cafes – North	68	68	-	68	10
Internet cafes – Accra	27	27	-	27	4
IT managers	-	30	-	30	7
Internet users	-	-	253	N/A	-
Policymakers, donors and IT experts	-	-	-	-	20

3.2.1 Internet cafe survey

Internet cafes were defined for the purposes of this study as commercial firms located in business premises, offering internet browsing services for payment. In order to survey the cafes in the North and part of Accra, a sampling strategy had to be devised. Conventional random sampling was not an option because of the lack of a current survey of the existing businesses in Ghana: two previous small business surveys were identified, one national survey carried out by the World Bank (Steel and Webster 1991) and one which sampled small businesses in Kumasi (Dawson 1988). Neither involved any businesses from the north of the country, and both were conducted before the internet became available in Ghana and thus did not cover internet cafes. The Ghana Industrial Census of 2003 (GoG 2003b), does not cover firms employing fewer than 10 people, while the Ghana Living Standards Survey (GoG 2005) only covers household businesses.

It also proved impossible to identify internet cafes from the records of their internet providers: the national telecoms company, the country's primary internet provider, was not able to offer data on

which towns had internet establishments because it did not distinguish in its records between internet cafes and other businesses or private homes. Providers of satellite connectivity were not a source of information either, since those used by Ghanaian cafes are scattered throughout the world including the Gulf region, the UK, Canada, and the US so that it was therefore not possible to narrow them down to those serving Ghanaian cafes.

Figure 3.2 Ghana regions

These restrictions ruled out random sampling, so that the most rigorous method available became to choose a particular geographic area and conduct a census of its internet cafes. The northern three regions (see Figure 3.2, where each region is marked by a different colour), the Upper West, Upper East and Northern, were selected because they represented both the newest areas of internet penetration and the most economically disadvantaged. This choice was based on the hypothesis that resource-poor conditions would make international mobility relatively more important and possibly more easily distinguishable as a factor in business formation and viability. Disadvantage was judged by the regional data on income, literacy and health published in the Ghana Census (GoG 2005), which showed that these three regions were highly disadvantaged in comparison to the rest of the country. For example, literacy averaged 29 per cent across the Northern areas surveyed, with the lowest - the Bawku West area - showing a literacy level of 9.2 per cent, compared to 85 per cent in Accra.

Locating internet cafes within these three regions was done by visiting settlements individually according to the roads shown on the national map of Ghana (ITM 2008) over the months from February to July of 2009. The principal approach to locating internet cafes was to conduct as exhaustive a geographical search as possible. This was carried out over a period of four months (February-June 2009) by a process of travelling every usable road (mainly during the dry season) in

the three regions and visiting every settlement where it would be possible to set up an internet cafe. This was judged in two ways, first, by talking to local people along the way in towns and villages and on public transport, asking them where the nearest internet cafe was; and second, by a set of guiding criteria hypothesised to influence the likelihood that a cafe would be found in a particular settlement. These are listed below:

1) **Access to electricity**. Although generators could be used, they were expensive, costing upwards of $1,000, which might double the cost of starting a small-scale cafe. This was ascertained by asking local people about the availability of electricity in the nearby settlements. In the end, only one cafe was found in an area without electricity, in Lawra, in the far northwest of the Upper West Region.

2) **Literacy**. In rural and remote areas, there were generally not enough literate people to sustain a commercial internet cafe. Literacy in the North is concentrated in towns and among workers in the formal economy (Ghana Census 2005). The literacy levels were used as a guide to how deeply the search should go into a given district.

3) **Accessibility**. Some areas of the North are inaccessible by public transport even during the dry season due to bad roads, and many (referred to locally as 'overseas' areas) are cut off for three months of the year during the rains. This also reduced schooling opportunities and income, and was reported by locals interviewed to be a strong disincentive to cafe formation in these areas. An exception was where a hospital or NGO had been set up in a remote area, as in Nalerigu, and a cafe was established to serve the employees.

4) **Local mobility patterns**. Historical patterns of mobility, particularly those involving former regional capitals such as Yendi, also offered a guide to the formation of cafes. These places used to be district capitals but have been largely cut off by electoral re-districting over recent decades, yet have retained their importance as centres of market activity and seats of paramount chiefs. Thus although government telecentres were generally built next to the district government building, commercial cafes were often found in these original regional centres.

In addition to these criteria, the advice of local research assistants made it possible to focus the search as effectively as possible. In each regional capital an assistant working in the internet cafe business was found, and these provided assistance with locating other cafes in that town, and elsewhere in the region. These assistants spoke several local languages and knew the IT community,

which was fairly small, very well. They also served as facilitators and translators during interviews, and as advisors during the data cleaning phase of the research.

This strategy had something in common with snowball sampling in that the methodology involved the use of word of mouth among local people. It used this, however, only to identify which areas were more or less likely to have cafes, and not to define the area of the search. The search proceeded along each of the roads navigable by vehicle in the three northernmost regions of the country, calling in at every settlement shown on the map unless local people confirmed there was no cafe there. The search was therefore exhaustive, but did not include villages where there were known to be no cafes.

A group of cafes in Accra was also surveyed as a comparison group. This was not designed as a counterfactual (northern vs. 'not northern' cafes) because the barriers to establishing an internet cafe in Ghana were hypothesised to be virtually identical in the North and South – namely market gaps, a lack of material and financial resources and the lack of an enabling policy environment. The aim in continuing the survey in Accra was to illuminate the nature and degree of the obstacles facing entrepreneurs by continuing the survey in a different business environment. Since Accra has a higher rate of international mobility, according to the Ghana Immigration Service,[3] this also constituted a form of insurance for the project in case the cafes in the north showed a very low rate, making it impossible to draw conclusions about the influence of mobility from the data.

This Accra group was selected based on city divisions. Using the Ghana census (GoG 2005) and interviews with local residents, two contiguous districts (Adabraka and Kokomlemle) were chosen for their characteristics as middle-income neighbourhoods with a high proportion of Ghanaian residents of local origin. This was important because many city districts are either populated predominantly by foreigners or by migrants from the North, either of which would have biased the findings. Higher-income immigrants are now able to get broadband service at home and therefore there are few internet cafes in expat neighbourhoods, whereas internet cafes serving migrants from the North are likely to be run by other Northern migrants, making these areas too similar to the cafes already surveyed in the northern regions of the country.

---

[3] Average migration rates were compiled according to Ghana Immigration Service 2006-2009 data on passport applications by region. There are two limitations to this way of assessing regional migration rates: first, it is estimated by the Ghana Immigration Service that 95 percent of international migration within the region (ECOWAS countries) remains unregistered by official statistics (interview with GIS, 12.9.09). Second, many people come to Accra in order to have their passports processed more efficiently, and the Accra passport application rates may therefore represent some people actually resident in other regions.

The inteviews with cafe owners were scheduled to take approximately an hour, in order to go through the survey questions exhaustively. The survey questions are shown in Appendix 3 (section 8.3). In addition to the survey questions as shown in the document, if the owner had time, I would stay longer and interview him or her in greater detail, discussing the local sector more broadly and gaining a more in-depth understanding of the issues addressed in the survey. These extended conversations (of which there were ten as shown in table 3.2 above), often took place over the course of an afternoon whenever the owner had spare time, and were therefore not recorded. Notes were taken by hand, and if a quote seemed especially important it was written down immediately. In this way it was possible to add greater depth and better understanding of the owners' answers to the survey questions. The presence of a research assistant (a local one was recruited in each town) also helped with knowing when to probe for more information, or by pointing out when I had misinterpreted an owner's answer. These more in-depth conversations were analysed by adding the quotations and impressions together into a set of 'field notes' documents, which were referred to for quotes, and to illuminate and further explain issues that came up as important issues in the course of the QCA and network data analysis. Besides serving as an overall reference point where the survey answers were unclear, these qualitative findings are also interspersed throughout the empirical chapters (4, 5 and 6) in the form of quotes from cafe owners to offer background to the particular findings discussed.

3.2.2 Problems and limitations in the internet cafe survey

Two main problems were encountered while conducting this survey. First, the informality of the businesses surveyed and their general lack of formal accounting practices made it difficult to find comparable figures for expenditure and revenue, and thus for net profit and return on investment. This informality was a common feature of businesses in the North since, as previous studies of Ghanaian small businesses point out, formalising a business located outside the capital is an expensive and laborious process that most skip (Steel and Webster 1991: 39).

To minimise confusion, business owners were asked how much they made in a typical month, or even on a typical day, and then about seasonal losses or gains (for example, school registration brings in many customers in summer, whereas the rainy season makes broadband service intermittent) and thus to calculate the average income per month over a year's business. In order to calculate expenditure it was necessary to list the possible expenditures of each business (electricity, connectivity, wages, rent etc) and ask how much the owner spent on each one in a typical month. These methods only offer an approximation of profit and expenditure, but since they were applied

across all the businesses surveyed this should equalise any systematic bias across all the cases and result in comparable data.

Given that it was conducted exhaustively as detailed above, the northern element of the internet cafe survey is believed to be a complete count, or census, of the cafes existing in the three northern regions at the time of the survey (early to mid-2009). Although this can never be conclusively demonstrated, it is important to remember that the claim to accuracy of any census is based on a clear and systematic methodology rather than proof of complete coverage. It was discovered two months after the survey was completed that two cafes opened at the end of the survey period had been missed because the owner had actively avoided identification by this study. The fact that these missing cases came to light (via a local research assistant who continued tracking the formation of cafes after the study was complete), however, suggests that had there been others, they might similarly have been identified, and that therefore overall the survey is likely to have been complete.

To go further into the question of transnational professional networks, a further survey was conducted involving a range of formal, higher-valued-added IT businesses based in Accra. This small group of nationally significant technology businesses represents on one hand a completely different level of business operations and goals from the small cafes that populate the first part of the study, but also the kind of technology business that theories of technology-driven growth and development point to as the conventional agents of technology diffusion. They were thus included as a different type of comparison case for the group of internet cafes, making possible a comparison of the micro-level dynamics of social networking and opportunity structures between the two types of business.

Next, a user survey was conducted in order to broaden out the research from the providers to the consumers of internet connectivity. Conducted in the North, in locations where the internet has only recently become available (communities that have had access for between one and five years), the goal of this survey was to provide micro-level data on people's current and anticipated use of the internet, thus gathering information on the changes that the first stages of access bring to social and economic life on the local level, and on the expectations and aspirations that this generates for the future.

As well as these three surveys, a total of 25 other interviews were also conducted. These interviews, which range from small-scale internet providers and users to policy experts and funders, are shown in Annex 2. Conducted with a range of SME owners, internet users, policymakers and

administrators, they aimed for more personal views of the spread of IT and to elicit critical perspectives on the work of the large international and domestic funders in particular.

3.2.3 Network survey

Social network data was included in this study in order to investigate in greater detail the circumstances under which people's contacts abroad contribute inputs to their IT businesses. Adding in a group operating at a different level of resources also gives a sector-wide perspective, making it possible to identify commonalities and differences in the contribution of mobility among lower- as well as higher-value-added businesses. There is little precedent for studying the contribution of mobility in the literature on networks and business: studies of professional networking (for example the classic studies of Granovetter (1985), Burt (2001) and Borgatti and Foster (2003)) tend not to focus on the international or transnational dimension.

Second, the logic for studying the higher and lower value-added ends of the IT business spectrum is that they play complementary roles in the diffusion of IT access and usership in Ghana. While small-scale providers throughout the country create local internet access and usership, IT firms in technological centres employ the young IT professionals who come from this base of national usership. While very different levels of skill and activities are involved in these two types of business, they occupy different ends of a common spectrum. This study connects them by asking what the processes and mechanisms are that enable people to enter and progress at these two ends of the IT business spectrum.

The network data collected was in the form of egonetworks, which is a type of social network information that reflects the connections, or alters, attached to a particular individual, or ego. Using egonetworks, it is possible to analyse all the connections individuals use in different areas of their lives, or, as in this study, to focus on a particular dimension such as professional ties. In contrast with egonetwork studies stand complete network studies (Wasserman & Faust 1994), which instead offer an exhaustive mapping of every interconnection among a defined and bounded group of individuals. This type of data is usually collected in a single contained environment such as a factory or company, and is therefore commonly used in management studies such as those of Granovetter and Burt, noted above. In this case egonetwork data was preferred, since the research question dealt with the way that multiple individuals used international connections to go beyond their local professional circle for inputs to their business, rather than asking how a single bounded network functions.

The network questionnaire used in the interviews with the internet cafe owners and IT managers in this study was designed to provide data on, first, the resources an entrepreneur could access as a result of their professional networks; second, the relative importance of international and local contacts in these networks, and the degree to which these networks facilitated professional mobility, i.e. the difference between the individual's initial level of resources; and third, the professional level at which they were currently operating. In the case of internet cafes with more than one owner, the network ties of whichever owner had overseas connections were recorded. An individual's social ties are inevitably influenced by their family status and the opportunities it provides, but if these factors are noted and controlled for, it is possible to go beyond this starting position to assess the extent to which their local and international networks give them access to new information and opportunities.

As well as the egonetwork data collected, it was also possible to collect 'complete network' data for the cafes in each main town, i.e. a list of all the connections within the local group of cafe owners, not including their foreign contacts. This implied mapping all the connections within this type of business in each town. This was not possible with the Accra IT managers because each of the firms surveyed was in a different type of IT-related business, and therefore the group did not represent a single community of businesses but a cross-section of a larger set of communities (software firms, broadband providers, etc).

The questionnaires used are set out in Annex 3. Internet cafe owners were asked about the location of any professional connections overseas, the type of relationship (family, friend or associate) involved in each case, and any transfers (material or informational) that resulted from it. Next, they were asked which local, national or international associations they belonged to, how often they engaged with them online or in person, and the names of other local cafe owners whom they knew, or with whom they collaborated professionally. The IT managers were engaged in semi-structured interviews based on a classic 'name generator' questionnaire (Wasserman and Faust 1994) asking for their principal contacts along a series of professional dimensions including technical advice on IT and innovations, career matters, and financial matters.

These two sets of egonetwork data were collected using substantially different interview techniques. The internet cafe interviews focused on a broad range of other questions relating to their businesses, and a simpler form of the name generator was used. In contrast the IT managers largely could not be asked such detailed financial questions since they were not sole proprietors and could rarely disclose such information. Instead they were asked to focus solely on their domestic and foreign

networks and their own history of mobility. Nevertheless, in both cases the name generator was applied exhaustively, i.e. until all professional contacts had been named, and thus the subset of data regarding contacts is considered comparable across the two studies.

Similarly to the internet cafe interviews, although the interviews with IT managers were conducted according to a survey it was sometimes possible to stay longer and ask more in-depth questions (this happened seven times, as noted in table 3.2). With these seven managers, I was able to follow up on details mentioned during the answers to the name generator, going into greater detail about their role in their company, their impressions of the sector, and what they believed to be the most pressing issues and needs in their part of the IT sector. These interviews were among the most useful in the project, since these managers were situated at the intersection between the local and small-scale and the global industry, working simultaneously on both levels and with attention to both. Again, these interviews were generally more social occasions and often took place over the course of a day or an afternoon – or in one case, a weekend house party – so that it was not appropriate to record them. Detailed notes were taken as soon as possible after the conversations, and quotes were written down as accurately as possible. These conversations were used similarly to those with the internet cafe owners: they were fed into the analysis as a way to illuminate issues that came up, to resolve confusions, and to provide quotes on particular issues.

3.2.4 Problems and limitations in the network survey

The limitations of the network section of the project relate first to sampling, and second to bias in responses. While sampling was less of a problem with the cafe owners, since a complete census was the goal, it became an issue with the choice of Accra IT companies. Although the national business association for IT companies (Ghana Association of Software and IT Services Companies, or GASSCOM) keeps a membership list, many of the companies on it were not currently active or could not be contacted. GASSCOM does not update the list regularly to reflect this, and did not have up-to-date contact details for many of their members. The potential bias involved in including companies based on their membership of this association (which might or might not be representative of the sector), and in the inclusion of only those that could be found or contacted by the researcher, meant that this option would be essentially a process of opportunity sampling. Instead, quota sampling was chosen, in order to represent each major type of IT company active in Accra – Business Process Outsourcing (companies that contract to provide back-office IT services such as record-processing and transcription for foreign enterprises); a general local service provider offering internet service (ISP) and support for new IT businesses; a software development company,

and the national telecoms company, which provides the country's only non-satellite-based broadband service.

The second limitation was in terms of bias in survey responses. Lin et al. (2001) point out that name generators, as used in the Accra IT company element of this project, tend to bias answers toward strong rather than weak ties. For the purposes of this project a strong tie was defined as someone belonging to the respondent's household, whether a relative or not, and a weak tie as someone from outside the household. In interviews with cafe owners there was an initial problem where respondents would describe an unrelated contact as a 'brother' if he was a sufficiently close personal friend (typically a neighbourhood friend with whom the respondent had grown up). This problem was solved by asking respondents whether they shared a parent with the 'brother', and if not, the contact was marked down as a weak tie. In contrast the Accra IT managers, possibly because of greater experience with European family structures through the media and international travel and awareness, distinguished carefully between family and non-family contacts, checking that it was acceptable to name a family member as a 'professional contact' (it was). Thus, after some adjustment and increased awareness, the data came to reflect as accurately as possible where contacts were kin and non-kin, and also the level and type of relationship the respondent described.

The second problem identified by Lin, that of a bias toward strong ties, was mitigated by the fact that this was a survey of professional contacts only. While egonetwork questionnaires usually ask about contacts who interact with the respondent across a broad range of categories, in this case respondents were asked to enumerate only those who were important to them professionally, and were then further probed on anyone else they were receiving inputs from in terms of knowledge, money or goods. This more tightly-focused type of egonetwork questionnaire made it possible to go exhaustively into each individual's professional network, using extra discussion and probing to increase recall and coverage.

The data collected, and its analysis, was thus restricted only to the structure of this particular element of respondents' social world, and specifically to the balance of overseas versus local contacts. Thus the research focus of the study to a great extent reflected the potential bias of the methodology, mitigating the classic problems attendant on egonetwork studies.

3.2.5 Survey of internet users

The final part of the quantitative research was an online internet user survey conducted in four towns: Tamale in the Northern Region, Bolgatanga and Navrongo in the Upper East, and Wa in the Upper West. The aim of the survey was to explore what internet diffusion might be contributing,

both currently and potentially, to development. One town was chosen from each region to control for regional differences in usership. These towns were selected purposively based on the presence of an internet cafe where a good working relationship had been established with a particular cafe owner who was also receptive to the idea of helping to conduct a survey. These cafes were each central and had a primarily local clientele, and managers and owners were instructed not to administer the survey to non-Ghanaians.

This survey was developed based on the idea that one important way in which the internet is relevant to development in a poor region with only recent internet access is by increasing various types of functioning, or capability (Nussbaum and Sen 1993), can be discovered and developed through internet use, but that it may be difficult to assess these accurately from an outsider's perspective. Thus the approach taken here was to ask individuals in as broad and non-prescriptive a way as possible what they perceived to be the benefits and disadvantages of access to this new technology. The problem of still-limited local understanding of the internet's potential and actual uses was anticipated in designing the survey, as was the potential that people would not approve of many of its possible uses. Thus questions were kept purposely broad, and opportunities were offered throughout for negative, or noncommittal, answers.

In order to help with the choice of locations for the survey, users' familiarity with the internet at each potential location was measured against Wolcott et al.'s 'sophistication of use' measure (2001). This involves four levels: no usership; minimal, where users can only use the simplest applications; conventional, where they change some established practices to incorporate the internet (e.g. by using email instead of post); transforming, where they develop new applications and significantly change processes or practices; and innovating, where a portion of users are able to push the boundaries of the technology. Each of the towns where the user survey was conducted offered users in the minimal and conventional categories, with the least sophistication of usership in Bolgatanga and Navrongo, where broadband service (and with it more widespread public access) had most recently begun, and more sophisticated use in Tamale and Wa which had had broadband for longer.

The survey was developed and piloted in Tamale. The questionnaire, included in Annex 3, incorporated both specific questions on people's computer and internet use and more wide-ranging questions on their understanding of the uses of the technology, what they hoped it would do for them and for Ghana, and its advantages and disadvantages. All users answered the survey anonymously online except for those in Bolgatanga and Navrongo where answers had to be

collected in person due to users' lack of familiarity with websites. Recruitment of respondents was done through a combination of incentives: respondents were offered half an hour of free time online, on top of the time it took to answer the survey, which was about 30 minutes on average. They claimed this from the cafe manager with an individual code, which became available on the final webpage of the survey to those who had completed the entire questionnaire. This code was a precaution to avoid the problem of respondents taking the survey multiple times in return for free time online: in combination with the vigilance of cafe owners, who knew their clients and could tell if someone was taking the survey more than once, the code made people feel both anonymous in terms of their answers, and as if they would be identified should they try to take the survey again. The code was, in fact, the same for every user since the survey technology (a simple programme from surveymonkey.com) did not make it possible to generate a new code for each user. However, owners reported that respondents were telling each other that the code was an individual marker, and that they appeared to believe this to be true.

Cafe owners were the only contact point for survey respondents. They explained how people could access the survey website, and offered technical support if someone did not understand what to do. As an incentive for owners to offer the survey in their cafes, two questions were added to provide feedback on the cafes' equipment and services.

Anonymity in online surveys has been shown to trigger some behaviour that does not occur in person-to-person interactions (Joinson 2001). In situations where they know themselves to be anonymous to the researcher, they tend to be more ready to disclose personal information and to reveal opinions that might usually be considered unacceptable by their peers. This could indicate that the majority of the answers (those from Tamale and Wa, 208 in all), which were from surveys conducted completely online without the presence of a researcher, might be biased toward a higher level of disclosure than those from Bolgatanga and Navrongo (45 respondents) who were answering a researcher face-to-face. Without the ability to create experimental conditions there is no reliable way to test whether this bias exists, but it is useful to keep in mind that it may be present to some extent.

Another question was that of external validity: whether the survey constitutes an observation of people as they are, or as they are under the circumstances of the study. This question applies particularly to survey items such as the respondent's most-visited websites, which can be a highly personal issue. In order to gain some degree of understanding of the honesty of people's responses, a comparative exercise was conducted on different days in two of the cafes where the internet

survey was administered in Tamale and Wa. With the consent and assistance of the cafe owners, the browser histories were checked for the URLs visited that day by all the users present in the cafe (who were not seen by the researcher, and therefore remained unknown). The results, explored in chapter 6, offered a (non-systematic and non-generalisable) idea of the composition of each day's actual internet traffic. They were broadly consistent with people's claims about their internet usage, but also indicated that attempted internet scamming as a significant additional activity. This was considered in the construction of the survey but was not addressed in the questionnaire due to the assumption that people were unlikely to admit to illegal online behaviour.

3.2.6 Problems and limitations in the user survey

The first limitation of this user survey was an obvious sampling bias: all the respondents were already internet users. There was therefore no way to gather the perspectives of non-users, whether prospective or those who had used the internet previously and had now stopped. There was another bias in that the survey was based on an opportunity sub-sample of the internet cafes already surveyed, due to the necessity of finding cafe owners who were interested in having the survey conducted at their premises. These two biases mean that the survey cannot be considered generalisable to the entire population of Ghanaians, nor can conclusions reliably be drawn about internet users in Ghana in general. However, the survey was designed in this way for a specific purpose: to reflect the views of individual users in areas where the internet was new; and to provide an extra layer of depth to the more systematic survey of the internet cafe owners.

A further bias may have been introduced by people's understanding of the survey, both linguistically and practically in terms of how to find it online, and of its purpose. In two of the towns, Bolgatanga and Navrongo, this limitation turned out to be so great that after several weeks of attempting to recruit users to take the online version with no success, it was administered not online but by in person by a research assistant. In Accra, there were doubts about my identity and the possible use of the data which eventually made the survey impossible to administer. The survey was identified as re was much suspicion amongst cafe users that the survey was an instrument of surveillance. As related by the owner of the cafe where the Accra survey was attempted, customers' refusal took an anti-colonial slant:

> '… They say it is a way of tracking them down rather than to help them with better lifes, they believe strongly that in the past the whites have fooled them and not this time again, they have the idea that your survey is an instrument of trying to monitor their activities and also to know what is on their mind, I sometimes tell them that is not what the survey

> intends doing, but the survey is just to know their problems and help solve it, and they tell me in return that, they don't need help from you they will help themselves, because of past records or history.'
>
> (Kofi, cafe owner, email, 8.31.09).

While this is understandable given Ghana's colonial history, this fear of surveillance may also reflect increased monitoring of cafes by police due to reports of large-scale internet fraud. Internet cafe culture in Accra involves a high rate of attempted international scamming activity (Burrell 2008), some of which was picked up in interviews for this project. The end result of this problem was that the survey process was stopped in Accra and the few Accra responses gathered were removed from the dataset, so that the survey only contains responses from the four Northern towns.

The survey responses from Bolgatanga were used in the final analysis, but those from Accra were not. This was because the former were judged to be part of an overall Northern group of surveys, where users were subject to similar challenges (connectivity, electricity, literacy) which differed by degree rather than type. In Accra, the suspicion of fraud and surveillance made respondents' experience different in ways which were not directly comparable to the North, and possibly introduced biases that were unquantifiable, leading to the decision to exclude them.

3.2.7 Respondents' place of birth

A decision was made to exclude those cafe owners or IT managers born outside Ghana (four of the internet cafe group and seven of the IT managers) from the analysis in Chapter 5. They were not excluded from the business analysis of Chapter 4, however. This was because Chapter 4 focused on business-level results, while Chapter 5 focused on individual-level ones. Whereas Chapter 4 dealt with businesses as a unit of analysis, and quantified contributions without regard to the social processes underlying them. Thus the amount of travel an owner undertook was relevant, but his or her place of origin was judged to be less so on the basis that the levelling influence of the common challenges of running a cafe in Ghana were considered more relevant to the analysis than the possible advantage conferred by being born overseas. Chapter 5, however, focuses on the social processes underlying these transfers from abroad, and specifically the opportunity structures constituted by individuals' backgrounds and life experiences. National origin was judged to be a potential source of bias in this analysis, which assumes that the individuals studied are subject to a similar political and social framework of rules and expectations.

Among the subjects interviewed, foreign birth was more common among the IT managers than the cafe owners (see Table 3.3 below). These managers were working at a more internationally connected level of the technology business and in some cases had been hired in from outside specifically for their foreign contacts and experience.

Table 3.3 Respondents' place of birth

Total surveyed	Born in Ghana	Born outside Ghana in Africa	Born outside Africa
Internet cafe owners (95)	91	2	2
IT company managers (29)	21	2	6

3.2.8 Policymakers and sector experts

Besides the interviews noted above, a set of 20 interviews were conducted with policymakers and sector experts. Most of these were within Ghana, while a couple were outside and had worked on ICT4D interventions in Ghana. All those in Ghana were located in Accra. The list is attached in Appendix 2 (section 8.2). These interviews had two main foci: first, the world of Ghanaian ICT policy, which was addressed with interviewees from the Ministry of Communications, mobile and broadband providers (Tigo and Vodaphone) and representatives from the Business Process Outsourcing office within the Ministry of Communications. I also interviewed various management trainees more in depth about the sector, what they hoped to gain from entering it, and their perception of the current prospects for IT in Ghana. I also attended one day-long meeting on broadband regulation while in Accra, to get a more in-depth understanding of the infrastructural and funding issues facing the sector. The second main focus of these interviews was on the world of ICT4D intervention in Ghana. For this, I interviewed representatives from large funders such as UNDP and the World Bank, along with several representatives of the Dutch NGO IICD, which along with the World Bank was responsible for funding the telecentre project analysed in Chapter 6. I also spoke to an NGO in the UK, Aptivate, which had extensive experience of working with large funders to execute projects in the kind of environment where the internet cafes were functioning, in order to understand the perspective of those involved in the telecentre project on the ground.

Besides these interviews, I also conducted some that were more general and which were a result of contacts made or interesting issues that came up during the process of data collection. For instance,

I spoke to two young men who were professional internet scammers, in order to understand the moral panic occurring around internet fraud and internet cafe use at the time of my research. For obvious reasons, these interviewees were anonymised, but so were several others who spoke to me off the record. The rest were transcribed and analysed in long form, by reading for particular issues that had come up in the analysis and tracing them across the group of interviews.

3.3 Data analysis: Qualitative Comparative Analysis (QCA)

The first of the research sub-questions for this project asks how mobility influences the formation and viability of internet cafes. This question was formulated with the idea of using a comparative perspective in order to look at differences in outcomes between businesses owned by migrants and nonmigrants, and with the idea that since people in resource-poor areas often cannot afford to travel frequently, mobility might be operating in a variety of ways and possibly assisted by other factors. The data confirmed this, and also showed huge variance in the size and features of the internet cafes surveyed. This, and the relatively small number of cases (95 cafes) in comparison to this diversity, suggested the need for an analytical method which could take into account the wide-ranging differences without having to exclude outliers as in statistical analysis. The desire to keep in outliers was driven by the rarity of detailed data on Sub-Saharan SMEs: there is little literature that goes into detail regarding the determinants of small business outcomes in Africa, so that rather than simplify their characteristics it was judged preferable to find a method which took this diversity into account. On this basis Qualitative Comparative Analysis (QCA) (Ragin 2000) was chosen as the most appropriate method for the analysis.

3.3.1 Basic principles of Qualitative Comparative Analysis (QCA)

Qualitative Comparative Analysis is a case-based analytical method which originated in the field of comparative politics. It was developed by Ragin (2000) to analyse configurations of conditions, using Boolean algebra, to see which factors and configurations of factors are quasi-necessary and/or quasi-sufficient for the outcome of interest. As such, it is not probability-based. The original form of QCA deals with binary sets, where a case is either in or out in terms of membership. Later, the need to include degrees of membership became apparent so that the method was extended to involve fuzzy sets, a variant named ‘fsQCA’ (Ragin 2008, 2010). Instead of using 0-1 classifications of set membership fsQCA attributes degrees of membership expressed as a range of values between 0 and 1. This variant of QCA makes it possible to test the relevance of mobility to

business outcomes in a nuanced way that takes into account both degrees and types of mobility along with possible interacting factors – expressed by Ragin (2008) as 'multiple conjunctural causation'. In this case, an example would be cafes that are statistical outliers in terms of revenue but which have other features that are potentially interesting and merit inclusion in the analysis. QCA, in contrast, is designed to deal with high variance in the data[4] and relies on finely tuned calibrations based on knowledge of the cases and of the social reality that forms their environment. As a non-probability-based method, it does not sacrifice diversity for explanatory power by setting analytical parameters that demand the exclusion of certain cases.

Building a QCA model involves developing a hypothesis about which conditions are important in explaining the outcome and calibrating the variables accordingly into fuzzy sets denoting membership, or lack of it, in each condition as operationalised. The 'crisp set', binary version of QCA involves dichotomising cases as either fully members or fully non-members of a given set. An example, where cases consist of individuals, would be the set of 'university-educated' people or 'politically active' individuals. In contrast, the fuzzy-set version of QCA (here referred to as fsQCA) allows a more nuanced calibration of these factors, placing cases 'more in' or 'more out' of a set of membership in a particular condition on a scale from 0 to 1. An example would be the set of 'religiously affiliated' individuals where, if detailed data was available on subjects' views, one might wish to denote more complex degrees of affiliation ranging from no religious activity to intense involvement. Both forms of QCA can be conducted using relatively simple software which can be downloaded free. fsQCA software was thus used to calibrate and analyse the variables used below.

This method has limitations in terms of generalisability, but given that the dataset used in this study constitutes a complete census of the Northern cafes and a systematic selection of those in Accra, using QCA does not limit the internal validity of the findings. Their external validity, however, is limited by the fact that a QCA model relaxes some of the assumptions that are common in the analysis of causality. First, additivity, or the idea that each factor has its own separate impact on the outcome. Instead QCA assumes that multiple causal factors may be acting simultaneously and possibly in combination. Second, it assumes that more than one configuration of factors may be

[4] QCA software offers the researcher three different levels of diversity in the final results of the analytical process: a 'most complex' solution listing every configuration leading to the outcome in question, a 'parsimonious solution' which reduces this to the set of configurations associated with the greatest number of positive outcomes (the 'most parsimonious' solution), or an 'intermediate' solution, which in the cases of the analyses performed for this research was generally the same as the parsimonious solution.

able to produce a given outcome; and third, that a factor may act in favour of a particular outcome in one combination but against it in another. Finally, it does not claim causal symmetry, so that different combinations of factors may be sought to explain the absence, as opposed to the presence, of a given outcome. Thus the method does not assume permanent or homogenous causality. This is a clearly limitation with regard to generalisability, since it implies a tradeoff between detail and generalisability. This tradeoff is judged worthwhile in this case because of the diversity and relatively small scale of the dataset: although its conclusions cannot be claimed to be generalisable, it does make possible a systematic analysis which does not exclude any outliers. Furthermore, the fact that this is a complete dataset for the area in question means that we can extrapolate in a limited way about particular factors – to do with mobility in particular – that have not been included in other analyses of this type of business. Further details of the method's assumptions regarding causality and the measures of sufficiency, necessity and consistency can be found in Ragin (1987, 2000), and examples of its use as part of a mixed-methods strategy for the analysis of data to do with migration and mobility include Takenoshita (2009) and Mengeot (2003).

3.3.2 Formulating and calibrating membership sets

In order to formulate the fsQCA models, decisions had to be made about how to transform the data from variables into membership sets. It is only possible to transform a scale variable into a fuzzy set, since categorical data can only be treated as 'crisp' or binary sets in QCA. A fuzzy set is calibrated according to three key points along the scale: the 'zero' point of full non-membership, a threshold point of 0.5, where a case is 'neither in nor out' of the set, and the point 1, which designates full membership (see Ragin 2010 for further explanation of the theory behind the calibration of membership sets).

An example of a crisp set would be 'internet cafes which break even', since an internet cafe is clearly either a member of that set or not (1 or 0 in Boolean notation). An example of a fuzzy set might be the set of 'migrant cafe owners', since although one could make a crisp set using the UN definition of a migrant (United Nations 1998) as someone who has stayed abroad longer than a year, a more useful set would involve the degrees of migration that are relevant to the research question – for example, international long-term; international short-term; migration within the continent; within-country migration, and no long-term movement. One would then program this choice into the fsQCA program, which uses the standard logistic function to attribute values and the threshold point for the set. The threshold should ideally be set so that no cases fall directly on the 0.5 point: any that do cannot be used in the analysis since the QCA method is predicated on the

degree to which each case is a member or a non-member of the condition of interest. Details of which factors were used and how they were calibrated are given in Annex 2. QCA software is then used to calibrate the variable's range of values according to these fixed points, transforming the values into a 0-1 scale. There are no technical disadvantages or inaccuracies associated with mixing fuzzy and crisp factors in the same analysis, since all the values remain between 0 and 1. In this analysis these three types of set were used together.

One particular advantage of this method is that it enables the researcher to include what would, in a statistical analysis, be outliers. Since QCA is not probabilistic, a non-normal distribution in the original is not problematic since the cases on the extreme ends of the distribution merely become either full members or full non-members of the set. QCA thus provides almost unlimited opportunities for preserving the texture of the data – balanced by the need to use a theoretical basis for one's choices to avoid simply data mining.

3.3.3 Case selection in the QCA analysis

The hypothesis that internet cafes in the North and South face comparable challenges in terms of access to resources and knowledge was borne out by exploratory analysis of the data: when frequencies were run they showed that there was virtually no difference between the financial or logistical challenges of running an internet cafe in the south versus the north, and that as expected there was a higher degree of international mobility amongst the Accra cafe owners. The Accra and Northern cases were therefore grouped into a single dataset in the QCA analysis, as in the network analysis that followed. The exploratory analysis conducted is laid out in detail in Chapter 4. It demonstrated that although the Northern cases differed from the Accra ones along several important dimensions, including the opportunity to migrate long-distance and the financial resources circulating in the local business environment, the more influential factors appeared to be those that did not differ significantly between Northern and Southern businesses, such as the socioeconomic backgrounds of the entrepreneurs, the type of networking they were attempting, and the proportion of family members amongst their contributing linkages. The main grouping criterion of interest emerged as older versus younger entrepreneurs, which again did not differ significantly by location.

3.4 Network analysis

Following the exploratory and QCA analyses, it became possible to reach some conclusions about the importance of different types of mobility and networking activities which were then further explored using social network analysis. At this point a second dataset was added: the network

survey performed on the managers of Accra IT companies. Since the QCA analysis had looked at paths to viability involving networking of various kinds, the aim in this next phase was to add in a potentially very different group, operating higher value-added businesses, to compare their patterns of international activity with those of the internet cafe owners. Thus as with the decision to group the Accra cafes together with the Northern ones in the previous analysis, a choice was made to include a group that was not directly comparable in several ways, but that could provide an illuminating counterpoint to the internet cafe cases on various dimensions of special interest.

The hypothesis behind the inclusion of higher value-added businesses was that although they had more resources than the internet cafes, they would still need to source technical equipment and expertise from abroad. While the individuals involved in these companies were often (though not always) better resourced and connected than the cafe owners, they still had to balance travel with running their businesses, they still operated within the financial and geographic boundaries of the Ghanaian environment, and they still had the aim of making a technology business succeed within these constraints.

3.4.1 Network analytic approach

The network analysis performed was predominantly qualitative rather than quantitative: after determining the general contours of the network dataset through data cleaning and exploration, a more qualitative analysis was performed to look at how opportunities at home and in terms of mobility affected the way individuals were able to use their networks. This analysis is detailed in Chapter 5.

The analysis involved bringing two datasets together: the name generator used for the IT managers and the network data collected as part of the internet cafe survey. This was done by first cleaning and coding this data so that the comparable variables could be included in a single dataset. These included respondents' history of mobility, the number of contacts they had abroad, and the inputs coming from these contacts. Since the same questions had not been asked to both groups, the responses were not all comparable: for instance the internet cafe questionnaire included questions about technical and business advice from overseas, which were comparable with the questions about technical, innovation-related and financial advice on the IT managers' questionnaire. However the questions about concrete inputs such as equipment and money were not comparable across the two surveys since the IT managers were operating within larger companies with more resources, and were not in need of these types of transfers in order to operate.

The initial analysis of the coded data ran frequencies and comparisons of means to explore similarities and patterns across and between groups. The variables used included education, previous mobility, family socioeconomic status and association membership. The next step was to group respondents along dimensions of interest according to this exploratory analysis and to do an initial mapping of selected networks in order to construct an elementary typology for each group's network structure and composition. The last step was to identify the differences in those types and analyse them according to theories about network dynamics and transnational connections. This analysis involved analysing in detail how network structure differed between groups and how this structure was influenced by the presence of mobility; how in turn people used their mobility to change their network structure through activities such as brokering between circuits of knowledge or resources; and the effects of these activities on people's opportunities in the IT sector.

The main limitation of the analysis was the lack of comparability across several dimensions within the two datasets. The IT managers' data was richer in terms of different types of contact and background information on those contacts, while the internet cafe owners' data offered much fuller picture of each respondent's business activities and outcomes. This was due to the individual, rather than company, focus of the IT manager interviews, and the business focus of the internet cafe survey. However this limitation was mitigated by the strategy of developing network typologies, where the typical network structures and compositions found within each group could be further explored using this background data. Thus the non-comparable data became a way to triangulate and explain the conclusions reached from the dimensions that were comparable.

3.5 Confidentiality and anonymity

The project underwent ethical review before the data collection phase, where one of the main issues dealt with was subjects' anonymity and the confidentiality of the information gathered. This was because of three areas of sensitivity: financial information about the businesses surveyed, the identities of interviewees, and the internet usage data collected on the user survey participants. Financial information regarding the internet cafes studied was sensitive because data on revenues could be used by the government to inform their tax assessments of the sector, and also because of the issue of corruption in broadband service provision. Personal identities were sensitive because several survey respondents had migrated undocumented, some were running cafes under an alias and most had not formally registered their businesses. Moreover, the network data collected involved the identities of a large number of contacts whose permission had not been sought, and who were not aware of the interviewees' disclosing their identity. The data gathered on internet

usage was also potentially sensitive given that it could reflect activities that users would prefer to keep private.

The project was adapted in several ways in order to respond to these concerns. The identity of respondents in Ghana and of their contacts overseas were anonymised throughout by changing their names, but respondents in the internet cafe study were informed that anonymised information from the study would be shared with government or other interested parties only as far as it was judged that this might contribute to policies that would make it easier for them to do business, or to travel abroad. In the case of the user survey, there are a significant number of precedents for this kind of usage study (e.g. Gribble 1995; Crovella and Bestavros 1997; Du et al. 2006; Johnson et al. 2010), all of which gathered data from servers rather than individual computers. These studies do not deal with the ethical implications of the methodology. In response to this ethical concern, care was taken in order not to download any personal information and to dissociate any knowledge of individual users from the usage information taken from the computers. Information was noted from the caches several days after the survey closed, and the check was done by the cafe owner, who did similar checks regularly to check for illegal usage, while the researcher noted and categorised the sites visited. The cafe owner stated that there was no way for him to trace which user had performed any given search.

These ethical concerns were tested in practice when the Ghanaian government's Small Business office, the national IT services development office and Google's Ghana office asked for the survey data because it represented previously unavailable information on the cafes in the North. An anonymised dataset comprising the basic characteristics of these cafes (region, size, number of employees and type of equipment) to the extent that this allowed them anonymity was shared with the two government bodies, and cafe owners' permission was sought by email to share their spatial location with Google.gh so that their cafes could be mapped, in the interest of providing them with increased business.

They were also tested when the internet cafe survey showed that the national broadband provider's technicians were charging cafes large 'call-out fees' which they then pocketed, an issue which came up during meetings with the national provider in Accra. The company then asked for the names of the owners who had complained. They were not disclosed, but instead the company was informed of how many cafes had said they were paying these 'call-out fees', and the area where they were situated, which later led to this practice being investigated and curtailed (at least temporarily) by the

firm. The cafe owners were informed of this decision, and responded that they had already found the demands for bribes to be decreasing, and were happy with the outcome.

3.6 Conclusion: methodological contribution

Much current research on technology diffusion, particularly that generated by institutions with an investment in the field, is limited by focusing on the inputs involved in interventions (such as computers donated or training given) rather than the interventions' outputs or outcomes, i.e. how many people adopt the technology. In contrast, this study looks at processes of adoption and the mediating factors that contribute, and offers a critical assessment of the tools and processes currently available to measure outputs and to gauge possible longer-term results. This focus on processes and the critical perspective on products is adopted in order to 'unpack' and problematise the often simplistic view of technology diffusion prevalent in the policy world, and to offer multiple perspectives that may contribute to greater awareness of the complexity and diversity of actors and mechanisms involved.

This research makes contributions both by providing new data on an under-researched phenomenon and in the area of methodological innovation. In terms of data, it is believed that the northern element of the internet cafe survey represents the first systematic enumeration of internet cafes performed in Ghana. Although the scale of the research made it impossible to cover the entire country, it nevertheless offers a new dataset that indicates the circumstances under which internet provision can be established. The decision to use a census methodology for this region means that the data, while not directly comparable with other areas of developing countries without confirming their degree of similarity along other dimensions, is at least internally valid and represents the population of cafes in the region at the time of the survey.

Also in terms of data, this study has the advantage of an interdisciplinary approach that takes into account mobility, technology diffusion and development. Research on small-scale enterprises in Africa often explores the influences of credit availability and entrepreneurs' education but fails to take into account issues such as mobility and networks. Moreover, this study does not use the snowball sampling method common to migration research, but instead offers a systematic cross-sectional analysis of a business sector that also takes mobility into account and provides detailed information on respondents' history of travel and contacts overseas. This represents a different perspective on migration and mobility in the context of development to that found in most such studies.

The third contribution of this study comes from its combination of analytical methods. The decision to conduct a census of businesses identified according to a few key characteristics, and in turn to a highly diverse dataset with notable statistical outliers. Due to the fact that this study was contributing new data on an under-researched phenomenon (small-scale internet provision in poor and remote areas), it was considered important not to exclude any cases from the analysis. This, along with the fact that the data-gathering methodology had offered detailed knowledge of each case, led to the decision to use QCA in order to keep an in-depth perspective that could be informed and re-oriented by both theory and individual case knowledge. The method has so far been used very little on micro-level data or in studies of mobility, largely because it is still seen as specific to political science and has not been sufficiently explored in other disciplines. Similarly, the fuzzy-set approach is still being developed with regard to these contexts. It was appropriate to explore its use in this context because micro-level data on businesses offers the kind of diversity the method was devised to deal with, and because the context of mobility represents a way to further develop and test the methodology in a new context. This study therefore contributes to the development and extension of QCA into new areas of focus.

Overall, the study explores the uses of mixed methods and multi-level data collection in research into mobility and development. The strategy of nesting methods within a larger analytical framework is frequently used in social science research, and the methods adopted, particularly the network analysis element, have been used individually in studies of migration. However the combination used here contributes to the argument that the relationships between mobility, technology diffusion and development are multi-directional and highly context-dependent, and that in researching them it is necessary to triangulate information along multiple dimensions, and thus to find methodological solutions that can offer generalisable conclusions without losing the diversity of strategies and outcomes in this field.

4 The view from the digital dirt road: mobility and the internet cafe entrepreneur

4.1 Introduction

4.1.1 The uses of international mobility among small and medium enterprises

Research has argued for the importance of a variety of forms of international mobility and networking as a factor in small enterprise development (e.g. Black et al. 2003; Portes et al. 2002; Vertovec 2010). This chapter asks what role mobility plays in the formation and development of internet cafes. It will argue that Ghanaian internet cafe entrepreneurs are using a broad range of mutually complementary strategies involving international mobilities and transfers, and that it is only by considering the entire spectrum of migration-related activities that we can see the importance of global influences and inputs in the functioning of the poorest and least-resourced businesses.

Studies of the influence of international mobility as a strategy for small business formation and sustainability have usually focused on migration and remittances as conventionally defined, i.e. international moves of a certain duration, and financial transfers from migrants to their home country, i.e. money sent or brought back (Alfieri et al. 2005). Discussions about broadening our understanding of the term (ibid.) remain within the sphere of capital transfers, without considering other kinds of remittance. Despite a relatively recent interest in social remittances (Levitt 1998), the term has rarely used to denote any other kind of transfer with effects on productivity. This chapter will argue that the usual conceptualisation of migration and remittances in origin countries – as bounded and targeted phenomena – is too narrow to incorporate the actual range of mobilities involved in growing and sustaining these businesses.

Based on the survey of internet cafes in the north of Ghana and in Accra, this chapter first outlines how the various types of mobility and transfers have been operationalised in this study. It then goes on to discuss the characteristics of the businesses and entrepreneurs surveyed. Section 2 presents an exploratory statistical analysis of this group of businesses, and the extent to which the entrepreneurs involved are using international travel and contacts to form and build their enterprises. Looking at the importance of mobility for different types of entrepreneur, this section explores the spatial characteristics of the contact zones these entrepreneurs have formed, where diverse types of exchanges occur.

Section 3 uses Qualitative Comparative Analysis (QCA – see Chapter 3) to address the question of business viability from a different and broader perspective, asking what factors enable entrepreneurs to enter the sector, and what enables businesses to break even. This variant of the comparative approach allows us to isolate particular configurations of factors that offer paths to the formation and sustainability of these businesses. The QCA models used in this section furthermore make it possible to locate the importance of factors that did not appear to play a role in the earlier analysis, but which are pointed out as important in the business literature. Section 4 draws together the conclusions of the two stages of analysis, showing how the findings of the comparative analysis can be used to provide a different perspective on the dynamics described in the exploratory statistical analysis.

4.1.2 Operationalising mobility, remittances and business viability

The subject of this chapter is mobility, a concept which encompasses both migration and travel. Migration, as defined by the UN (United Nations 1998), entails a stay of a minimum of three months abroad, with long-term migration defined as a stay of more than one year. Studies that have analysed the effects of transnationalism on business (e.g. Portes et al. 2002), have tended to define the benefits entrepreneurs gain from mobility as taking place within this framework of long-term migration. However, this study adopts the term 'mobility' because it can encompass shorter lengths of stay which may still result in important gains to human, financial and physical capital. This use of 'mobility' is also closer to a developing-country perspective: while it is important for receiving countries to be able to identify longer-term migrants in order to track and facilitate their civil and economic integration, for citizens of developing countries migration is just one of a continuum of mobilities, the most important aspect of which may be the freedom to remain mobile.

In order to assess the influence of mobility on ICT diffusion, this chapter looks at its influence on the formation and viability of internet cafes in northern and southern Ghana. The businesses studied here can all be categorised as Small or Medium Enterprises (SMEs). The viability of this type of business is usually judged according to profit, growth and longevity (e.g. Frese 2000). However, the process of data collection suggested that viability is also measured subjectively by these entrepreneurs and that profitability may not be a central concern (see Chapter 3, section 3.2.2). The data on internet cafes collected during this research does support the existing literature on Sub-Saharan African SMEs in that those surveyed were generally informal and were often part of a group of businesses owned by a household (DeKlerk and Havenga 2004), where the household moves capital between them according to its needs (Kiggundu 2002). Furthermore, a high proportion become unprofitable and go out of business within 18 months (Frese 2000).

These multiple kinds of informality mean that many entrepreneurs have little incentive to keep formal accounts, and that (as was found in this study) that while they have a sense of whether they are making money from their business or not, this is frequently not codified in formal terms. This has obvious implications for any study of business viability: entrepreneurs may not be basing their decisions about whether to keep trading on reliable information about their earnings, but are likely instead to be operating reactively, with a significant time-lag. Businesses may stay open while they can pay their bills, close temporarily if they cannot, and reopen if an injection of cash is found. Enterprises may thus keep trading even in the absence of profits over quite a long period.

The question of viability – here defined as a business' ability to break even – is particularly interesting in the case of internet cafes because the sector is new, risky and high-status. A cafe demands a high initial investment, but in turn offers the chance for the entrepreneur to advertise his existence as a businessman. The statement made by opening an internet cafe, according to interviewees, involves notions of being 'modern', engaging with the global economy, contributing to the nation's development, technological literacy and cosmopolitanism. Interestingly, these ideas are similar to the reasons people surveyed during this research gave for migrating internationally, and involve a powerful imaginary based on ideas of globalisation, connectivity and empowerment which will be dealt with in more detail in a later chapter. The interviews conducted for this project show that these internet cafes often act as publicity for entrepreneurs – a form of branding intended to indicate success and status – as much as sources of profit, and that some owners use them as part of a longer-term overall entrepreneurial strategy involving multiple ventures with different functions and lifespans. This can be seen in the names of the businesses, particularly in the north: Boldtech, EasyRich and The Trend being just some examples.

The notion that profit is just one of the motives leading people to start internet cafes is borne out by the immense variation in outcomes of these businesses, so that it makes sense to see the group overall as composed of some enterprises that are designed to make a profit, some that are designed to convey a brand, and a majority that are designed to do both. Thus even if a business does not make a profit, it may operate in relation to other businesses belonging to the same owner and thus be part of a profitable livelihood overall, as well as adding to the owner's experience and longer-term potential as an entrepreneur.

Formality was not used as an outcome in this analysis since, although it is almost universally used as one measure of successful small business development in Africa (e.g. Nsengiyumva et al., 2006), in the case of northern Ghana in particular it turned out not to be useful. Most of the businesses

surveyed in the North had no realistic opportunity to register with the Internal Revenue Service, since this cost significantly more than most of the businesses reported they made in an average month and required a four-day trip to Accra. Most of the Accra businesses surveyed were registered, but this largely reflects the fact that businesses in the capital are accessible to the tax authorities, while those in the North are not. A government representative interviewed in Accra[5] noted that 75 per cent of the national tax revenues came from the cities of Accra and Kumasi, which suggests that only the largest businesses north of Kumasi are formally registered. However, the businesses that were not 'formal' had been identified by the local authorities (district assemblies), which regulate new business formation and tax informally at street level, and were paying tax but without a formal assessment.

The use of credit is another factor used by researchers to determine business viability: Schindler (2010), for instance, suggests that the most relevant way of looking at small business viability involves charting the success of credit-related risk management strategies over time. For this study, however, credit access is not the most useful way to judge the viability of businesses because of its cross-sectional approach, which does not allow us to gauge viability over time. Instead the use of formal and informal credit is included here as one of a range of inputs including concrete ones such as finance and equipment and less defined ones such as business skills and technical ability.

The first part of the analysis (as noted in Chapter 3, section 3.3) focuses mainly on profitability and return on investment (ROI) to evaluate the businesses surveyed. The fsQCA analysis is based on two characteristics: a business having been formed recently (i.e. the entrepreneur being a new entrant to the field) and its viability (i.e. breaking even on a monthly basis during the period of data collection for this research), which offer binary rather than scale measures of viability. In combination, these two approaches help to triangulate the factors that lead to viability in this complex and resource-poor business environment.

4.1.3 Characteristics of the SMEs surveyed

Internet cafes represent a new trend in Ghana – a large share (40 per cent) of those surveyed had been in business for a year or less. Although the majority of those found were very small-scale enterprises, they still represented a significant investment on the part of their owners, given that several northern interviewees estimated that US$1,000 was the minimum investment needed to start a small cafe. Table 2 shows the migration history of the entrepreneurs surveyed. The majority of

[5] interview with Victor Adadjie, Ministry of Communications, 15.9.09

those travelling beyond Africa had stayed for more than three months. A small minority who had only stayed for one month were also included in the same category because their travel had related specifically to their businesses.

Table 4.1. Cafe owners' mobility

Mobility (principal entrepreneur)	Number	%
<6 months outside region of birth, internal travel only	5	5.2
Internal migrant (> 6 months outside region of birth)	27	28.4
Mobile within Africa	21	22.1
Mobile beyond Africa	42	44.2
Total	95	100

Destinations beyond Africa were principally the US and Europe, but many also travelled, or were aspiring to travel, to China and other Asian destinations. All those who had not yet migrated expressed the desire to do so in the future. The respondents who had migrated had almost all done so independently of any organisation or programme. A few had been deported, but most had returned voluntarily for a wide variety of reasons. Despite the existence of policies promoting return migration and entrepreneurship (e.g. IOM 2012), none of those interviewed had been part of a formal return programme.

As can be seen from Table 4.2, most of those who were mobile outside Africa worked while abroad. A little over half of these also studied outside the continent, frequently on separate trips. Several travelled abroad to take masters degrees as far afield as Malaysia and the US, but it was more common to work while studying. A small minority had travelled on visits to friends or other trips without engaging in formal employment.

Table 4.2. Reasons for travelling

Activities	Number	%
Worked outside Africa	36	37.9
Worked and studied outside Africa	16	16.8
Studied outside Africa	19	20.0
Mobile without working or studying	4	4.2
Mobile within Africa	21	22.1

Respondents were more educated than the Ghanaian average (Table 4.3), which for the 18-36 age group in Ghana nationally is 6.9 years (Rolleston 2010), i.e. primary plus one year of high school. In contrast, most of those surveyed had at least high school education, and a large share were tertiary educated, a definition which included any form of education beyond high school. Respondents came from a wide age range (Table 4.4) but were predominantly young, with a significant proportion aged under 30.

Table 4.3. Entrepreneurs' education level

Education level	Number	%
Less than high school	2	2.1
Some high school	23	24.2
Completed high school	34	35.8
Tertiary	36	37.9

Table 4.4. Entrepreneurs' age

Age	Number	%
<25	14	14.7
25-29	26	27.4
30-39	31	32.6
40-49	17	17.9
>49	7	7.4

Only three of the cafes were run by women, and in one of the cases it was reported that the business belonged to a husband who was working overseas. There were various reasons given for this by the women entrepreneurs interviewed, but the most convincing was that in Ghana responsibility for childcare is considered to fall on women alone, so that they it is hard for them to manage a business that is open 24 hours, seven days a week. While women are commonly traders in Ghana, it is unusual to find them in small-scale businesses that do not allow a flexible schedule.

The next sections will examine the different influences found to be acting on business viability: mobility, age, location and the ability to access inputs from outside the country.

4.2 Findings: determinants of business viability

4.2.1 Migration, return and remittances

The main hypothesis of this study, that migration would be associated with stronger business outcomes for entrepreneurs, is supported by the data. The figures given are monthly because entrepreneurs, who often did not keep accounts, were encouraged to indicate their daily takings, which were then multiplied by 28 to arrive at an approximate figure for monthly revenue. Those who had travelled outside Africa tended to have larger businesses, measured by monthly revenue: the cafes where an owner has been outside the continent show a significantly higher median revenue – 700 cedis compared to those owners who had never moved outside Africa, who made 500, a finding significant at the 0.05 level (Table 4.5). The range of revenues was from 20 cedis per month for the smallest to 100,000 for the largest business (a distant outlier, given that 95 per cent of the businesses made less than 3,500 cedis per month). However, those who had travelled outside Africa did not have a significantly higher median net profit. The median is used because the range of businesses was very large, extending from several businesses making losses of up to 705 cedis per month to three which made over 5,000 cedis per month.

Table 4.5. Mobility outside Africa

	Mobile outside Africa (44%)	Not mobile outside Africa (56%)	Significance (continuity-corrected Pearson chi2)

Revenue (GH₵[6] monthly, median)	700	500	0.051*
Net profit (GH₵ monthly, median)	195	105	0.497
ROI (median)	0.382	0.308	0.762
Age of entrepreneur (median)	34	30	0.046*

Significance levels: *=10%, **=5%, ***=1%

Given that exchanges of knowledge and skills are here assumed to be one of the most important effects of travelling outside Africa, it is also useful to know whether working outside Africa is associated with better business outcomes. Working, rather than merely travelling outside Africa, did not make a significant difference for the variables shown in Table 4.5 above.

However, working outside Africa appears to be associated with better efficiency for the young. When a separate test was conducted on ROI for those 30 and younger who had travelled outside Africa, this group were found to have an ROI significantly higher than the median.[7] When working abroad was added into this calculation, the group of young entrepreneurs (14 in number) who had worked outside Africa had a median ROI of 0.763, compared to a median of 0.333 among those who had not worked outside Africa. This benefit in ROI from working abroad only shows up among the young entrepreneurs: the older entrepreneurs who had worked overseas had a median ROI of 0.377, only slightly higher than those who had not worked abroad. The result, however, should be regarded as a tendency rather than a clear direction since a rank-sum test shows it is only close to significance at the 10 per cent level (0.104). Despite this, this tendency is worth taking into account since it suggests that those under 30 may be able to use the skills and knowledge gained by working abroad to substitute for status in the local business environment.

These contrasting findings are interesting because they suggest that travel may be both a cause and an effect of having more resources. Those who travelled internationally might be doing so because they were already well-resourced, and were therefore also putting more into their businesses. As Table 4.6 shows, they were also more likely to bring home remittances and equipment (computers) which go directly into their businesses. However, despite having larger businesses they are not making significantly more net profit than those who have not travelled outside Africa. The group

[6] Ghanaian New Cedis.
[7] This was found in an analysis not shown in the tables. It was found using another median-based test, the Wilcoxon rank-sum (Mann-Whitney) test.

who travelled abroad were also likely to be older than those who did not, with a median age of 34 to the non-travellers' 30. It is possible that these extra years enabled this group to build up more resources that allowed them to travel and to spend more on their businesses.

Table 4.6. Share of those mobile within versus outside Africa who keep accounts, use remittances and receive goods from abroad

	Mobile outside Africa %	Mobile in Africa (outside Ghana) %	Significance (continuity-corrected Pearson chi2)
Formal accounts	69.05	42.86	0.045**
Business formed using remittances	64.29	38.10	0.049**
Computers sent from abroad	52.38	23.81	0.031**
Receiving inputs from abroad	76.19	57.14	0.12

Significance levels: *=10%, **=5%, ***=1%

As Table 4.6 also shows, various forms of remittances were more likely to be found among those who had travelled outside Africa: amongst those mobile outside the continent, 64 per cent started their business with remittances, compared to 38 per cent of those who travelled only within Africa. Similar results are found for those using computers sent from abroad, and those receiving ongoing inputs of all kinds from beyond Africa. Those who had travelled outside Africa are also more likely to know how to keep formal accounts, at 69 per cent compared to 42 per cent of those only mobile within the continent. This is important because the ability to keep formal accounts is pointed out in the literature (e.g. Frese 2000) as a factor in building a business beyond the micro-level.

The group surveyed here is diverse in terms of age and location. It is possible that many of these differences in opportunity and resources also relate to underlying demographic differences. If we take the demographic factor of age and look at differences between businesses run by younger versus older entrepreneurs (Table 4.7), we see significant divergence in each indicator except for ROI.

Table 4.7. Business characteristics by age of entrepreneur

	Young (≤30) /uneducated (n=48)	older (> 30) (n=47)	Significance (continuity-corrected Pearson chi2)
Revenue (GH₵ monthly, median)	382.5	700	0.003**
Expenditure (GH₵ monthly, median)	352.5	500	0.078*
Net profit (GH₵ monthly, median)	70	200	0.029*
Return on investment (median)	0.30	0.40	0.350

Significance levels: *=10%, **=5%, ***=1%

The younger entrepreneurs have lower expenditure and revenue, lower net profit, and are therefore clearly at a disadvantage given that the internet cafe sector privileges capital and hardware over skill. However, their return on investment does not show a significant difference from that of older and higher-status entrepreneurs. How are they achieving a similar return on investment in the absence of similar resources?

The answer seems to be through mobility. Table 4.6 showed that travelling outside Africa is associated with a higher level of business skills (indicated by the ability to keep formal accounts), and Table 4.5 showed that it is associated with higher revenue (though not with higher net profit or ROI). When a younger entrepreneur works outside Africa, it is associated with a higher ROI – but only among this younger group.

The young are less likely to be mobile, however (Table 4.5. Mobility outside AfricaTable 4.5). This is likely to be because they cannot afford to travel as much as the older entrepreneurs. However, they are using mobility, as we can see from Table 4.8. They use it in the form of foreign inputs, specifically from the non-Ghanaian contacts which are just as common among this younger age group as among their older competitors. Similarly to international mobility, importing computers is a feature of having more resources (since Ghana's technology import taxes are high). The older entrepreneurs with imported computers had significantly larger businesses, measured by expenditure, than those who bought second-hand ones in Accra. However, they did not have a significantly higher ROI. During the research, this benefit of mobility was immediately apparent in the form of up-to-date computers and flat screen monitors that are more resilient to heat and dust of West Africa, while most of the internet cafes where entrepreneurs did not migrate were stocked with second-hand imported computers dating back to 1997 or earlier.

Table 4.8. Mobility-related characteristics and age of entrepreneurs

	Young (≤30) /uneducated (n=48) %	older (> 30) (n=47) %	Significance (Pearson chi2)
Mobile beyond Africa	29.16	59.57	0.003**
Business formed using remittances	35.42	55.32	0.051*
Computers bought outside Ghana	22.92	46.81	0.014**
Inputs to business from contacts abroad	68.75	59.57	0.351
Contacts of non-Ghanaian origin	72.92	80.85	0.359
Inputs from people of non-Ghanaian origin	22.92	36.17	0.157

Significance levels: *=10%, **=5%, ***=1%

Therefore although younger entrepreneurs have less opportunity to travel outside Africa, they are nonetheless making contacts that they sustain online (as they reported in interviews), and from which they receive inputs. In the context of the market gaps outlined in Chapter 1, Section 1.1.1, where hardware and software are extremely hard for these entrepreneurs to come by unless they have large amounts of starting capital, these inputs may make them more competitive, and constitute a factor of the diminished difference between their ROI and older entrepreneurs. They are also interesting in light of the finding that when the young can both travel *and* work outside Africa, they seem to gain a greater increase in ROI than older entrepreneurs do. ROI is important because rather than showing the resources an entrepreneur has to put into his or her business, it indicates how effective they are in using whatever resources they have. This too, then, suggests that the young are doing more with less. They have lower levels of resources and status, but that they may be using their international social networks and mobility differently from the older entrepreneurs.

4.2.2 Accessing inputs through others' mobility

The other important feature of these international transfers is that they appear to take place not only through cafe owners' own mobility, but also through the mobility of others. These may be family members (the most usual source of remittances), friends or associates, or non-Ghanaian visitors such as foreign volunteers or NGO workers. These non-family connections involve what Granovetter (1973) termed 'weak ties': contacts not connected by kinship or other close bonds of obligation. Weak ties, Granovetter found, are most useful in transmitting new information and opportunities, since they form a more open network than the individual's close (and closed)

community of strong ties. This use of contacts can be categorised into three main areas. First, capital; second, hardware and software, and lastly, intangibles including technical and business knowledge.

As Mohammed, a cafe owner in Accra, put it, 'to have a good IT industry in Ghana, people will have to go out there and get the technology - but it is very hard to get the visa.' The challenge, therefore, is to find ways to source the computers, software and knowledge that are not yet available in Ghana, without being able to travel at will. Although nearly half of these businesses involved someone who had travelled outside Africa, most entrepreneurs interviewed had only done so once or twice at the most, and thus still needed an ongoing resource. As this section will demonstrate, many of them managed to access equipment, including software, from overseas without travelling themselves. The other option for these cafe owners was free applications such as Avira (an antivirus programme) or open-source software such as OpenOffice (for word processing). Although internet cafes did report using free antivirus, none reported using OpenOffice. Therefore software from overseas was at a premium.

More entrepreneurs were using weak ties abroad than strong ties – 46 per cent as opposed to 26 per cent. When this was restricted to those mobile outside Africa, this tendency became stronger, with 61.4 per cent doing so as opposed to 40 per cent using strong ties. The businesses using these weak ties did not differ along any other dimensions such as size or age of enterprise. Again, the fact that all types of business are using contacts abroad to the same extent indicates that entrepreneurs are able to mobilise social capital internationally regardless of inequalities in their resources and environment.

These inputs, especially technical knowledge, were coming primarily from the Americas and Europe. Interviews revealed a bifurcation in these entrepreneurs' access to technical training where those without significant starting capital could not afford the IT training courses available in Ghana, which were mainly in the South, whereas those with more resources went abroad wherever possible to study at a higher level. Those in the middle of the range managed to take training courses in Ghana, but these were a small minority of the entrepreneurs interviewed. The majority said they had come across IT during secondary school and had pursued it as an independent interest without taking classes. Contacts abroad were particularly useful for those who had not studied IT, but were also useful as an ongoing resource for those with technical training. Business skills were also expensive to acquire: courses in record keeping and general business skills were hard to find and expensive, particularly in the North. During the period of this study, a two-day entrepreneurship

course was advertised at the main polytechnic in Tamale, in the Northern Region, for 450 Cedis (US$303.05) – three times the median monthly profit of the businesses studied.

The data (see Figure 4.1) confirm that cafe owners are primarily receiving technical skills and knowledge from foreign contacts. Among the group of 95 businesses there were 52 instances of technical information being received from someone abroad who was not connected to the business owner by kinship or household ties. Software and hardware are the second most common transfer from outside the continent, with 28 instances of a weak tie contributing these. Financial capital from abroad, in contrast, is more likely to be contributed by kin or household members.

Figure 4.1. Foreign inputs to businesses

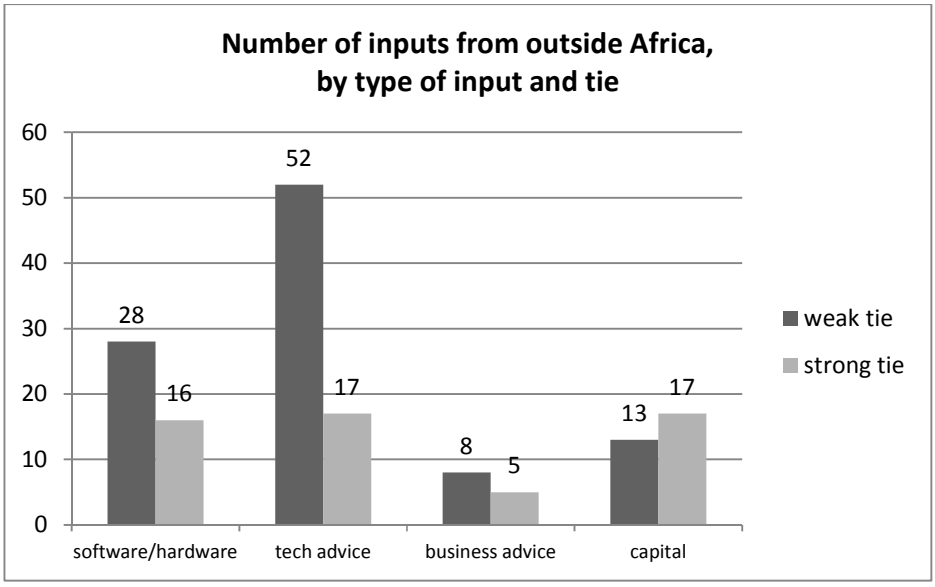


Figure 4.1 shows that the transfers these businesses are receiving are coming in many different forms, via different types of ties, and are occurring as much via friends and associates (weak ties) as via family members (strong ties). The weak ties in the diagram are responsible for 64 per cent of the inputs received by the entrepreneurs in this study, meaning that this proportion of goods, finance and advice was sourced from associates who were not members of the entrepreneur's household. The only exception to this dynamic is financial remittances, which come predominantly (56 per cent) from household members. Overall, 46 per cent of the contacts contributing from outside Africa are those of entrepreneurs who have not themselves travelled outside the continent. This dynamic includes all types of transfers, and indicates the universality of strategies of transnational networking amongst the group studied.

As Table 4.9 shows, these weak ties are not associated with entrepreneurs who have stronger business outcomes – though we do see them among larger businesses (as measured by expenditure), there is no difference between businesses with and without weak ties along any other dimension. One way to interpret this would be to say that although these transfers do not raise the profitability of these less well-resourced enterprises to the point where they could compete directly with the larger and wealthier businesses, they do allow younger, but technologically competent entrepreneurs to enter and survive in the sector.

Table 4.9. Weak ties and business viability

	Using weak ties abroad (n=44)	No weak ties abroad (n=51)	Significance
Revenue†	687.50	500	0.1392
Expenditure†	446.50*	350*	0.0818*
Net profit †	170	150	0.8084
Return on investment†	0.32	0.43	0.2484

† Wilcoxon rank-sum test

This interpretation is supported by the fact that despite their lesser mobility, the younger entrepreneurs are just as likely as their older counterparts to be networking beyond the continent (see Table 4.10 below). This suggests purposeful use of international networks as a way to enter the sector and keep their enterprises viable despite the obstacles identified above, i.e. a lack of credit and business experience. This in turn suggests that as well as giving better-resourced businesses a comparative advantage, these networks and the resulting transfers may be levelling the playing field for younger and less well-resourced entrepreneurs.

Table 4.10. Age and networking abroad

	Entrepreneur ≤30 (n=48) %	Entrepreneur >30 (n=47) %	Significance (Pearson chi2)
Using contacts outside Africa (n=83)	49.4	50.60	0.563
Receiving inputs from outside Africa (n=61)	54.10	45.90	0.351

As importantly, the younger group are not significantly more likely to be receiving inputs from their contacts overseas than the older group. Table 4.11 below explores these values with regard to location, where we see that location, like age, is not associated with a greater or lesser likelihood of having and benefiting from contacts outside Africa.

Table 4.11. Location and networking abroad

	Northern (n=68) %	Accra (n=27) %	Significance (Pearson chi2)
Using contacts outside Africa (n=83)	69.88	30.12	0.334
Receiving inputs from outside Africa (n=61)	54.10	45.90	0.753

These weak ties also demonstrate the other facet of contact zones, as spaces of misunderstanding and disjuncture. The meeting of cultures can lead to false assumptions about the type of contact being made, as occurred with Samuel, a cafe owner from the North, who related what seemed to be a case of mismatched expectations:

> 'I didn't know how to network [my 30 computers] together with the server. Then a Peace Corps volunteer came through... He saw the problem, and he stayed here for a few days to network the cafe… after that I could start the business. Then he left... we were emailing for

> a while, he paid for some software against viruses, and he would give me tips. But I have not heard from him for many months. I email, but he does not email back. I think perhaps he has died.' (Samuel, interview 2.6.09)

These contacts may make the difference between survival and failure in the case of some businesses, but without a longitudinal study it is impossible to tell. However, the sheer volume of the inputs from these contacts compared to the formal and informal credit available to these businesses suggests that however hit-and-miss, cultivating them is still a good strategy. Only 23 of the group of 95 businesses surveyed had received some form of credit, but 83 had contacts abroad and 61 were receiving contributions from their contacts. In all, these businesses had an extended network of 128 people making concrete contributions from outside Africa.

4.2.3 The advantage of age

These findings show that the older entrepreneurs are more successful in terms of revenue and profit. The inputs from abroad that they report (computers and finance) show that their mobility is clearly related to their business success. However, the younger ones are doing better in terms of business efficiency (ROI) and business skills (keeping formal accounts – this finding is not shown in these tables) and just as well as the older entrepreneurs in terms of gaining inputs from international contacts who are not from their immediate social circle. This suggests that mobility is benefiting the younger ones in a less direct way, through networking and the acquisition of skills and knowledge, which is still having an impact on their businesses.

Interviews support these findings. Respondents reported that entrepreneurs in this younger age group were less likely to be taken seriously as members of the business community, regardless of their technical skills and education. They also stated that it was almost impossible to gain credit from a formal financial institution as a young entrepreneur, particularly in the technology sector, which banks found new and unfamiliar. One entrepreneur explained that loans are subject to a short term (one year) and high interest (48 per cent), and that the bank tends to keep around 30 per cent of the loan as a kickback while the entrepreneur pays interest on the full sum. The issue of influence was also frequently mentioned by interviewees:

> 'You need credit to expand the business by getting more computers and maintaining it well – but it's too hard to get unless you are connected. You have to know people in the bank. Sometimes if you are influential in Tamale you can get credit.' – (Mohammed, Tamale, 27.3.09)

This suggests that younger business owners who can access any extra resources overseas have a comparative advantage that allows them to enter a relatively capital-intensive business despite their lack of 'influence'. While finance is clearly the most important factor, entrepreneurs who lack this may to some extent fill the gap by acquiring greater IT skills and knowledge. Younger cafe owners also said that having transnational connections raises one's profile as an entrepreneur, drawing more customers to the business. They stated that working outside Africa, or having contacts outside the continent, changed their approach to business, and to technology in particular. This point of view was encapsulated by Thomas, a young cafe owner from Accra, who explained:

> 'It is imperative for someone starting a business to be exposed to what is going on outside. It gives you a broader view, you are looking at the whole picture - how big do you want to be, how current. It is important to be current.' (Thomas, Accra, 26.7.2009)

4.2.4 Location: North vs. Accra

Given the huge inequality between North and South, it is important to check the extent to which geographic location is acting as a determinant of business outcomes. When the factors from Table 4.5 are compared according to the North/South division (Table 4.12), it can be seen that being located in Accra seems to confer a similar advantage in terms of median revenue and expenditure to that of being older. This is an intuitive result given that the North has a much higher poverty rate – with fewer resources available, businesses there tend to be smaller overall.

The 68 northern entrepreneurs were also more likely to be running multiple businesses (not shown in Table 4.12), adopting what is termed by Kiggundu (2002) an 'octopus structure', a common response to the greater uncertainty of doing business in poor locations (Dercon 2002, de Klerk and Havenga 2004) However, Table 4.12 also shows that median net profit and ROI did not differ significantly between North and South. Thus age and status appear to be a more important predictor of business outcomes than location. This is supported by two findings regarding the cost of doing business: entrepreneurs in both North and South estimated that it took the same minimum investment to start an internet cafe (around US$1,000), and the main fixed costs – electricity and connectivity – did not differ by location.

Table 4.12. Northern vs. southern internet cafes

	North (n=68)	Accra (n=27)	Significance (continuity-corrected Pearson chi2)
Revenue (GH₵ monthly, median)	427.50	829.50	0.005***
Expenditure (GH₵ monthly, median)	350	505	0.005***
Net profit (GH₵ monthly, median)	125	300.25	0.139
Return on investment (median)	0.33	0.54	0.449

Significance levels: *=10%, **=5%, ***=1%

The challenges of running a business were found to be similar in North and South in that the costs of broadband and electricity are the same, and import taxes on equipment and lack of credit hit northern and southern entrepreneurs equally. Rent costs more in Accra, which may balance out the higher revenues seen among the Accra businesses. The main challenges for entrepreneurs in North and South were found to be intermittent connectivity and electricity, a lack of credit and high taxes on equipment. For these reasons, although the southern businesses are larger, they suffer the same challenges to their viability as the northern ones. Although they show a higher median profit and ROI, these differences are not significant, and thus location is not judged to be the primary factor determining their viability.

Age, therefore, is important – but mobility appears to be an important asset as well because it impacts on several areas of entrepreneurship, from business skills to accessing financial and material resources, providing leverage particularly for those who are young or under-resourced. In contrast, age and location are fixed attributes which influence one's overall likelihood of success, but do not provide a flexible, incremental advantage as mobility seems to do. One example of this is that young entrepreneurs can apparently boost their ROI by working outside Africa. One possible explanation for this tendency is the presence of the 'contact zones' identified by Pratt (1999) and Raj (2010) and discussed in chapter 2. These spaces are characterised by the construction of new knowledge particular to the cultures and sets of experience that come together there: in this case, ICT and business skills and knowledge are acquired, processed and adapted to the needs of the Ghanaian technical and business environment. Interviews suggested that entrepreneurs are inspired by travel, but also filter the knowledge they gather overseas for what can be applied at home:

> ‘Travel and the world outside is imperative for someone working in technology – when I went to Holland I was exposed to many things that were commonplace there – broadband access on the streets, around town, mobile phone connectivity everywhere. I have a wireless service I supply to clients, but only within 300 metres. In Holland you could access it anywhere.’ – (Thomas, Accra, 25.07.09)

A significant proportion of entrepreneurs also described themselves as being involved in ‘development issues’ – a term that is not indigenous to Ghana, but which the interviewees used to indicate that they were taking part in an internationally oriented ‘development’ culture with a particular perspective on Ghana, one situated halfway between Ghana and the foreign countries they visited. The next section uses comparative analysis to examine these international mobilities and influences further.

4.3 ‘Missing’ factors and mobility: a comparative analysis

The previous section used descriptive statistics to find the main factors involved in migration’s relationship with SME outcomes. However, several variables which might be expected, according to the literature (e.g. Nziramasanga 2010; Frese 2000), to have a strong effect on these outcomes, such as education; local, sector-specific professional networks; and access to various types of credit, did not show a significant association with business viability. It is possible that these variables do influence business characteristics, but in combination rather than alone. To investigate this, an additional analysis is conducted using fuzzy-set Qualitative Comparative Analysis (Ragin 1987; 2000), a non-statistical method for the systematic analysis in social science. As noted in Chapter 3, the main characteristics of this method are a non-probabilistic, combinatorial approach, and an ability to focus on diversity rather than most-common explanations. The latter is particularly useful in a small-scale cross-sectional study such as this, where existing theory is minimal or possibly inapplicable but the researcher has detailed case knowledge. In such a situation QCA makes it possible to take into account outliers and deviating cases that might be important to understanding the phenomenon but would necessarily be excluded by a statistical approach.

To undertake this QCA analysis, four ideal types of internet entrepreneur were first created based on hypotheses about the factors making businesses viable. These were then used to generate QCA models. The first two are based on the process of breaking into the internet cafe business, as represented by having a cafe that is less than 3 years old. These new cafe entrepreneurs constitute 70 per cent of the population surveyed. Within this group of new cafes, there are two types of entrepreneur. First, those who have not travelled outside Africa (ideal type 1), and are therefore

making the most of local factors to get a business advantage – mainly (according to the interviews conducted) building status in the community that will allow them to gain local allies and access credit to expand their businesses and survive shocks. The second group of cafes (ideal type 2), which constitute 55 per cent of businesses three years old or less, are those whose owners have travelled outside Africa, or who have contacts who do so, and who are thus drawing resources and knowledge from more technologically advanced areas.

The second pair of scenarios involves the likelihood of a business breaking even. Here, similarly, the entrepreneurs are grouped into an ideal type (type 3) where they are using local resources to make their businesses viable, and another (type 4), where the owner employs international mobility and contacts in order to gain a competitive advantage. These four ideal types were translated into four models, as demonstrated below. The calculations used will be explained in some detail for the first model, but for a fuller explanation of the procedures involved in the computation of a fuzzy-set QCA analysis, see Ragin (2008).

For purposes of clarity, the steps used to run the first model will be shown in full and explanations of the necessary terminology are included. The tables showing these intermediate steps for the other models are shown in Annex 1.

4.3.1 New entrants to the sector: local factors

Model 1: Businesses established less than 3 years ago, without mobility as a factor

This model is designed around an ideal type where new entrants to the field are using existing resources to set up their enterprises. Thus the factors included (shown in Table 4.13) are having at least one pre-existing business, having another salaried job (i.e. one providing security and possibly savings to invest productively), access to formal credit, and access to informal credit. All the variables used in this first model are dichotomous, i.e. binary, in their construction.

Table 4.13. Variables used in model 1

Variable	Type	Description	Rationale
Business not older than 3 years	Dichotomous	OUTCOME VARIABLE	Defines a group of new entrants to the sector.
Other enterprise	Dichotomous	Is the business part of a group owned by the same person	Those who are already doing business are looking for opportunities in new sectors
Other salaried work	Dichotomous	Does the respondent/owner have an unrelated salaried position	Public sector workers may seek to grow their savings through entrepreneurship
Formal credit	Dichotomous	Has the business ever benefited from a bank loan	Literature suggests formal credit is a key factors in SME formation
Informal credit	Dichotomous	Has the business ever benefited from another type of loan from an organisation	Same rationale as formal credit

The next step is to create a 'truth table' (Table 4.14) containing every possible logical combination of the variables used in the model, and the outcome with which each is associated.

Table 4.14. Model 1: truth table

Other enterprise	Other salaried	Formal credit	Informal credit	Number of cases	Outcome = not older than 3 years	Cases where outcome (Y = not older than 3 years) occurs	Cases where outcome (Y = not older than 3 years) does not occur	Consistency
1	0	1	1	1	1	1	0	1.000000
0	1	0	1	1	1	1	0	1.000000
0	0	1	1	1	1	1	0	1.000000
1	1	1	0	2	1	2	0	1.000000
0	1	1	0	3	1	3	0	1.000000
1	1	0	0	6	1	5	1	0.833333
1	0	0	1	5	1	4	1	0.800000
0	1	0	0	14	1	11	3	0.785714
0	0	0	0	26	1	20	6	0.769231
1	0	0	0	24	0	14	10	0.583333
0	0	0	1	4	0	2	2	0.500000
0	0	1	0	4	0	2	2	0.500000
1	0	1	0	2	0	1	1	0.500000
0	1	1	1	0	?*			
1	1	0	1	0	?*			
1	1	1	1	0	?*			

The last 3 rows here show 'logical remainders', marked by *. These are combinations that are possible but were not observed. The truth table displays all the combinations of conditions that are sufficient, or may be sufficient, for the outcome to occur. Due to limited diversity in the dataset, the final rows represent combinations which could lead to the outcome but were not empirically observed. These 'logical remainders', marked '?' in the truth table are in this case excluded by the choice of consistency threshold.

The term 'consistency' in the truth table refers to the extent to which a causal combination is representative of the argument being tested. It can be expressed by the following formula:

$$\text{Consistency } (X_i \leq Y_i) = \sum[\min(X_i, Y_i)] / \sum(X_i)$$

where 'min' denotes the lower of the two values, X is membership in a particular combination of factors, and Y is degree of membership in the outcome. Thus when all the instances of a combination X also show outcome Y, the consistency score is 1, but when a few 'near misses' (Ragin 2008:134) are present, the score will fall slightly below 1. To take the example of line 6 of Table 4.14, the consistency score is arrived at by dividing the number of instances of the combination in question (X) where the outcome (Y) is present (i.e. 5) by the number of instances of combination X throughout the dataset (6), yielding a score of 0.833333. When many inconsistent scores are present, the score will be even lower. The researcher then determines the level of consistency score (the 'consistency cutoff point') at which she will use a given combination as potentially 'explanatory' in the analysis, and sets the outcomes to 0 for cases falling below this score, so that they are not included in the Boolean minimisation process used to calculate the solution terms. The consistency cutoff point is chosen by the researcher, but is guided by the convention of regarding cases with less than 0.75 consistency as representing 'substantial inconsistency' (Ragin 2008b).

A QCA analysis also involves testing all the individual conditions for *necessity* (Table 4.15) to check whether any of them is a perfect fit with the outcome and should therefore be excluded. For instance, if Ghana had recently passed a law stipulating that only those with other salaried work could own an internet cafe, this condition would show up at this point as 'necessary' to the outcome and would need to be excluded from the analysis. We should note that when testing for necessity, consistency and coverage are calculated differently (see Table 4.15 for a disaggregation of this difference in calculations). In this case, no condition offers a perfect fit with the outcome.

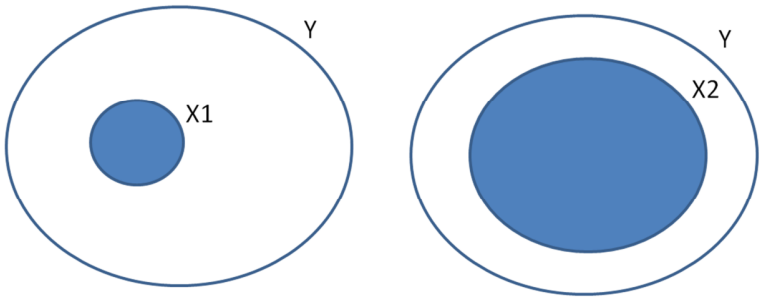
Table 4.15. Model 1: Analysis of necessary conditions

Outcome variable: Business not older than 3 years		
Conditions tested	**Consistency**	**Coverage**
other enterprise	0.402985	0.675000
other salaried	0.328358	0.846154
formal credit	0.149254	0.769231
informal credit	0.134328	0.750000

Given that no single condition is found to be necessary, the analysis therefore next moves to a minimisation of the combinations in the truth table, in a search for the *combinations of conditions that are sufficient for the outcome to occur*. This is performed using an algorithm for Boolean minimisation to reduce all the possible combinations to their simplest expressions, or 'solution factors'. These, taken together, form a 'solution term' which can explain all the instances of the outcome.

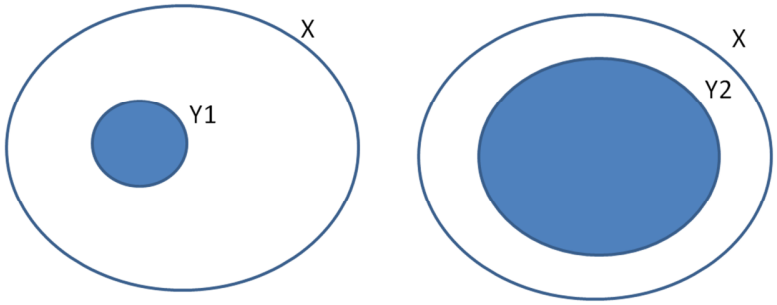
This procedure of testing for *sufficient conditions* also involves measures of coverage and consistency. When we look at sufficient conditions, the consistency level denotes the degree to which each path (X) is a subset of Y, the outcome. Figure 4.2 shows this: X1 shows a low level of consistency, such that we only rarely see path X and outcome Y together, while X2 shows much higher consistency, being present in most instances of the outcome.

Figure 4.2. Consistency in the case of sufficient conditions



Coverage, in the case of sufficient conditions, denotes the extent to which the outcome is a subset of a given path. Figure 4.3 demonstrates this: the first diagram shows low coverage where cases of the outcome, Y1, are only a small share of cases showing path X. The second shows high coverage, where most of the time when we see the outcome, Y2, we also see instances of path X.

Figure 4.3. Coverage in the case of sufficient conditions



Thus, a solution term's *consistency* level speaks to its contextual accuracy: where we find the outcome, do we find the condition? In contrast, the term's *coverage* level denotes its empirical relevance: where the condition is present, can we reliably expect to find the outcome?

As noted above, these two measures operate differently in the tests of necessary and sufficient conditions, as can be summarised as follows (Table 4.16):

Table 4.16. Necessity and sufficiency

	Necessity	Sufficiency
Consistency	Y as a subset of X	X as a subset of Y
Coverage	X as a subset of Y	Y as subset of X

Table 4.17 shows the solution terms for this model. Boolean syntax is used so that * denotes the logical AND, while ~ denotes the logical NOT. Here the measure of coverage is split into two more exact terms, 'raw', where the solution term may overlap with others in explaining the outcome, and 'unique', which denotes the extent to which cases of the outcome involve that term alone (see footnote for how to calculate these terms).

Table 4.17. Model 1 solution factors

Model 1	**Business 3 years old or less =f(other enterprise, other salaried, formal credit, informal credit)**				
Consistency cutoff:	0.769231				
RESULTS:		Number of cases	Raw coverage[8]	Unique coverage	Consistency[9]
Solution factors:	1. Other salaried	22	0.328358	0.164179	0.846154
	2. Other enterprise * informal credit	5	0.074627	0.059701	0.833333
	3. Formal credit * informal credit	2	0.029851	0.014925	1.000000
	4. ~Other enterprise * ~formal credit * ~informal credit	31	0.462687	0.298507	0.775000
Solution coverage:	0.716418				
Solution consistency:	0.813559				

The first three solution factors, which involve various forms of capital generation, show high consistency but low coverage. This suggests that although entrepreneurs often have another source of income or can somehow access credit, these do not do a good job of explaining the specific characteristic of *recent entry* to the sector. In contrast the last term, which shows businesses with much less access to capital through loans or related enterprises, shows higher coverage and therefore greater relevance to the question. Who are these entrepreneurs, and what are they using

[8] The number of cases with the outcome (Y) is 67. Thus the 'raw coverage' score is obtained by dividing the number of cases in each configuration by the total cases showing the outcome, and 'unique coverage' by dividing the number of cases showing the outcome by those which involve that term alone.
[9] The 'consistency' score is determined, as in the truth table, by dividing the number of cases where the configuration and outcome are both present by the overall number showing that configuration.

instead of locally generated capital? The relatively substantial number of businesses involved, 31, suggests that this fourth path is worth investigating using a different model.

Model 2: businesses younger than 3 years involving mobility

A second model was run to explore the idea that this fourth group from model 1 is using other means than credit, stable income or local standing to advance their business interests. The outcome variable is the same: being in the sector three years or less. This time, the factors included were those suggested by the exploratory analysis, according to the ideal type involving entrepreneurs who are young and/or uneducated, lack status, and are therefore trying to use international resources to replace those that are lacking locally. Unlike the first model, this one uses a combination of fuzzy and dichotomised variables (Table 4.18): the young/uneducated group is captured by a dichotomised variable, while the potential solution factors (having a high number of non-Ghanaian contacts outside Africa, receiving inputs from outside Africa, being young or uneducated, and migrating outside Ghana) are expressed as fuzzy sets. The migration variable is calibrated to give greater importance to migrating to an OECD country outside Africa, based in particular on recent work by de Vreyer et al. (2010) which found significant returns to this type of migration in terms of entrepreneurial productivity. For an explanation of the theory behind, and the process of, calibrating fuzzy variables, see Ragin (2010).

Table 4.18. Variables used in Model 2

Variable	Type	Description	Rationale
Business not older than 3 years	Dichotomous	OUTCOME VARIABLE	Defines a group of new entrants to the sector.
Migration	Fuzzy	Set of cases involving long-distance migration	Migrants who travel are more exposed to the potential commercial benefits of internet use, those going outside Africa most of all. (N.B. the use of the 0.1 threshold weights the variable so that internal migration is taken into consideration).
Non-Ghanaian contacts	Fuzzy	Set of cases with a high number of non-Ghanaian contacts overseas	Even if contacts are not yet contributing to the business, many businesses are seeking them in the hope of future contributions.
Foreign inputs	Fuzzy	Set of cases that receive significant resources from overseas	Interviews suggest entrepreneurs are seeking to gain and use social capital via international networking
Young/uneducated	Dichotomous	Is the business run by someone young and/or without a high school education	Those with relatively low social status will find it harder to do business in conventional sectors and may be seeking new venues for entrepreneurship

The truth table produced for this model is shown in Table 8.5 in Annex 1. The last row of the table, as in the previous model, represents a *logical remainder* (Ragin and Sonnett 2005): a combination that is possible but is not empirically observed. This logical remainder is excluded from the eventual solution term, since case knowledge indicates it seems unlikely to occur. The truth table shows that being young and/or uneducated is common to most of the cases of new entrants to the sector. Consistency values are less straightforward in this model because it involves causal conditions that are expressed as fuzzy sets, so that each case may have partial membership in every truth table row (Ragin 2005). The other factors that combine with this to produce the 'breaking

even' outcome vary considerably, suggesting that strategies of mobility and of using contacts abroad are used both in combination and separately.

The test for necessity (Table 8.6 in Annex 1) showed that there were no single conditions that could be counted as necessary for the outcome. Thus the analysis moves on to a minimisation of the truth table, which offers three solution factors (Table 4.19). While these have low unique coverage, their raw coverage is noticeably higher than in the previous model, suggesting that mobility is indeed an important factor in entering the internet cafe business. The most common condition among these new businesses is being young and/or uneducated, and the overlap between these factors (higher raw than unique coverage) shows that while most cannot travel outside Africa (1) and are not yet accessing foreign inputs (2), they are nevertheless building networks of non-Ghanaian contacts in the hope of generating inputs (3).

Table 4.19. Model 2: solution factors

Model 2	**Business less than 3 years old =f(migration, non-Ghanaian contacts, foreign inputs, young/uneducated)**				
Consistency cutoff:	0.741935				
RESULTS:		Number of cases	Raw coverage	Unique coverage	Consistency
Solution factors:	1. ~ foreign inputs * young/uneducated	19	0.299254	0. 063731	0.827487
	2. ~ migration* young/uneducated	20	0.327164	0.022388	0.871571
	3. non-Ghanaian contacts * young/uneducated	20	0.328209	0.077761	0.903080
Solution coverage:	0.495224				
Solution consistency:	0.842346				

This model is interesting in comparison with the truth table (Table 8.5 in Annex 1), because of the difference between the variety of paths indicated in the truth table and the minimised version of these combinations. The overlapping solution factors can be interpreted, with additional support from the interviews conducted, to indicate the overall unavailability of options rather than the freedom to choose different strategies – migration is impossible, foreign inputs (such as capital or

equipment) are scarce, and non-Ghanaian contacts (factor 3) are not yet paying off. This is also reflected in the geographical distribution of the outcomes analysed in this model: the paths highlighted involve mainly actors from the north (30, as opposed to 7 from Accra), who have a lower rate of mobility outside Africa. While international contacts and mobility come up clearly in the exploratory analysis concerning this group, they are not clearly contributing to concrete achievements. This could be interpreted, with the help of the interview data, to suggest that transnational social capital is viewed as essential by those without the status to access credit locally, but is difficult to mobilise and may be of more use as a longer-term strategy.

4.3.2 Breaking even and the influence of international contacts

Model 3: businesses that break even and involve little international contact

From the process of entering the sector, the analysis now moves on to the outcome of breaking even. The third model includes formal education and sector-specific skills, which are important according to the literature on small business viability (e.g. Nziramasanga 2010; Frese 2000), but which have not so far emerged as strong explanatory factors. Of the entrepreneurs surveyed, 74 per cent had a high school education or more, and 53 per cent of the businesses surveyed kept accounts. Regarding sector-specific skills, 38 per cent were owned by entrepreneurs who also worked with varying degrees of formality as IT technicians.

The variables used in this case, their calibration and its rationale are detailed in Table 4.20. 'Broad networks' was calibrated to give full set membership to those with the greatest variety in their networks (i.e. local, national and international) and non-membership to those who were least connected. 'Formal education' was calibrated to give those with a high school diploma or above full membership, and no membership to those without any formal education, on the basis that first, the studies suggest this is important elsewhere in Africa, and second, that a high school education should improve entrepreneurs' level of English, and thus their ability to do business in a sector that privileges English language proficiency. Finally, keeping formal accounts and having technical skills that extend the business' human capital base are included as dichotomous variables.

Table 4.20. Variables used in model 3

Variable	Type	Description	Rationale
Breakeven	Dichotomous	OUTCOME VARIABLE	Does the business make a profit in an average month
Broad networks	Fuzzy	How varied is the owner/respondent's network of contacts	Those with the broadest range of contacts are most likely to be able to mobilise social capital in the form of resources and problem-solving help.
Formal education	Fuzzy	What is the highest level of education attained by someone responsible for the business	Ghanaian high schools teach in English, the language of the IT sector. Those with more than primary-school education can keep accurate accounts, pay back loans, read contracts in English.
Formal accounts	Dichotomous	Does the business keep accounts	Literature suggests formal accounts are key to SME viability
Technical ability	Dichotomous	Does the owner/ respondent have advanced technical skills	Do they have a sideline in repairing hardware, building websites or networking?

The truth table for this model is Table 8.7 in Annex 1, and the test for necessary conditions Table 8.8 in Annex 1.

The model shows an interesting and initially counterintuitive result (Table 4.21), again describing mainly northern enterprises (33, as opposed to 9 from Accra). As seen in the first solution factor, technical skills and accounting ability – which is associated with working abroad, as seen in the exploratory analysis – are involved in 13 of the cases showing the outcome. The second factor shows that in 20 cases, entrepreneurs can break even through technical skill despite a lack of networks.

Table 4.21. Model 3: solution factors

Model 1	**breakeven = f(formal accounts, technical ability, formal education, broad networks)**				
Consistency cut-off:	0.739130				
RESULTS:		Number of cases	Raw coverage	Unique coverage	Consistency
Solution factors:	1. accounts * technical ability	13	0.303030	0.170606	0.833333
	2. technical ability * ~ networks	20	0.208333	0.075909	0.859375
	3. accounts *~ education * ~ networks	8	0.130303	0.057424	0.807511
	4. ~ accounts * ~ technical ability * ~education * networks	15	0.123636	0.123636	0.739130
Solution coverage:	0.560000				
Solution consistency:	0.808222				

The last two solution factors show a surprising result: formal education seems to contribute only by its absence. It is negatively implicated in each of the two factors, with networks and accounting indicated as possible substitutes.

In both the exploratory and the QCA analysis, this was the only way in which formal education emerged as a relevant factor for the small businesses studied. This finding differs from that of Nzimarasanga et al. (2010) whose study of self-employment in various sectors in Zimbabwe found that entrepreneurs' level of education was an important condition for business viability. However, the entrepreneurs in Nzimarasanga's study were all able to access loans, whereas only 14 per cent of those surveyed here had done so. This suggests that the relationship of formal education to

entrepreneurial success differs according to the sophistication of the business environment, and that where the environment is resource-poor, the ability to problem-solve and gather resources from elsewhere is more helpful than formal education.

Model 4: businesses that break even and involve mobility

This fourth model, where entrepreneurs are able to migrate, is based both on the exploratory analysis and on the Transrede study of Ghanaian entrepreneurs (Black and Ammassari 2001), which showed that migrating for work is a source of new approaches and greater efficiency, and thus a higher likelihood of breaking even. It includes maturity as a variable since returnees tend to be older (de Vreyer 2010), and incorporates the possibility that these cases will also show ongoing foreign inputs resulting from contacts made while abroad.

Table 4.22. Variables used in model 4

Variable	Type	Description	Rationale
Breakeven	Dichotomous	OUTCOME VARIABLE	Does the business make a profit in an average month
Migrated for work	Dichotomous	Has the owner/ respondent worked abroad	Any period spent working outside Africa enables people to learn different skills and approaches to business
Foreign inputs	Fuzzy	How many people are contributing from outside Ghana.	One foreign contributor may be a coincidence, but if a business is communicating with 2 or more people abroad, the owner may have been building a network by design.
Maturity	Fuzzy	Are they senior members of their community	Entrepreneurs over 30 are considered mature, senior members of the community in terms of credit eligibility and association-building.
Non-Ghanaian contacts	Fuzzy	Set of cases with a high number of non-Ghanaian contacts overseas	Even if contacts are not yet contributing to the business, many businesses are seeking them in the hope of future contributions.

This model generated a logical remainder (shown in line 1 of the truth table - Table 8.9 in Annex 1): 'having migrated for work and having non-Ghanaian contacts that are not contributing inputs'. This was not excluded from the analysis because it was considered possible, given that there were observed cases involving work migration that had neither ongoing contacts nor inputs.

Table 4.23 shows the solution factors for this model. First, there is a group of 9 northern and 4 southern cases, for whom none of these factors are at work. The second term shows that another path involves having worked abroad, and having non-Ghanaian contacts and inputs resulting from those contacts. This solution factor is shared by 10 northern and 10 southern cases. Finally, the third solution involves being over 30, having worked abroad, and having non-Ghanaian contacts which may or may not be actively contributing resources, and involves 12 northern and 8 southern cases.

Table 4.23. Model 4, solution factors

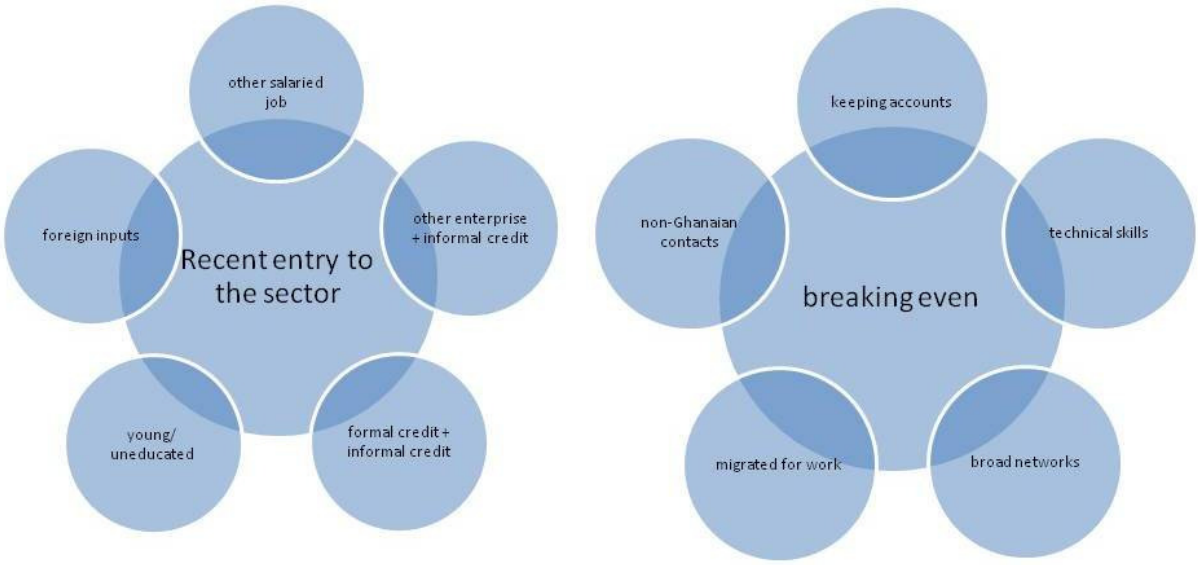
Model 4	**breakeven = f(migrated for work, foreign inputs, maturity, non-Ghanaian contacts)**				
Consistency cut-off:	0.708887				
RESULTS:		Number of cases	Raw coverage:	Unique coverage:	Consistency:
Solution factors:	1. ~foreign inputs * ~non-Ghanaian contacts * ~mature	13	0.222576	0.192576	0.739678
	2. migrated for work * non-Ghanaian contacts * foreign inputs	20	0.177879	0.041970	0.782667
	3. migrated for work * non-Ghanaian contacts * mature	20	0.170909	0.03333	0.749004
Solution coverage:	0.406515				
Solution consistency:	0.762216				

This suggests that those who can migrate build networks overseas that continue to operate after their return, and that, for those who are able to do so, migrating for work is an important path to the outcome of breaking even. Second, it suggests that the youngest entrepreneurs are unlikely to have these contacts or these inputs. Thus networks are built up over time, and do not always result in inputs. Those in the first group, who migrate for work, may not have such an immediate need for these inputs from their contacts abroad, but may instead be bringing back the technical knowledge, capital and hardware they need. Overall, this shows that migrating for work may have a powerful influence on entrepreneurs' skills and effectiveness after return, a finding that supports the conclusions of projects such as the Transrede study.

It is interesting that this model incorporates fewer northern cases (23) and more (16) from the Accra group than the previous models. This can be explained by the fact that it most explicitly involves factors related to travel outside Africa, which was more common among the Accra businesses (63 per cent, in contrast to 36 per cent of northerners). Model 2, in contrast, also looked at migration but covered mainly northern businesses and showed that among these, migration was important in terms of its absence. This concurs with the findings from the exploratory analysis, where the cafes found to be using contacts abroad as a proxy for migration were generally northern.

Figure 4.4 below offers a visualisation of how the factors analysed in the fsQCA models interact overall. It shows that conditions which come together to help a new entrepreneur enter the sector, or which contribute to a business breaking even. Notably formal education, which the literature highlights as an important factor in breaking even, appears less important than the gradual acquisition of technical and business skills through international networking.

Figure 4.4. QCA findings



This QCA analysis has brought together the highly diverse set of characteristics identified as important by the exploratory analysis around a series of scenarios to do with mobility and its absence. The method's bias toward preserving diversity in the data makes it possible to devise the most relevant ways of calibrating the factors used, according to the findings of the previous analysis. Thus mobility and entrepreneurs' use of contacts abroad have been divided into several different factors, each calibrated appropriately to the question. The answers offer different and more nuanced insights from those of the exploratory analysis, since they go beyond it to show how

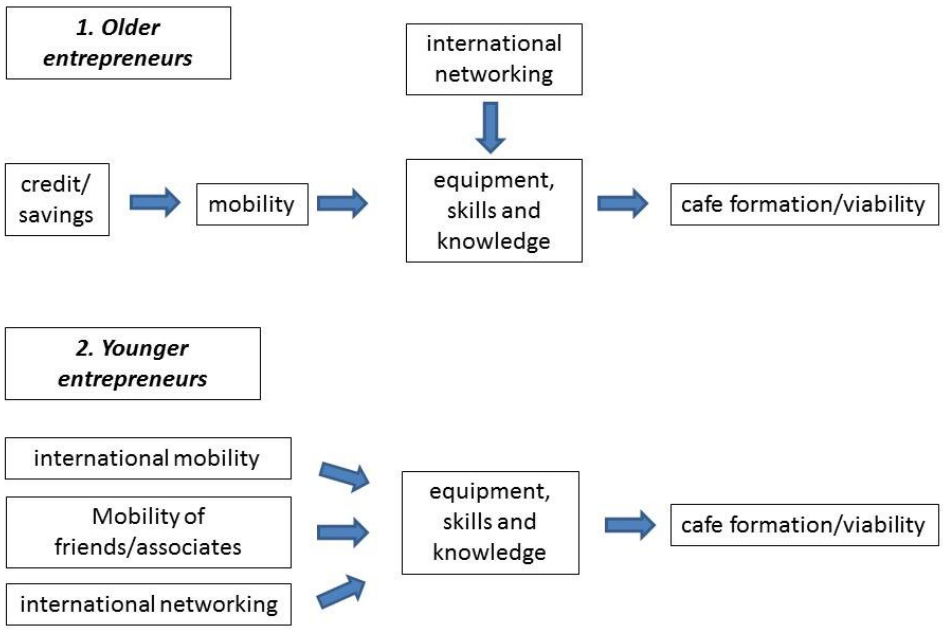
configurations of factors work together to allow entrepreneurs to enter the field and sustain their businesses. This interplay of factors, expressed both as components of a larger interplay (individual combinations of factors vs. the entire solution term) represents the added value of QCA: it is a robust way of arriving at an overview of the issues identified as important, and of how they work in combination to produce the outcomes in question.

4.4 Conclusion

This chapter has assessed the role played by international mobility in the formation and development of Ghana's internet cafes. More specifically, the distinction that emerges from this analysis is between migration, as conventionally defined, and other forms of mobility and networking as the facilitators of small business formation and viability. Overall, it seems that long term travel does form one important path to business viability, but that other types of networking, which do not involve physical mobility - especially help from mobile friends and associates and virtual mobility in the form of international networking - also form a path to entry into Ghana's IT sector. The factor that acts as a confounder in this analysis is resources: mobility and networking act as both a cause and an outcome of having a larger business because one has to have resources in order to become internationally mobile, and those who can travel internationally can acquire better equipment and more resources. These two contrasting relationships can be set out as in Figure 4.5 below.

In the diagram, older entrepreneurs (1) with higher status in the local business community and a base of financial capital (earned from another business or salaried job, or lent by family) apply resources to the problem of a local scarcity of equipment and knowledge. They travel internationally in order to access these resources, and then continue to network internationally after returning. Thus for them, international networking is a result of their mobility. In contrast, the second type of entrepreneur (2) is younger and less well-resourced, and cannot easily travel internationally. He uses a mixture of international mobilities – the mobility of friends and contacts, his own short-term travel, and international networking – to gather the resources that make it possible to enter the sector. Thus a combination of forms of mobility can help to bridge the gap left by financial capital for less advantaged entrepreneurs.

Figure 4.5. The role of mobility in internet cafe formation and viability



These two paths reflect the classic alternative strategies of capital accumulation: one can either boost one's business' productivity by using more capital, or one can use capital and resources more effectively through better technology or greater efficiency. International mobility is here found to play a role in both strategies, since it can be purchased as a production factor, but can also be achieved virtually or by proxy – effectively, borrowed from others – and used to acquire the production factors necessary to start and sustain a business.

This logic would explain why we see that mobility is not associated with a higher profit, but is associated with higher revenue and expenditure. Those with more money to put into their businesses are also those who can afford to travel and access more resources to put into their business, so that their mobility becomes part of a virtuous circle. It would also explain why mobility is not associated with a higher net profit – since the first type of entrepreneur may not be as efficient as his younger counterpart, while the younger counterpart's profits are restricted by a lack of capital. The increased efficiency of the younger entrepreneurs can be seen in the finding that mobility does affect ROI, but only where an entrepreneur is both young and has worked abroad. Thus for the young, mobility would seem to be an important way to build efficiency, and virtual mobility (practised by those who cannot afford to travel) gives access to the critical level of equipment and skills that can substitute for capital enough to enable new young entrepreneurs to enter the sector.

This chapter has demonstrated that mobility and international networking are part of a group of factors which come together to help entrepreneurs form and sustain internet cafes. It has shown that age is an important factor in entrepreneurs' opportunities since it can determine access to resources such as credit, but that mobility and international contacts can help younger entrepreneurs to gain a foothold where they might not otherwise. Location has not been found to be as important as age in determining access to opportunity. Overall, the analysis shows that rather than thinking of small business viability as reliant on a small cluster of binary variables (access to credit, education and skills), it may be more useful to see it as depending on more of a 'fuzzy' set of essential resources (financial, material and knowledge-related) which mobility may help to activate and to multiply.

5 Reconfiguring knowledge and building opportunity: how international networks structure opportunity for IT businesses

5.1 Introduction

Ghana's IT sector is still a small world. Although there is no reliable count of the precise number of internet-related businesses, a search of the relevant online association websites and directories suggests that there are fewer than 100 actually in operation. As one interviewee, the owner of a software company in Accra, stated, '[in] the IT world in Ghana, everybody knows everybody.'[10] This tightly knit structuring of connections restricts the circulation of information to a highly localised group of enterprises founded by a group of people who all know each other. This puts new information on technology-related innovation and opportunities at a premium. Much of this innovation and opportunity comes from the international sphere outside the 'small world' of Ghanaian companies, so that international networks confer a comparative advantage.

The main question addressed in this chapter is which types of international mobility and contact are beneficial to Ghana's IT sector as a whole, and what type of benefits they confer. Taking a social network perspective, the analysis that follows will look at the characteristics of IT entrepreneurs' and firm managers' professional networking, and the processes and structures through which international flows of resources take place. I argue that the notion of embeddedness in international social networks is essential to understanding how these relationships can shape opportunities for individuals and for the country's IT enterprises. Assessing the contrasting types of international embeddedness among different groups involved in the ICT sector, I show how their networks and mobilities influence changes in the larger structures of opportunity within which these individuals are operating.

As noted in chapter 2, the role of networks in creating opportunity is central to much of the literature on Sub-Saharan African businesses (e.g. Grief 1989, Barr 1998, Fafchamps 1999, Zumarimwe and Kirsten 2007), but these studies tend to focus on more sophisticated business environments than that of Ghana(for instance Zimbabwe and South Africa) or on the agricultural sector. The literature on transnationalism also addresses this question, most notably Vertovec (2003, 2010) who brings together the literature on transnational entrepreneurship (e.g. Portes 1995, Portes

[10] Interview with Accra software company owner, 9.6.2009

et al. 2002) with that on structures of opportunity (Vertovec 2003). He notes that networks reflect and help to determine both people's physical mobility and the conditions of opportunity within which they operate. This chapter builds on this assertion.

As noted in chapter 3, social network theory offers a lens with which to look at this professional networking behaviour and the lines of communication and association along which goods and information flow. It also brings into focus the theory of social capital, the system which underpins and facilitates these flows of resources. This form of capital is described by Lin (2001) as 'resources embedded in a social structure which are accessed and/or mobilised in purposive actions.' This social structure' is the network, and the embedding can be both *structural*, i.e. degree of connectedness, and *relational*, i.e. the strength and depth of relationships.

The next sections are arranged as follows. First, there is a comparison of the key socio-economic characteristics of the three groups studied here – Northern internet cafe owners, Accra cafe owners and Accra IT company managers – followed by a comparison of their domestic and international networks. I outline the average number of contacts these individuals have, how many live in Ghana and how many abroad, and the extent to which each type of contact is contributing to individuals' careers or enterprises. There follows a more in-depth comparison of the different network structures of these three groups, and how these structures determine the contributions that can be drawn from one's contacts. This comparison works outwards from the starting point of the group of Northern cafe owners' domestic networks to then compare these those of cafe owners in Accra. Next, these two groups are compared to the Accra IT company managers in terms of their structural network characteristics – density, embeddedness, and how both these characteristics affect their ability to draw on their contacts for help and resources. A last section explores the process of professional brokerage that occur – or are lacking – in these three types of network, and how the ability to broker between groups reflects different opportunity structures and leads to different professional outcomes.

5.2 Networking practices: breaking out of the 'small world'

5.2.1 Network characteristics: embeddedness, density, closure and brokerage

The analysis that follows explores how various structural features of individuals' networks help to determine professional opportunity. Chapter 2 offered an overview of the relevant theories to do with network dynamics, and highlighted some key concepts: structural embeddedness, which is a

quality of group relationships where the network is dense and connections all know each other; and relational embeddedness, a quality of individual relationships where ties are deep and informed by a strong mutual history. Structural embeddedness facilitates trust and reputation within the group, and can lead to sharing of resources, while relational embeddedness on the level of one-to-one relationships also positively influences the likelihood of transfers of resources. In addition, brokerage and closure are also important factors in determining an individual's power to create opportunity and to profit from his or her contacts. Closure occurs when two of an individual's contacts know each other, and repeated throughout a person's network decreases the opportunity for that individual to 'broker' between their associates by controlling or allowing the flow of information or resources. Where this brokerage can occur, it represents a way for individuals to profit from their ties.

5.2.2 Respondents' characteristics:

This chapter is based on interviews about professional networks conducted with internet cafe owners in northern Ghana and Accra, and with a smaller group of Accra-based IT firm managers. Each set of interviews involves one group who are mobile internationally and another group who are not. The geographical difference additionally makes it possible to assess whether the disparity in international migration rates, resources and service provision between North and South is as influential as international connections and the ability to draw resources from them. This section points out certain features of these groups that serve as indicators of the differences in professional networks that this chapter seeks to explain.

Table 5.1 shows measures relating to interviewees' socioeconomic status. The Accra IT managers can be seen to inhabit a different opportunity structure from the cafe owners. The groups all share a strong likelihood of having at least one professional parent. However, the IT managers are much more likely than either group of cafe owners to be tertiary-educated, and to have taken a course or degree abroad. Within the group of cafe owners, there is an equal likelihood of having a professional parent, but the northerners are much more likely to be tertiary educated. In contrast, the Accra cafe owners are more likely to have travelled and taken a course or degree outside Africa.

Table 5.1. Respondents' socioeconomic status

	Northern cafes (n=66) %	Accra cafes (n=25) %	IT managers (n=21) %
Professional parent(s)	89.4	84.0	86.4
Tertiary education	40.9	24.0	72.7
Studied internationally	13.6	32.0	59.1
Travelled internationally	36.0	64.0	71.4

A quantitative look at these groups' domestic and international networks also shows differences. One anomaly should be noted: Table 5.2 below shows that according to the responses given by the Accra cafe owners, these have a much higher share of international contacts in their networks. However, this disproportionate number is due to the fact that they reported almost no domestic professional ties, only foreign ones. This issue suggests that the Accra business environment for internet cafes is less trusting than that of the North, and will be examined in more detail later in this chapter. Besides this imbalance in domestic contacts, the size of the three groups' professional networks shows a significant difference. The IT managers have the most contacts, both in their entire networks and in terms of their international ties.

Table 5.2. Comparison of domestic and international networks among cafe owners

	Northern cafes	Accra cafes	Accra IT managers
Total owners	66	25	21
Contacts per owner (mean)	6.38	1.64	11.95
Contacts overseas per owner (mean)	1.14	1.60	3.33
% overseas contacts per owner (mean)	17.8%	97.6%	27.9%
Total internationally mobile owners	24	16	15
Contacts per int. mobile owner (mean)	6.33	1.69	12.53
Contacts overseas per int. mobile owner (mean)	1.87	1.63	3.67
% overseas contacts per owner (mean)	29.6%	96.3%	29.3 %
Inputs per domestic contact (mean)	1.48	N/A	1.22
Inputs per international contact (mean)	2.28	1.31	1.66

Table 5.2 also shows that the number of inputs coming from each contact, domestically and internationally, is similar among the IT managers but quite different for the Northern cafe owners, with international ties offering significantly more inputs to their businesses than their local ones. (Again, the Accra cafe owners' lack of domestic contacts means their information is not comparable on this question.) The types of input listed by interviewees were categorised as (a) technical advice, (b) hardware and software, (c) financial advice, (d) advice on innovations, (e) gifts or loans of financial capital, and (f) career advice. The maximum possible would be for an interviewee to have received all six different types of input.

These data suggest that whereas foreign contacts are playing a much more important role than local ones for the cafe owners, for the IT managers the importance of foreign and local ties is much more balanced. These managers report more contacts overall, both domestic and overseas, and appear to rely less on their overseas contacts for inputs than do the cafe owners in the North. This may be because the managers have a richer set of contacts (both financially and in terms of diversity of

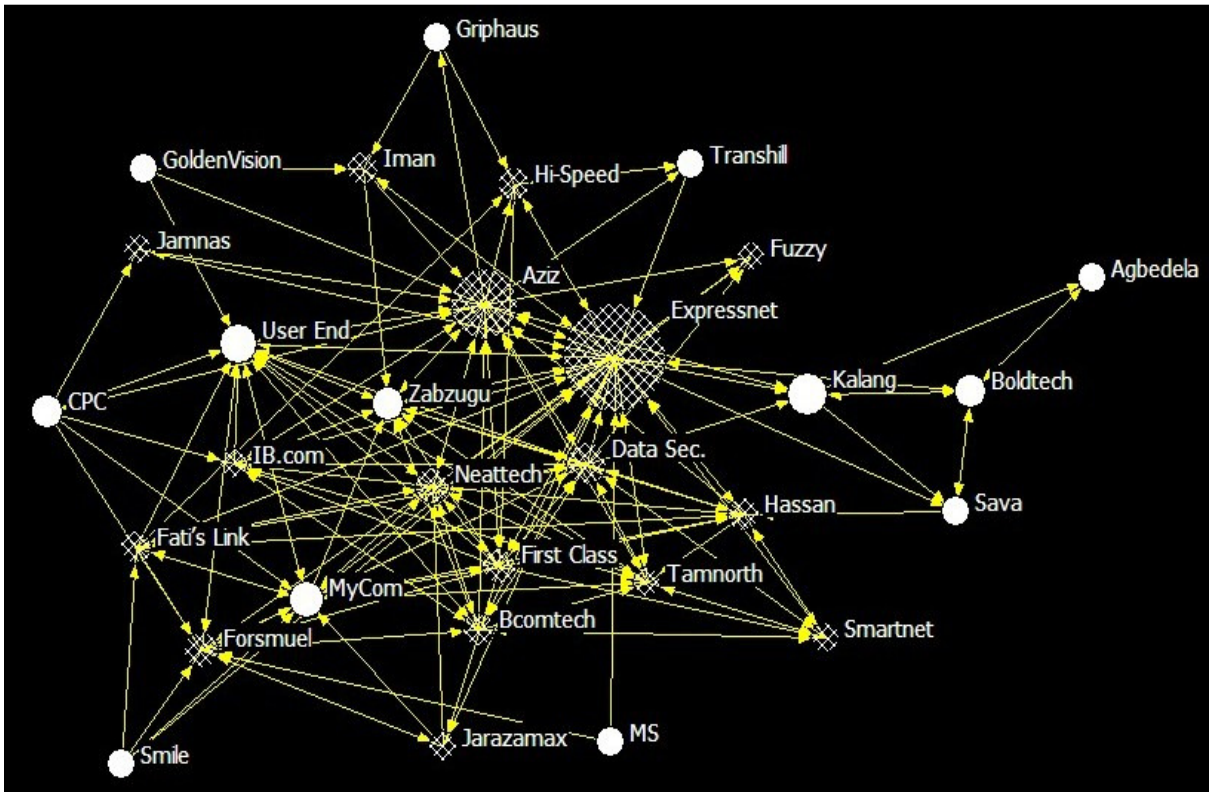
possible inputs) within Ghana than the cafe entrepreneurs, something which seemed to be the case from the descriptions and explanations given during the interviews. If this is true, then for those at this higher-value-added level of the IT business local contacts may play a similar role to international ones, whereas for internet cafe owners the value of international and local contacts may be more differentiated. The next three sections will explore these dynamics in greater detail for each group in turn.

5.2.3 Northern internet cafe networks: density and scarcity

Affinities based on religion and ethnicity characterise the northern cafes' networks. Figure 5.1 below shows the complete inter-cafe (domestic) network of cafe owners in the northern town of Tamale as an example. The solid nodes represent Christian, non-Dagomba cafe owners (the Dagomba are the majority population of the area) and the cross-hatched nodes Muslim, Dagomba ones. The arrows denote where an interviewee indicated that he or she had a strong professional relationship with another owner. The direction of the arrows connecting the nodes shows the direction of each stated relationship – where relationships were claimed by both parties, there is a two-headed arrow, and where only one claimed a strong tie, the arrow points to the owner they claim to know.

It can be seen from the diagram that the two groups move in differentiated professional circuits. The Christians seem to be predominantly outsiders, claiming more people as connections than claim them in return, while the Dagomba/Muslim owners are predominantly grouped together and share a high proportion of mutual ties. Their networks are also denser overall, with more ties knowing each other than amongst the Christian, non-Dagombas. These Christian, non-Dagomba owners are, if not isolated, at least not party to much of the information flow available. This is not true throughout – the factor of years of business also affects people's connections, as can be seen by the older businesses such as Zabzugu and MyCom, which despite being run by non-Dagomba owners are well known by the others. However, the diagram shows that overall, the entrepreneurs from the majority population of the area have significantly more local professional ties. The nodes in the diagram are sized according to their *betweenness centrality*, a metric which denotes having connections to different social clusters. Those with the highest betweenness scores are Muslim/Dagomba cafe owners, indicating that these have the ability to bridge between other Muslim/Dagomba cafe owners, potentially gaining power and status from controlling the flow of information.

Figure 5.1. Tamale internet cafe owners' professional networks



These Muslim/Dagomba cafe owners have strong, dense networks, denoting structural embeddedness. This means a high level of social capital (Coleman 1988, Burt 2005), due to the high levels of trust and reputation. One could also say that these networks have a high degree of *closure* (Burt 2005: 15), i.e. individuals (egos) with contacts (alters) who in turn usually know each other. All this leads to a situation where there is a strong local economy of power and reputation, but little new information entering from outside as there might be in looser networks. The outside connections named by interviewees were predominantly overseas, particularly among the Muslim owners. For these entrepreneurs, most of the new information entering this rather closed network came from the international sphere rather than within Ghana. The Christians, in contrast, had some access to information from within Ghana, but from outside the local network since several were members of peer learning networks such as GINKS[11] or IT trainers' or teachers' associations. Thus these 'outsider' internet cafe owners were to a small extent linked into national-level networks that included foreign funders and advisors and which allowed new knowledge to penetrate. However,

[11] Ghana Information and Knowledge Sharing Network, a national group founded by the Dutch NGO the International Institute for Communication and Development (IICD) to bring together smaller-scale providers involved in the World Bank/NGO-funded telecentre project of the late 1990s/early 2000s

the weak connections between their network and that of the Muslim/Dagomba majority meant that this information often reached a bottleneck when brought to the local level, and was not shared.

This Tamale network, then, is high in trust but low in the 'structural holes' (Burt 1992; 2001) which provide the opportunity to bridge across groups with access to different types of information. Symptomatic of this is the lack of any professional association among these cafe owners. Interviewees in each of the towns visited told of defunct owners' associations that had not been able to bring people together for coordinated action. People preferred to keep their competitive edge in the overcrowded local market rather than share information – making these close networks an arena for infighting rather than an efficiency mechanism. This aligns with Burt's findings from research in American IT companies (2005: 102), which show that the degree of reported trust in professional networks rises over a period of, on average, four to five years depending on the type of firm. By this calculation, the cafe owners surveyed have not had time to build trust as IT entrepreneurs, since the majority of their businesses were less than two years old. Interviews supported this, with a member of the defunct Tamale association stating that he 'used to be member of the cafe owners' association, but it broke up because broadband owners charged more than dialup.'

This lack of an association led to huge efficiency problems for these businesses. For example, in the course of the interviews it became clear that each cafe was paying a different amount for the same broadband service. The provider offered various tariffs purportedly based on the number of clients a cafe needed to serve. However one of the more technically adept owners – a newcomer who did not yet have links to the others – revealed that this was a fiction since the provider did not have an effective system in place to regulate the amount of data transmitted. Thus some were paying 40 cedis per month and others were paying as much as 280, but all were receiving the same amount of data capacity, and none knew that the provider could not regulate data transmission. Even those with the highest betweenness scores in figure 1 were subject to this problem of over-payment – making their bridging capital useless, since the necessary information was not available in the network.

Mobility was one potential remedy for this lack of information (see box below). One owner from Bolgatanga, Joseph, stated:

> 'I would like contacts outside Ghana, or to move – it's critical for training and for information. I have to rely on my own resources, on technicians recommended by other internet cafes.' (interview, 24.5.09)

However, those in the North had the lowest rate of international mobility and overseas contacts, as seen in section 5.2.2.

Overseas contacts play an important role in helping internet cafes overcome the barriers to accessing hardware, software and training. Computer hardware, which can only be accessed from abroad, is subject to import taxes in Ghana that in 2009 made an item such as a basic netbook computer approximately twice as expensive as in the US. Software is equally hard to get, since the financial infrastructure does not yet exist for Ghanaians to buy it online. Credit and debit cards are not commonly available, and where a card is available, online security provisions make it almost impossible to order goods from abroad to be delivered to Ghana, due to concerns over internet fraud that lead to the automatic shutdown of accounts on websites such as Amazon that are used to order items for delivery to West African addresses. This drastically reduces access to software such as the antivirus and basic productivity applications that enable users to use the web securely and do more than play online videos or games (see Box 5.1). Computer skills are hard to learn for those outside the technology concentration areas of the South, since technology courses are heavily concentrated there. Few courses in Ghana teach programming or hardware skills, so that all those surveyed for

this research who could code had learned to do so abroad.

Box 5.1 Overseas contacts work around formal restrictions

'There is one copy of Windows Office in the north of Ghana – you can't buy new software online. It circulates and everyone uses it.' (Richard - cafe owner, Tamale)

'I want good antivirus, but the only kind we can get is the free online software. It does not always work – I have to reformat all the hard drives every couple of weeks to remove the viruses.' (Abdul - cafe owner, Tamale)

'I wanted to send my brother in the US a transfer to buy hardware. I started an account at NIB [a local Ghanaian bank] and tried to make a transfer, but they said they would not make transfers to individuals, only corporations outside Ghana. There are times when I see software I would like to purchase, but there is no way I can do that. There has never been any payment system in Ghana that will allow you to buy online.' (Ezekiel - cafe owner, Navrongo)

'I need a more reliable computer and accessories supplier – I have to use one in Accra and he is not good.' (Yusif - cafe owner, Wa)

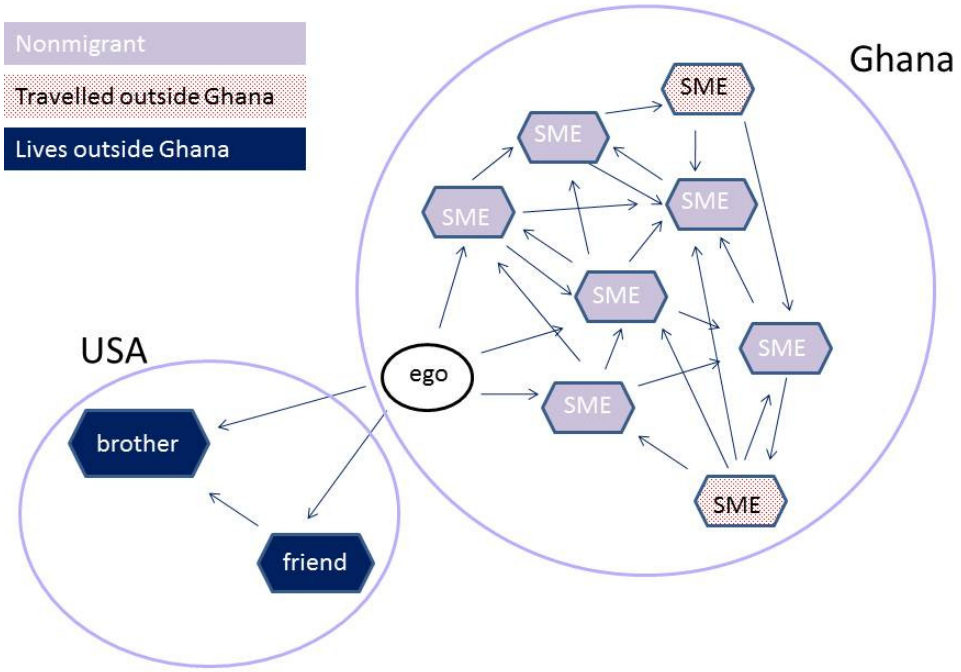
'We need less tax on imported computers – it's a tax that doesn't exist in other West African countries.' (Simon - cafe owner, Tamale)

'If I need access to parts I have to get them from Accra or Kumasi, and takes them up to a month to get here. So instead I have to get friends [abroad] to buy them and send them.' (David - cafe owner, Bolgatanga)

The utility of overseas ties may be subject to similar structural limitations. Figure 5.2 below shows a typical northern cafe owner's individual network. The overseas ties have a local origin, with the two US contacts originating in Tamale. Though these contacts are potentially very important in terms of transfer of knowledge, remittances and goods, their common origin also potentially limits their ability to provide genuinely new information. This is termed *homophily* (Lin 2001) – a network characteristic where contacts are peers with access to similar resources. This both reduces the amount of new information the entrepreneur (marked 'ego' in the diagram) can access through

his overseas connections, and means he cannot gain social capital by acting as a broker between them.

Figure 5.2. Professional network of one (Muslim, Dagomba) Tamale cafe owner



The diagram shows an egonetwork that, just like the larger network among the internet cafes, is characterised by density and closure. The foreign contacts of this cafe owner know each other, and those in the local circle who have travelled outside the country are similarly connected. This is a network that would serve a transnational entrepreneur well: the two Ghanaians living abroad have many trusted home-country ties who all know each other and who can provide home-country support. However, for the ego in this case, particularly since he is active in the field of technology, this network is disadvantageous since it offers a high degree of closure that is likely to limit the possibility of innovation based on information flow from outside.

This density, however, makes the international networks of the cafe owners relatively effective at bringing in resources. Contacts abroad were described by respondents as a highly important source of business and technical knowledge, software, hardware and capital. Software was a commonly reported input from overseas. Out of the 54 northern entrepreneurs who reported having ties abroad, 18 had received software bought abroad by contacts with credit cards.

In the business world density and closure can be essential to monitoring within a group of competitors or collaborators to detect rule-breaking. However, Figure 5.2 supports Mizruchi's conclusion (1992) that density and unity are not the same thing in a business networking context. The Tamale entrepreneurs may have a dense professional network, but it is populated by peers who do not travel as much as their Accra counterparts. They are therefore reliant on international connections for new resources and information. Furthermore, their network is going underused due to the lack of formal associations that would codify the connections and mobilise the dormant social capital. The internet cafes in Tamale have much social capital saved up, but little to spend it on.

5.2.4 Accra internet cafe networks: a strong overseas bias

Similarly to the northern entrepreneurs, the Accra cafe owners reported the absence of a formal association, either IT-specific or for local business owners. Several interviewees attributed this to an ambivalence about competing and being seen to behave entrepreneurially. There may be a historical basis for this ambivalence stemming from former President Jerry Rawlings' political victimisation of entrepreneurs during the 1980s, when the majority of the cafe owners in this study were growing up and some had already formed businesses. Rawlings effectively waged war on entrepreneurs, and principally on Ghana's market traders – the occupation of 48 per cent of the mothers of the interviewees for this research – as scapegoats for the country's economic problems. Rawlings 'invoked the corrupt or wealthy trader as the targeted "hoarder,"' (Clark 2010) ultimately blowing up Ghana's two iconic urban markets, Makola in Accra and Kumasi Central Market, with dynamite. These conflicts were less marked in the North, where Rawlings' power base was strong and where poverty meant entrepreneurs could not grow as wealthy. This history may still provoke ambivalence regarding entrepreneurial ambition and account for the reluctance of these Accra businesspeople to associate with their competitors.

Equally, there may be few returns to the cafe owners from formalising their professional networks. The literature on Sub-Saharan business claims the needs fulfilled by professional networking are principally intra-network trade (Kranton 1996); referrals for employees and clients (Velenchik 1995); and circulation of information (Barr 1998). However, in an environment where information is scarce and constitutes a competitive advantage, equipment is jealously guarded rather than traded, theft is a constant fear, and businesses mainly employ family members or close junior contacts (as was largely seen to be occurring in this study), the incentives to network are drastically reduced.

There were many stories about failed owners' associations, or associations that existed in theory but had not yet met. The reasons for founding them centred around failures in broadband service by the

national provider combined with a lack of compensation. In early 2009, for example, the 'link' was unavailable for two weeks without compensation, and one owner sent round a letter suggesting a meeting. This was when cooperation broke down, however. Several owners said they had been aware of the meeting, but had not gone, and one explained that instead people had each met with their immediate neighbours instead of as a group. The same problem occurred with the provider again in 2010: this time the owners did meet, they lobbied the provider and service was restored, but the new association immediately broke up over pricing disputes. Box 5.2 below charts some of these fragmented attempts at associating.

Box 5.2 Internet cafe owners are reluctant to form associations

'GT [the broadband service] was off for two weeks recently without compensation, and the cafe owners got together - someone sent a letter to call people'. (Charlie – cafe manager, Kokomlemle, Accra).

'the local cafe owners' group operates as a chain, not with meetings. There are more than fifty people involved, but they don't meet together as a group.' (Seidu – cafe owner, Kokomlemle, Accra)

'The cafe owners have an association [here in Kokomlemle], but it hasn't met yet… An internet café owners association was formed by someone in Nima recently to combat internet fraud, but I have not yet joined that either.' (Brian – cafe owner, Kokomlemle, Accra)

'There is an association here [in Kokomlemle], but I was not invited to join. I cooperate with three cafe owners here nearby, mainly about the link.' (Stephen – cafe owner, Kokomlemle, Accra).

'I formed the association of cafe operators in 2002, but the business life was too short, membership kept changing, and price competition was problematic.' (Ali – cafe owner, Tamale)

There is no central point for information about cafe owners' meetings. No one runs the organisation, no one makes people aware of meetings. You only get information if you are central.' (Abraham – cafe owner, Tamale)

In contrast to the northern entrepreneurs, the Accra cafe owners reported no local ties at all, in contrast to the 81.7 per cent of the northerners' ties which were local (see Table 5.3 below). This claim should be regarded with scepticism, since clearly the business owners were aware of each other. Yet the format of the survey involved asking owners about their sector-specific professional contacts, which for internet cafe entrepreneurs, situated on the fringes of the IT sector, would represent a fairly narrow set of ties. Given that all the cafe owners, interviewed separately, responded that they had no local professional contacts, this may be taken to denote a situation where an extreme lack of trust exists within the local community of internet cafes. It is possible to understand by their claim that their 'real' contacts – those they trusted and who were useful in terms of resources – were elsewhere. Whatever underlies this reporting of no local contacts, these Accra cafe owners did report ties overseas. Table 5.3 shows that they focused their professional networking on the Americas and Europe, receiving similar inputs to the northern entrepreneurs from these international contacts.

Table 5.3. Internet cafe owners' professional contacts, by region

Location of contact	Accra internet cafe ties (%)	Northern internet cafe ties (%)
Ghana	0.0	81.7
Americas	39.0	6.7
Europe	53.7	9.2
Mideast/Asia	4.9	1.4
Africa	0.0	0.5
Online	2.4	0.5

The reason the Accra entrepreneurs gave for this lack of contacts locally was that their peer group was highly heterogeneous due to Accra's diversity, with northern Muslims, southern Christians, and within these groups multiple social classes, ethnicities and tribal origins. Unlike the northern group, these entrepreneurs had not attended school together or grown up in the same town. They had no basis for trust, were operating in an over-populated sector (a conservative estimate based on the two sections of the city surveyed suggests that there may be anything up to 1,000 cafes in Accra) and saw no benefit in getting closer to their competition even in the interest of resolving common problems. In this scenario, contacts abroad become increasingly important, and in the case of Accra they are likely to be more available than in the North, given the higher migration rate of the South.

It is difficult to represent the 'typical' professional network of an Accra cafe owner because of this lack of reported local contacts. A few cafe owners named local professional contacts in Accra as well, but these were not in IT-related businesses. However the most common account of their professional networks consisted of a single co-owner or family member overseas who was the source of the cafe's startup funds and equipment, but left the day-to-day running of the business to their co-owner in Ghana, and other contacts overseas, usually of local origin. Some respondents recounted highly original uses of overseas networking, such as Yaw, a cafe owner who had become interested in NASA through surfing the web and had made contact with a scientist there by sending him an email. The scientist had responded, and had become Yaw's main contact for technical advice regarding computers and the internet.

Table 5.4 shows that Accra cafes receive more software and hardware from abroad than their northern peers, while the northern cafes receive more technical advice. This is probably due to the greater technological isolation of cafes in the North putting a premium on technical advice. The proportions of ties resulting in business advice and capital, while smaller, are almost equal across the two groups.

Table 5.4. Inputs to cafes from abroad

Inputs from abroad	Accra cafes (n=19)	Northern cafes (n=54)
Software/hardware	47.5%	32.0%
Tech advice	35.0%	64.0%
Business advice	7.5%	7.5%
Capital	20%	18.6%
Total ties abroad	40	75

This suggests that international contacts may be able to serve as an alternative to local professional networks and social capital where the latter are lacking. If this is true, it adds a new finding to the extensive literature on networks in small businesses, including Putnam (1993), Amin (1994), Fafchamps (1996) and Barr (ibid.), which holds that the value of networks in reducing transaction costs is high, even in resource-poor African areas. This value, however, is only realised when resources are present in the network so that transactions can take place. The fact that both the northern and Accra internet cafes seem to perceive little value in networking locally, as evidenced

by the lack of functional owners' associations, suggests that those resources are so limited that the opportunity cost of networking is higher than that of remaining isolated.

5.2.5 IT firm managers' networks: outreach and brokering

Similarly to the cafe owners in the North, the IT firm managers' networks are mainly characterised by a diversity of contacts with the majority in Ghana (Table 5.5 below). This group was composed of 29 managers of IT companies in Accra, 21 of whom were born in Ghana. Of these, 18 reported having professional ties overseas.

Table 5.5. IT managers' contacts, by region

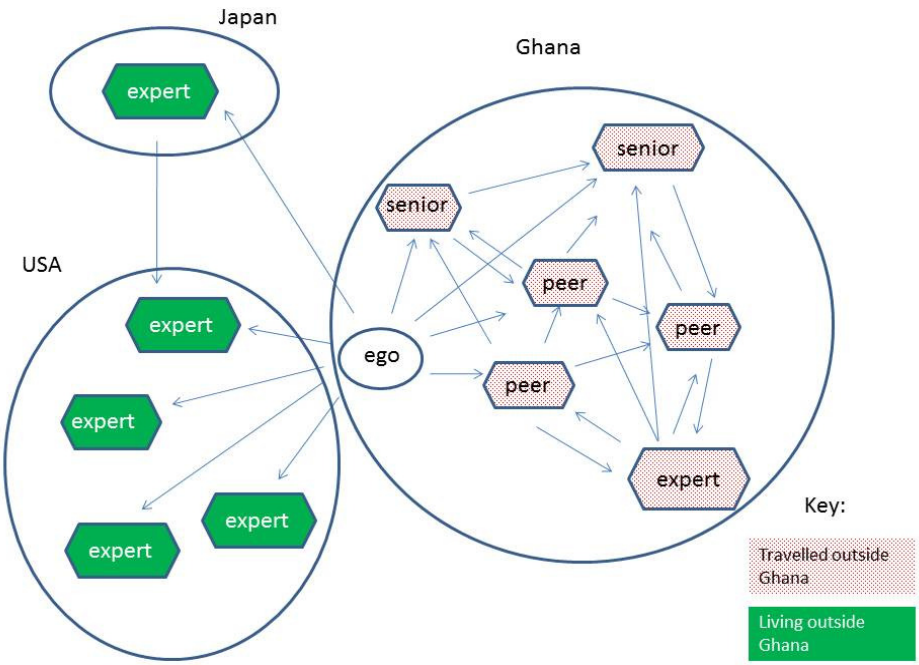
Location of contact	IT managers' ties (%)
Ghana	72.1
Americas	11.6
Europe	9.2
Mideast/Asia	1.2
Africa	3.2
Online	2.8

However, the composition of their networks is different from those of the internet cafes. Connections are not predominantly to family members or hometown friends, but are weaker ties to contacts with whom they nevertheless had a depth of history and common understanding. These contacts, according to their interviews, were stable and reciprocal in comparison to those of the cafe owners, which were much less reliable (see box, section 5.3). They also have more overseas connections who do not know each other, and who thus offer opportunities for the IT managers to connect the Ghanaians they know with these overseas contacts and potentially benefit from their role as brokers. Finally, more of their local connections are internationally mobile and themselves have loose professional networks, creating a greater chance that new information on technology can enter the network from outside the country.

The IT managers' networks also show more *heterophily* – a diversity of connections who do not know each other. In this case the main source of heterophily is overseas, where the ego has several contacts who are experts in the IT field (marked as such in Figure 5.3 below). These connections constitute opportunities for brokerage by the IT managers. This is shown in Figure 5.3 below, which

offers an example of an IT manager's network. This network is typical of all the IT managers – except the recently promoted ones in the business process outsourcing firm DataCo examined later – in that it includes peers, senior managers and experts outside the company, and in that it includes connections in more than one country beyond Ghana.

Figure 5.3. Egonetwork of an Accra IT company manager



This network is similar to historical trading networks described by Greif (1989). He analyses the networks of tenth-century Maghribi traders in North Africa, who imported goods from the northern Mediterranean countries. As a group, these traders had a single tightly cohesive network which allowed trust and coordination in trading activities (like the senior IT specialists in Accra), but each individual also had looser international networks with brokerage opportunities that allowed them to gain the goods that they then traded within the group. This combination of brokerage and closure – the transfer of new information plus the advantages of control and reputation – makes for successful trade.

In comparison the local networks of the internet cafes, where they exist, are much less cohesive and collaborative. This is because while the Accra IT managers' activities are complementary, those of the cafe entrepreneurs are in competition and they are less incentivised to cooperate. Thus the benefits of networking do not spread throughout the group to create a local economy of overseas connections. Moreover their overseas connections, though providing access to more resources, are similarly structured to their local ones, with everyone knowing everyone else.

Contact with experts also sets the IT managers' networks apart. Almost all of them listed international thinkers and leaders in their field among their contacts. They mainly made these

connections during international events such as conferences, and paid great attention to keeping them alive through emails and sharing information about mutually beneficial events or information. This activity denotes the characteristic known in network terminology as *relational embeddedness*. This involves 'norms, sanctions, expectations and reciprocity' (Vertovec 2003), and gives an individual's connections background and depth. Relational embeddedness is an extra layer in a relationship that overlays and gives meaning to the structural embeddedness seen among the cafe owners. This reciprocity explains how the two groups can have similar numbers of contacts overseas but radically different ways of using them.

The IT managers also reported being members of many associations, which provided ways of meeting new contacts beyond their current circle. The most common form of association was a local religious fellowship, but they ranged from martial arts groups through alumni associations from education in Ghana and abroad, to women's activist groups and sector-specific associations. In all, they reported belonging to 49 associations, 37 of which were explicitly professional and 12 of which were either religious or sporting but with professional dimensions. Whereas the IT managers reported 1.87 professional association memberships each, the internet cafe owners reported just 0.2, most of which related either to the mostly-defunct Tamale cafe owners' association described above, or its counterparts in Bolgatanga, Navrongo or Wa.

Mobility is a prominent factor in these managers' networks: alumni associations from studying abroad in particular were frequently mentioned as influential. Of all the associations mentioned, nearly 60 per cent were explicitly oriented toward involving international contacts, while another 30 per cent involved them incidentally. Responses on how they use their associations included 'to find clients', 'networking', but especially 'keeping up with the international world.' Those who had not travelled outside Ghana indicated that these associations with international membership acted as a substitute for travel. Overall, in fact, there is more substitution in the IT managers' networks between actual international mobility and contacts who travel. Their local and international contacts almost all engage in international mobility, encompassing a huge variety of sources of knowledge, clients, ideas and experience and combining vertical hierarchies with horizontal relationships.

If each group exists within a certain opportunity structure (Vertovec 2003), this is one indicator that the IT managers' opportunity structure is richer (both in terms of peer-to-peer variety and of chances for making more powerful contacts) than that of the internet cafes. Furthermore, the IT managers network within and outside Ghana in a seamless way – their alumni associations include individuals who live all over the world, as do their professional associations – while no more than a

couple of the internet cafe owners appear to have access to this kind of association. Those who do are virtual social isolates, suggesting that there is a tradeoff for internet cafe owners between a local and a non-local professional circle. The next section will explore the ways that these professional network structures limit or create opportunities for each group.

5.3 Restructuring opportunity: embeddedness and international outreach

The previous section explored three distinct types of professional network: the northern cafe owners, which combine a dense local network with substantial overseas contacts; the Accra cafe owners, who focus on overseas contacts and avoid their local contacts for professional purposes; and finally the IT managers, who tend to have a dense local network combined with a more loose-knit set of overseas contacts, providing greater opportunities for both new information and brokerage between contacts. This section explores the different types of embeddedness that characterise each, and the effects that identify them.

5.3.1 Structural embeddedness

A network's degree of structural embeddedness is composed of three factors (Kempner 2010: 140). First, density, or the number of actual connections in a network as a proportion of all the possible connections. Second, centrality, which denotes the average length of the path connecting any two members of a network, and third, structural equivalence, the similarity of the types of ties between network members.

The two groups of internet cafes show significant structural embeddedness. The local networks of the northerners (figures 1 and 2) show density, a similar length of paths between contacts, and similar types of tie – professional and competitive – between individuals. The Accra cafe owners reported similar structure among their overseas networks: individuals know their contacts from home or family, the contacts tend to know each other or be related to each other. The IT managers, however show less of this structural embeddedness. While they inhabit a small world in terms of their local Ghanaian networks, their professional circles overall are more loosely structured (figure 3). Although their Ghanaian contacts frequently know each other, their overseas contacts do not.

There is a corresponding divide in terms of relational embeddedness. The international contacts the cafe owners can use for inputs to their businesses tend to be described as 'thinner' and less reciprocal than those of the IT managers (see Box 5.3 below).

Box 5.3 Internet cafe owners' international ties are important but usually not reciprocal:

'I wish my friends outside Ghana would help me, but they are too busy.' (Michael - cafe owner, Bolgatanga)

'A guy from Bolga Poly [Bolgatanga Polytechnic] who studied in Holland came by and explained about Skype, and now another expat is going to help load it [onto the computers].' (Saful - cafe owner, Bolgatanga)

'Can you tell me how I can find a benefactor from outside? Some of the cafe owners, they meet someone who is visiting, and they have no more trouble – they send them whatever they need.' (Yusif - cafe owner, Tamale)

In contrast the IT managers' ties seem to be characterised by an extra layer of relational embeddedness: depth and background arising from the greater degree of reciprocity in the relationships (see Box 5.4 below). This relational embeddedness stands out in several ways. First, while the internet cafe entrepreneurs almost always described the overseas contacts resulting in inputs in hierarchical terms – a senior contact or senior family member – the contacts of the IT managers interviewed were much more varied. While an almost identical proportion of family ties were cited by internet cafe owners and the IT managers: six per cent of all ties among internet cafes and seven per cent among the IT managers, the ways in which their non-family ties had been formed were noticeably different. The IT managers' contacts were frequently formed through professional associations, through a wide variety of higher education and employment experiences, and in many cases through frequent short-term travel. These features add up to networks that respondents described as involving a greater degree of perceived equality and mutual benefit between egos and alters than those of the internet cafe owners.

Box 5.4 IT managers' overseas contacts are made through work and study, and purposely sustained:

'The people I know outside Ghana are people from my education, from work, and people I grew up with, and their friends, in that order. ...I use my contacts from abroad to raise investment, get technical support, recruit for the business, do procurement, find clients.' (Matthew - CEO, software company, Accra)

'I know people from my student jobs in the UK, and from contracts abroad with [employer] across West Africa – five to seven per cent of our business is in Nigeria, we work in Liberia, Sierra Leone.' (Fifi - Manager, software company, Accra)

'I keep in touch with everyone abroad constantly. Most people, they keep a sim card when they move countries and check every few days for messages so they don't miss anything.' (Osei - Account manager, software company, Accra)

'I am the only Ghanaian in my alumni network' (Syracuse University, US). 'I keep in touch constantly through Facebook, and through the email list. I use my alumni network to find new ideas.' (Twia - Department head, internet access provider, Accra)

These different types of embeddedness reflect differing abilities to draw on connections for resources. It appears to be the associational activity of the IT managers, their history of past and ongoing international mobility, and their proactive sustaining of contact with their connections that makes it easier for them to draw on them and increases the reciprocity of the relationship, so that social capital used in these 'withdrawals' can be replenished rather than thinning over time. In contrast cafe managers' relationships with their international contacts are thinner and therefore less productive than those of the IT managers.

5.3.2 Hierarchy and influence

Relational embeddedness can be seen at work in individuals' relationships to authority, specifically in terms of contacts who are government officials. The same proportion of internet cafes (both northern and Accra), and IT managers, 25 per cent, stated that they had a contact in government. However, the IT managers who named government officials all defined them as friends, whereas only two of the 25 internet cafe owners did. The IT managers also said they were regularly in contact with these alters by phone, SMS, Facebook and in person, describing them as close friends

rather than contingent or one-time contacts, as was predominant among the internet cafe owners. Whether the closeness of these friendships was real or imagined, this difference highlights the issue of relational, as opposed to structural embeddedness – the emotional content of connections rather than their structural proximity to other connections.

It is obvious that those who live in Accra and work for elite companies will tend to have (or at least claim they have) elite contacts in government, and indeed the IT managers' government contacts were more international, ranging from different branches of the national government to the United Nations and the World Bank, while the internet cafe owners tended to know low-level local officials (virtually the only type of government official working in the North). Significantly, however, the internet cafes were also more likely to have government contacts if they were not Muslim: among those with such contacts 17 were northern, but only five were Muslim. One Accra cafe owner stated, when asked if he knew any government officials: 'I am a Muslim, I have no contacts.' The IT managers did not mention ethnic or religious divisions, but all were Christian.

International flows of information similarly highlight the differences between IT managers and internet cafe owners. Whereas the IT managers said they valued their contacts principally for information and innovation, the cafe owners principally valued them as sources of equipment and capital. When asked what was their main challenge in running their business, 45 per cent of the cafe owners said they needed a more reliable internet connection, the same proportion said they needed credit and 33 per cent said they needed equipment, while just 3 per cent said their greatest need was knowledge or capacity. Many of the internet cafes spoke of their desire for 'a benefactor', someone who would extend them credit for free, or at best, give them cash: 'I need grants, not loans', as one owner from the North said during a discussion about credit.

Among the cafe owners, clientelism was a common feature of relationships with their influential contacts. These mainly took the form of bribery, such as the practice of 'dashing' technicians to fix the broadband service (bribery to get basic services often skimmed off up to 25 per cent of monthly net profit), or of giving bribes in order to get formal credit. Thus for the cafe owners business relationships tend to involve constant bargaining and 'dashing', whereas the IT managers, although no doubt experiencing similar pressure, described professional connections that were much less dependent on day-to-day transactions and where immediate compensation for favours was less common than calculations of long-term mutual advantage.

5.3.3 Brokerage

The other activity strongly connected to relational embeddedness is brokerage, the practice of bridging the 'structural holes', which separate 'nonredundant sources of information' (Burt 2001), i.e. contacts who do not know each other. As demonstrated above, IT managers are brokering more than the cafe owners because their broader overseas networks offer a wider net of contacts who do not know each other. However, relational embeddedness is likely to play a role in this activity too, given that powerful contacts are likely to prefer brokers whom they know well. Where two unrelated contacts, representing different circuits of information, can be brought together, it is possible for the broker to potentially profit from controlling the flow of information and activity that results.

There are indicators that suggest the IT managers are engaging in bridging and brokerage to a greater extent than internet cafes. First, the prevalence and characteristics of their professional associations, as outlined earlier. Second, the fact that they describe themselves as using their networks to locate alters such as potential clients, investors, and places to invest. These alters, by definition, are not known already, and require outreach across gaps in an individual's network. Many of the IT managers were doing this on behalf of their companies, and could therefore be described as brokers in the classic sense. One clear example of this is Esther, an IT manager who uses her visits to her overseas family to broker on behalf of her company:

> 'My family live mainly in the UK – London and Welwyn Garden City. I go and visit often, recruiting for [the company]. One of my other main strategies is to recruit returnees [to Ghana] from overseas. Those are the main ways I find new people for the business.' (interview, 12.03.09)

This flow, however, also represents the circulation of new ideas and knowledge. Brokering does also occur among the cafe owners – the flow of technical knowledge from their contacts abroad is clearly an example. However, their brokering appears to be less sustainable because of the thinness of the relationships involved, and the fact that the transfers received seem not to be part of a reciprocal process where both parties can expect to benefit.

5.3.4 International mobility as a source of relational embeddedness

The cafe owners studied here are nearly all embedded in dense networks where even their overseas contacts are often of local origin. As such, the new information circuits they can access are limited, and their lack of relational embeddedness means that where they do make new overseas contacts,

they are soon worn thin by a lack of reciprocity. There are exceptions, however, which demonstrate how international mobility can change an individual's access to new information.

The first example is that of Joseph, a cafe owner in Tamale and a lecturer at two local polytechnics. After his undergraduate degree in Ghana, he decided to go to Malaysia to study for a Masters qualification in IT, since Ghana's university system did not offer the practical element he needed. On his return, he started consulting locally, networking and maintaining hardware for other cafes and businesses. Next, he became manager of the local telecentre in his hometown. He met representatives from the European NGO evaluating the telecentre project, who hired him as a consultant for background research on telecentres and ICTs and development, and monitoring and evaluation reports for their projects.

Joseph's story could be seen as a triumph of education, but is also related to his mobility. He was hired because he can bring an international perspective to his research on Ghana's IT sector, and can communicate cross-culturally – something he would not have achieved by staying home. Today, although Joseph has not been to Europe he is connected to the ICT sector there, and through those contacts to other regions. He could therefore be said to operate within the global ICT sphere, although he remains located in northern Ghana.

This interaction between mobility and an expansion of networks and thus opportunity can be observed among the managers of one of the Accra IT companies studied, DataCo. DataCo is one of Ghana's showpiece Business Process Outsourcing (BPO) firms, taking care of numerous back-office data processing contracts for large US firms. The BPO industry in Ghana is still in formation: several companies have started up and failed, or are running at a minimal level. The CEO of DataCo was invited in by the Ghanaian government in light of this failure to re-start what they hoped would be a profitable industry. He brought a new strategy: transnational hires, namely Filipino managers from that country's successful BPO industry, to train junior Ghanaian managers to international standards.

Erlat, the director of HR and a Filipina trainer, explains that there was initially a great disparity between Ghanaian business practices and those they were expected to learn:

> 'We tried local hiring using online posting, and found the CVs were good. So we called candidates in for basic tests. None of them passed. Finally we chose two candidates, one who is a professor of IT, and who told us how IT is taught here. Even the tech colleges

> teach more theory than practice. The problem here is a combination of lack of hardware, software and knowledge.' (interview, 21.07.09)

She describes how the incoming managers had to adjust their strategy to Ghanaian context:

> 'We conducted a training needs analysis… Some processes from Asia are not applicable here, for example we have incorporated multiculturalism in training – making people understand that Ghanaian standards may not be the international standard and that they must compete in a global market. So we included basic office etiquette, organisational behaviour, and international business etiquette.' (interview, 21.07.09)

Erlat explains that DataCo's training programme has a 80-per-cent attrition rate, because Ghanaian ways of working are more relaxed ('Slow motion compared to the Philippines'), less product-oriented, and more regimented. She notes that 'those who join the company get a culture shock' due to the lack of a sense of international standards in university-level IT training in Ghana. The company promotes according to the ability to comply with the international standards it must follow, which has so far resulted in several young women being promoted into positions of authority over men. Erlat recalls that there was 'a resistance because of her age and gender, to obeying her or working with her. But because we are an international company we use rhetoric and keep hammering – age doesn't matter, it's skills.'

Ghanaian employees were hired as management trainees, with the aim of promoting them to senior management as soon as possible and making the company Ghanaian-managed. Felix, a junior manager training for promotion at the company, describes the difference between the Asian and Ghanaian ways of working:

> 'You can switch between the two ways of doing business, but when you switch from the international system to the Ghanaian system you will be very efficient, because you don't condone lateness and relaxed behaviour. People will think you are trying to be the guy who works too hard, but here you understand the cost of time.'

Table 5.6 shows a comparison of the background and basic features of the networks of the trainees and the managers surveyed. The foreign managers all have global professional networks composed of experts they have met through work or education. They name these contacts as people who could help them find new jobs, solve technology problems and learn about new innovations. Almost all of the people named are weak ties with whom they maintain regular contact. The trainees, who have

not travelled, have networks consisting mainly of school and neighbourhood friends and family. Whereas the managers were members of international professional associations, the trainees belonged only to local religious and community associations.

Table 5.6. Background and networks of DataCo trainees and managers

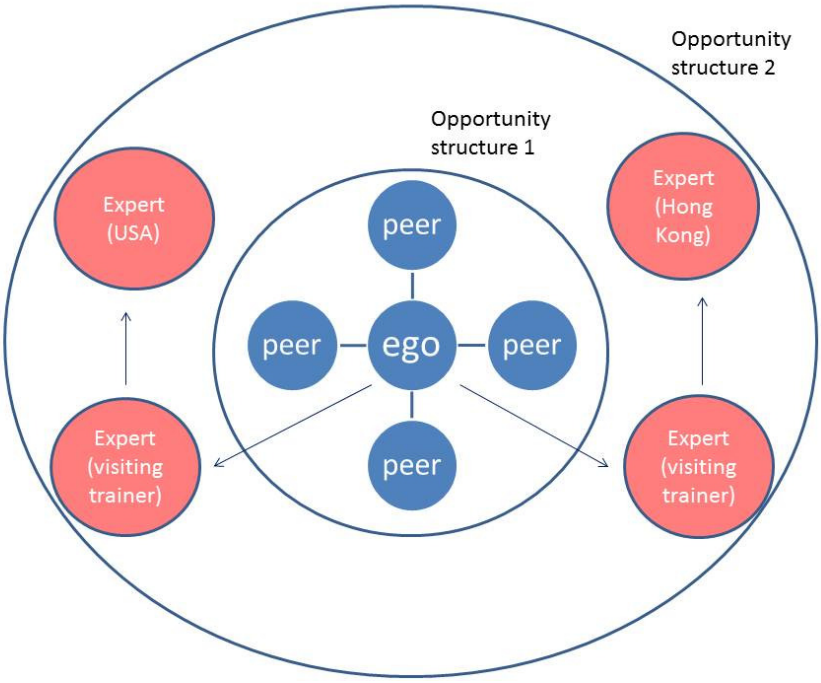
	Felix (trainee)	Adjoa (trainee)	Amma (trainee)	Sam (manager)	Tom (manager)	Erlat (manager)
Country of origin	Ghana	Ghana	Ghana	US	Philippines	Philippines
Education	HS	HS	HS	Tertiary	Tertiary	Tertiary
Professional parent(s)	No	No	No	Yes	Yes	Yes
Professional ties	10	8	8	21	13+	14
Weak ties	9	5	7	19	12	13
Strong ties	1	3	1	2	1	1
Countries in network	2	3	2	3	4	6
Professional associations	0	0	1	2	2	1
Countries visited	0	0	0	16+	6	9
Countries worked in outside Ghana	0	0	0	1	6	9

However, the trainees named their internationally connected trainers as close professional contacts, which meant they now had access to international networks through them. As long as they remained on good terms with their trainers, they could expect to benefit from professional networks far beyond their own circle and that of their local contacts. Moreover, they also had access to the company's overseas clients as important sources of professional information. Thus these trainees gained important resources from their managers and clients from abroad. First, they expanded their soft skills by learning to work to 'international standards'. Second, they expanded their network of weak ties, both directly (via their colleagues) and indirectly (via those colleagues' own networks) to include a much higher proportion of contacts who could help them both problem-solve with technology issues and find future jobs in the IT sector. Third, they gained a base of clients who were highly skilled international professionals, constituting sources of information on technological, financial and other professional issues.

The rules and frameworks within which an individual lives – their opportunity structure – are determined by their background, their location, and their education. This opportunity structure influences the resources they can access through their networks (Lai et al. 1998), since wealthy, privileged networks offer more resources. International mobility plays an important role in these structures of opportunity, as can be seen from the frequency of overseas education among the IT managers (Table 5.1). However, they are not completely inflexible. The cases of Joseph and the trainees of DataCo show that these structures can be changed, where international mobility generates relational embeddedness and opportunities for brokerage.

Figure 5.4 is an idealised representation of this kind of change, using the example of a DataCo trainee. The trainee begins with a closed network (at centre) and a restricted opportunity structure ('opportunity structure 1') where she can only progress subject to local rules and expectations (for instance, the gendered expectations about roles and behaviour noted by Erlat). However, the company imports Filipino experts to train the local employees as managers. These are represented on the edge of the initial opportunity structure because they interact with it, but are not restricted by it. In turn, these experts know others overseas, whom the trainee can now potentially access. She gains relational embeddedness from working with the migrant experts, so that if she needs resources that their networks can provide, they can broker for her. Similarly, in the future she may be able to act as broker herself, connecting these third parties with other Ghanaians. Finally, her opportunity structure has expanded, potentially, to include a more global framework of rules and expectations ('opportunity structure 2'), where she can operate in a variety of contexts and continue to learn and broker with those outside.

Figure 5.4. Changing opportunity structures through transnational connections



This is an example of how even indirect mobility – that of the trainers in this case – can create an increase in opportunity. These trainees share similar backgrounds to the internet cafe owners: relatively low-status families, a low level of starting resources, and networks with few senior or influential contacts. The company's transnational strategies, however, enable them to bridge the gap between the local and the global IT sectors, positioning them for a career in Accra's developing IT industry. In this case, as with that of Joseph, the cafe owner, opportunities can be radically changed where people can connect with the international sphere, and particularly when that connection is structured around skill and knowledge transfer.

5.4 Conclusions: contact zones, embeddedness and opportunity structures

This chapter set out to determine which types of international mobility are beneficial to Ghana's IT sector as a whole, and what kinds of benefits they confer. The horizontal network structures explored in Chapter 4 are located within the larger vertical structures of the IT sector nationally and globally. The analysis of individuals' progression within the hierarchical structures of the sector also has bearing on larger process of internet diffusion in Ghana. First, because where networking activities provide access to resources to connect new users to the internet who then participate in creating content, these networking activities increase the network consumption externalities of

internet usership and make it more likely that others will choose to adopt if they have the opportunity to do so. Second, where international networking is used strategically to increase individuals' opportunity frameworks, it contributes to the growth of the sector and to its reputation as an employer within Ghana. This process of growing the IT sector's influence and its positive image as an employer is important, given the perceived negative aspects of internet use (an issue explored further in Chapter 6). The more the IT sector is perceived as a way for ordinary Ghanaians, rather than the international elite, to progress professionally and to achieve social mobility, the more public support it will receive and more likely it is that the sector will receive adequate policy support.

From the evidence presented here, it is clear that there are different opportunity structures for those engaged in the IT sector, divided along the lines of North and South, Muslim and non-Muslim, small-scale enterprises and larger companies. One structure involves a type of learning and exchange that leads to participation in the global IT sector. It is characterised by relational embeddedness seen in broad, loose-knit networks that energise the flow of information between individuals. The other type of structure leads to a small business which is likely to remain small, and which is to a great extent interchangeable with other small businesses. There is value in these small enterprises: they are an important force in diffusing internet access and usership in poor and remote locations. However, they are not sources of international-level technological innovation, nor do they aim to be.

These network structures exist within larger opportunity structures that are both formed by, and manifested in, the way people build and maintain their relationships. It can be argued that these opportunity structures hold the key to the diffusion of technology into and within Ghana. They are not entirely deterministic: being in the right place at the right time allows individuals to make foreign connections that can move them from one opportunity structure to another, as seen with the example of DataCo. This case study shows that professional networks can work to change opportunities, but only in the context of migration and foreign inputs. The DataCo model turns structural embeddedness to advantage by creating a company that uses both Ghanaians and foreigners to provide the networking context. Lin's distinction (2001) between 'network resources' which reside in the ego network, and are therefore immediately available, and 'contact resources', which come from third parties outside the immediate egonetwork, is useful here. Network resources are plentiful for each group studied here. However, it is these contact resources that have the power to open doors to international-level engagement in IT.

These contact resources, rather than difference in location, appear to be the main determinant of the differences in opportunity and activities seen among these groups. In particular, the group of cafe owners in Accra and that of the management trainees at DataCo are similar in their backgrounds and educational profiles, but are involved in differently structured international circuits of knowledge, ideas and resources. Among the cafe owners many networks form dead ends rather than circuits, and much social capital is earned but never spent. Mobility, however, offers both access to new circuits and ways to sustain that access. Thus the circulation of goods and ideas that drives the development of Ghana's IT sector represents a complex and fertile interaction between mobility and opportunity – which could therefore be expanded by increased international circulation among the less-advantaged.

The notion of contact zones, as outlined in chapter 2, helps to bring these findings together since the concept rejects notions of core and periphery, instead positing that knowledge is reconfigured when people from previously separate circuits of knowledge come together. This kind of reshaping is key to the expansion of IT-related opportunity and functionality in Ghana, since it holds the key to moving beyond a policy-driven transplanting of IT resources into the Ghanaian context to a reinvention of the technology so that it answers Ghana's specific needs. This chapter has demonstrated how Ghana's IT sector is undergoing this kind of cross-fertilisation through various kinds of transnational contact and exchange, and how it differs in effectiveness and potential benefits.

Internet cafes are becoming increasingly common in remote places across Ghana thanks to the limited transnational contact zones formed by visitors or the mobility of local entrepreneurs. In contrast, the IT managers engage in more multidimensional contact zones that also involve the dimensions of time and depth, growing new knowledge through sustained and iterative contact. This extra dimension of time leads to a more interactive shaping of that knowledge, and the evolution of technological innovation among those who network this way. Both forms of knowledge creation are essential to Ghana's IT-related development, since they both reconfigure knowledge for the Ghanaian context. The first drives competition that builds usership and access at the grassroots level whereas the other informs the higher-value-added activities that are potentially transformative for the Ghanaian economy.

In terms of the network perspective, this chapter has shown that density and closure are not phenomena confined to networks within companies or particular locations, as they are usually studied, but can also exist in a transnational context, something as yet unexplored in the literature

on social networks. The transnationalism literature usually deals with dense, homophilous networks in the context of ethnic entrepreneurialism (e.g. Portes 1995), where international connections and travel, although germane to the analysis, occur outside the space of the study. Here, these phenomena are seen to be operating across great distances, with the network acting as an added spatial dimension.

It has also demonstrated that mobility is a catalyst for changing opportunity structures. This occurs either where individuals travel internationally for work or education, or where structured exchanges take place through the in-migration of those with wider networks. Those with ties formed through international professional activities, which they maintain through personal contact, find it easier to mobilise resources from their networks. Therefore while being internationally mobile matters in terms of learning skills and gaining productive contacts, certain types of professional contact can be just as effective when they occur through the mobility of others.

6 ICTs and development: policy aims and local diffusion dynamics

6.1 Introduction

The preceding chapters have explored various ways in which the private sector is overcoming obstacles to provide internet connectivity, with particular attention to how this both makes the technology available to potential new adopters in remote and rural areas, and increases opportunities for urban workers to develop and expand the new IT sector. These private sector activities, however, have generally not received policy attention or support either within Ghana or from international organisations interested in ICT diffusion. Policymakers and international bodies have instead focused on a public-sector model of provision (as outlined in Chapter 1, Figure 1.1) involving government workers, public-sector employees in general, and the general public as users of telecentres, all connecting through government-provided internet links. This public model for providing access is based on the principles laid out in the country's internationally sponsored ICT-for-development (ICT4D) policy, which indicates specific sectoral initiatives for e-government, health, education and private enterprise, and involves telecentres as a way to inclusive access for poor, rural and remote populations. Following on from the analysis of private sector internet diffusion, this chapter locates that process in relation to this public-sector model of provision. It argues that the private-sector model has been overlooked by policymakers in favour of the public-sector one, but that the former is more effective at diffusion and is therefore potentially a more effective way to achieve broader internet access and usership – and in turn to promote the overall goals of the country's ICT-related development policy.

The interventions which have shaped Ghana's ICT policy are based on an international ICT4D discourse about the potential economic and social benefits of increased, and more inclusive, connectivity (Unwin 2009a). This discourse has played an instrumental role in the institutional background to Ghana's engagement with technology and the internet over the last two decades (GoG 2002a; Infodev 2005). ICT4D incorporates donors, governments, NGOs and technology specialists in a discussion of the ways that more inclusive access to ICTs can facilitate economic and social development (ibid, UNECA 1999, UNDP 2001, UNCTAD 2005). Ghana's policy is virtually a carbon copy of a host of ICT4D policies promoted by the United Nations Economic Commission for Africa (UNECA) across Sub-Saharan Africa, and focuses on a specific set of sectoral interventions: the increased provision of infrastructure to deliver connectivity, the digitisation of government processes and public services, the extension of health and education by

means of ICTs, the provision of low-cost connectivity to remote and rural locations by means of telecentres (publicly managed internet centres where anyone can access the internet for a small fee), and the 'mainstreaming' of these technologies into the agendas of donors and development practitioners.

The theory of change involved in ICT4D (Kleine and Unwin 2009; Heeks 2010) proposes that ICTs can benefit developing countries in economic terms by increasing businesses' efficiency and fostering a new economic sector, but also in terms of human development. These human development benefits are categorised into four main ways that ICTs impact civil society. These are the increased inclusion of the poor through access to information; anti-corruption effects where ICTs provide more direct access to public goods and services and eliminate rent-seeking; democratisation of the media environment and collective empowerment, and new poor-friendly business models that change and increase production. These potential benefits are clearly all correlated with the number of people who become users of ICTs, and achieving them thus depends on making access to ICTs as inclusive as possible. This makes inclusivity a central element of the theory of change of ICT4D, something which is confirmed by the policy documents that delineate Ghana's ICT aims and goals (GoG 2002a, 2003a).

Ghana's ICT4D theory of change as expressed in the main strategy document for the policy (GoG 2002a) focuses mainly on the internet as a driver of economic and social development, and clearly sets out the need for inclusive access. The document names three priorities that distinguish Ghana's policy from others in Africa: the aim of making its ICT-based development strategies all-encompassing (cross-sectoral, and relating to human as well as economic development), sustainable without ongoing recourse to international donors, and inclusive, with the aim of making the proportion of the population who are internet users as great as possible (ibid, pp. 101-108). One section specifically names inclusive access to the internet as essential to the success of the ICT4D policy:

> '[Policy initiatives and measures shall be targeted at:] promoting universal service and access to information and communication technologies services and systems. Some of the initiatives that could be targeted include those relating to expanding access to rural and under-served areas and communities and making access to services affordable to a larger section of the population in an equitable manner.'
>
> -- (GoG 2002a: 118)

This goal of increasing internet usership in rural and remote areas and making access 'equitable' raises important questions in relation to the theoretical perspectives on adoption outlined in Chapter 2. The literature on adoption (e.g. Soete 1985; Steinmuller 2000; Guillen and Suarez 2005) shows that absorptive capacity is a precondition for new users to adopt a technology, and defines this capacity as a base of skill and knowledge necessary to develop relevant uses for new technologies, combined with the 'organisational capacity' (Horowitz 2010) to make them generally available. As noted in Chapter 2, there is something of a theoretical gap regarding how this absorptive capacity arises in a context where potential adopters are significantly culturally and educationally different from the majority of users. This is exactly the scenario addressed by Ghana's ICT4D policy: the country's internet users are still predominantly urban and educated, and in the remote and rural areas identified as priorities by the policy strategy there are high barriers to adopting the technology in terms of language, cost and physical access to computers and connectivity. These barriers constitute a serious challenge for the country's ICT4D initiative: overcoming them would indicate the overall success of the strategy, and failing to do so would represent a failure to achieve the objective of increasing usership and access on which the theory of change is based.

This chapter assesses how these barriers to access have been addressed by Ghana's ICT4D initiative since 2003, and to what extent the policy can be said to have succeeded so far. The next section outlines the specifics of the ICT4D initiative, and the following one examines the initiative's public-sector goals in detail, asking what progress has been made towards each. Next the policy's private sector goals are assessed, along with the extent to which these have been achieved. The following section assesses the telecentre element of the ICT4D strategy, which has been the chief strategy for diffusing internet use to new adopters. The chapter then outlines the private sector's potential as an alternate model for achieving the goals of Ghana's ICT4D policy, and shows how the specific features of private-sector processes of diffusion analysed in the preceding two chapters – mobility and international transfers – may be relevant to the country's ICT policy goals.

6.2 The ICT4D agenda in Ghana

Ghana's ICT4D agenda is aligned with the general philosophy of ICT4D as described by Unwin (2010): ICTs can enable the private sector to generate employment and economic growth, and can be used in state and civil-society-led interventions to reduce poverty and promote human development objectives. Ghana's ICT4D strategy sets out three main goals: first, to develop Ghana as an information society and economy; second, to use ICTs to achieve 'socioeconomic policy goals' in a 'multisectoral' way, and third, to 'use ICTs as a broad-based enabler of development goals'. ICTs as a tool of development are also found in the country's most recent Poverty Reduction

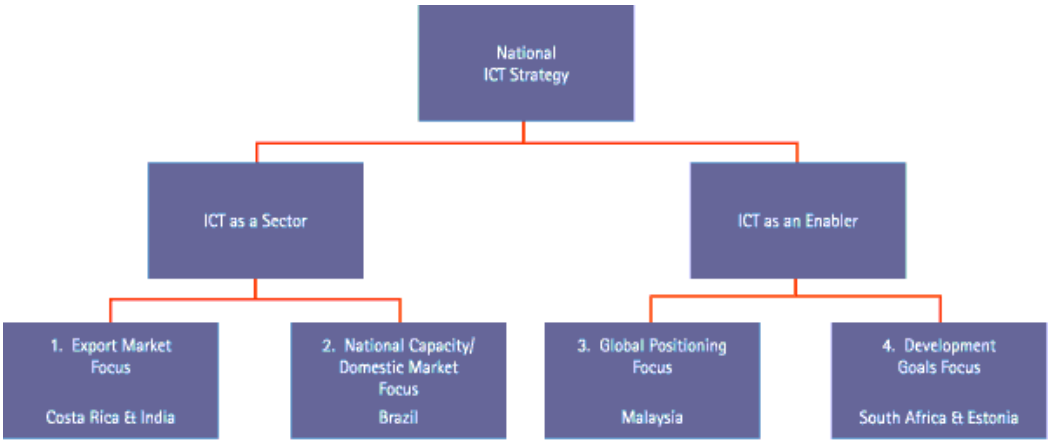
Strategy Paper (IMF 2006) which similarly prioritises inclusive access to ICTs as part of a pro-poor agenda that includes 'enabl[ing] low-income individuals to gain access to the internet', creating economic diversification and providing jobs for women and the young.

Ghana's potential for offering internet connectivity to new areas and users has risen with the development of new infrastructure over the last five years. Along with a national broadband fibre system (as shown in Chapter 1, figure 1.2) the country also gained access to increased bandwidth with the laying of the SAT-3 fibre-optic cable from Europe to South Africa in 2001, and later the GLO cable which increased and stabilised this bandwidth availability in 2010. This new level of connectivity increased optimism among international policymakers about the potential transformative effects of the internet for the poorest countries (World Bank 1998, UNECA 1999, UNDP 2001, UNCTAD 2005) and bolstered UNECA's African Information Society Initiative (AISI), which created a policy 'framework in which ICTs are mainstreamed into the national planning process' of 30 African nations (UNECA 2007a).

With its roots in UNECA's AISI framework, Ghana's ICT for Accelerated Development policy (GoG 2003a) names eleven objectives, headed by two overarching goals. The first of these is 'to transform Ghana into an information and knowledge-driven ICT literate nation', and the second is to promote ICTs as a route to socioeconomic development. The other nine cover sectoral objectives including using ICTs to expand education and government services, and to promote 'a globally competitive local ICT industry'. The strategy for achieving these aims, set out in an accompanying strategy document (GoG 2002a), indicates that ICTs will enable Ghana to 'leapfrog' stages of industrialisation and 'transform her poorly performing predominately subsistence agriculture based economy into a predominately information and knowledge economy without first being fully industrialized.' (GoG 2002a)

This notion of 'leapfrogging' stages of development is widely used in the ICT4D literature (for an overview, see Peña-López 2009). However, successful case studies often come from nations such as those in Southeast Asia or Eastern Europe which had higher educational and technological levels when broadband internet became available in the 1990s and therefore did not face such high barriers to adoption as Ghana does. Figure 6.1, taken from Ghana's main ICT4D strategy document (GoG 2002a) illustrates this difference: the comparator countries named in the lowest boxes in the diagram – Costa Rica, India, Brazil, Malaysia, South Africa and Estonia – have relatively strong bases of human capital compared to Ghana.

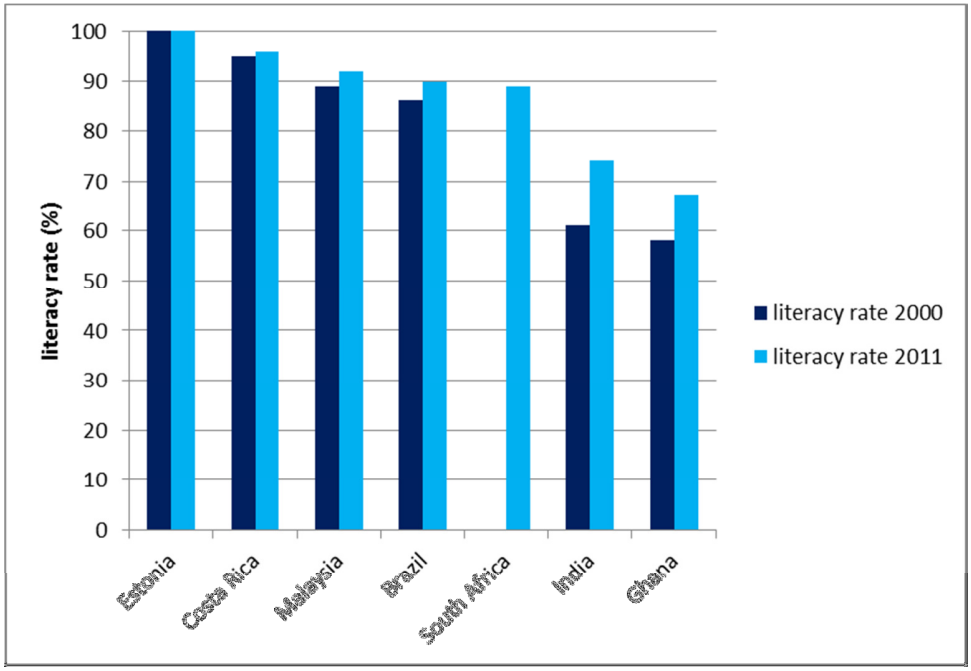
Figure 6.1 The role of ICT in national strategies: a typology



Source: The Digital Opportunity Initiative (DOI) Report, UNDP (2002).

Ghana's foundational ICT4D policy document (GoG 2003a) argues that since Ghana and Malaysia were on the same economic footing in the 1950s, therefore Ghana can follow Malaysia's technology-driven development path today. However Malaysia, like the other fast-developing countries cited in Figure 6.1, invested heavily in education throughout the second half of the 20th century and was ready with an educated workforce when the technology boom hit in the 1990s. In contrast Ghana has a different challenge, having instead been subject to structural adjustment and a consequent massive reduction in public spending. The comparative literacy rates of each country (Figure 6.2) suggest that despite its progress since 2000, Ghana has a long way to go before it can adopt the same human-capital-based strategies as these other countries. India's challenge is arguably not as great as Ghana's given that it has a population of one billion compared to Ghana's 23 million, and despite low levels of literacy overall still has a substantial literate and skilled population.

Figure 6.2 Total adult literacy rates (both sexes), 2000-2011



Source: World Bank development indicators (figures for South Africa in 2000 unavailable).

This human capital challenge has not gone unexamined in the literature on ICT4D. Research has shown that the more technocratic advocates of ICTs have not always worked from a strong knowledge base regarding the capacity and infrastructure challenges faced by developing countries (e.g. Mansell 1999, Peizer 2003, Gillwald 2010), and that this in turn has generated wariness among development actors regarding the quick-fix mentality. Heeks (2009) shows that ICT4D initiatives over the last two decades have frequently failed due to a lack of understanding of conditions in low-income countries and the search for a 'quick, off-the-shelf solution'. The next two sections look at the achievements of each of the aims of Ghana's ICT4D programme in order to assess whether the policy as a whole has been able to overcome these capacity and infrastructural challenges.

6.3 ICTs as a driver of development in the public sector

6.3.1 Education - ICTed

Ghana's original ICT4D policy document (GoG 2003a) names expanding education using distance learning as a main objective. However, in 2007 when the most recent evaluation was published by the World Bank, Ghana's ICTed policy framework was still under formation with little practical progress made (Mangesi 2007). There were 14 pilot initiatives completed or in progress that year, but all were small-scale projects. Five involved the donation of equipment to a few schools in a

particular area, and the rest involved networking projects designed to encourage awareness of ICTs among school administrators and pupils. The aim to place IT equipment in schools on a national level has not been realised to any significant extent, as Table 6.1 shows. These low rates of ICT use in schools can be explained partly by the passing on of costs to students, since even in the poorest areas schools are supposed to impose an ICT levy of US$3.20 on students in order to provide equipment and internet access (70 per cent of Ghanaians in the northern three regions live on less than US$.68 per day (GLSS 2005, Osei 2010).[12] Mangesi (2007: 6) explains that this has resulted in 'a great disparity between public and private schools as well as between urban and rural areas in access to ICTs'. He also points to a lack of support among educators.

Table 6.1 ICTs and education in Ghana, 2007

Ratio of enrolled students to PCs (in primary, secondary and tertiary education)	13:1
Percentage of tertiary education institutions with e-learning courses	13%
Percentage of ICT-qualified teachers in primary and secondary schools	16%
Percentage of primary and secondary schools having internet access for students	24%
Percentage of students enrolled in tertiary education having internet access for study purposes	89%

Source: UNECA (2007b)

The table shows that of the three groups here, primary, secondary and tertiary students, the tertiary students have by far the most internet access, at 89 per cent. However, Mangesi (2007) comments that this has generally been achieved by inviting in private sector operators to create campus internet cafes where students pay for access. This view is supported by my own observations, and by the user survey conducted for this project in internet cafes in northern towns which showed that nearly 67 per cent of those using the cafes were students, and the most common use of the internet there (named by 37 per cent of users) was academic research. There are also problems with connectivity where it is achieved: interviewees said that the relatively slow progress in setting up

[12] Based on the Ghanaian government's 2005 GLSS5 survey standard of poverty measurement, and adjusted by this author for inflation to 2009.

financial infrastructure in Ghana makes it next to impossible to buy effective virus protection, so that even staff computers in universities are often rendered unusable by viruses.

E-learning is another aim where there has been less progress than hoped. The 2002 ICT4D strategy document notes that large areas of Ghana are not served by any tertiary institution, and that e-learning courses run by existing colleges and universities could 'dramatically increase the proportion of the population with access to tertiary level education'. Table 6.1 shows, however, that only 13 per cent of these institutions are running such courses.

The World Bank's report concludes that while there is found to be commitment to the ICTed initiative at the highest levels of government, it is handicapped by four main obstacles: lack of connectivity outside the main cities; lack of capacity and aversion among teachers; lack of buy-in from implementation agencies, and lack of private-sector involvement in primary and secondary-school ICT provision.

6.3.2 e-health

The government's stated policy priorities in the area of health (GoG 2002a) are to use ICTs to introduce telemedicine, and to improve healthcare delivery and health data collection. Some advances have been made toward the goal of telemedicine, with privately funded pilots at the initial stage in several private hospitals, but the e-health policy as a whole is still in the planning stage (IICD 2009b), without a clear idea of how to fund and operationalise the digitalisation of actual processes. A study of ICT readiness in 21 public hospitals in Ghana conducted by Luk (2007) showed that the internet was available in a minority of hospitals, with eight of them having some form of connectivity, and six having more than five computers in the building, signifying the potential for digital record-keeping, another goal of the policy. The study found, however, that the power supply was too unreliable for internet-based applications such as telemedicine to be worthwhile, and instead designed a system that relied on SMS messages to doctors' mobile phones.

Table 6.2 shows the statistics available on health professionals' use of ICTs in Ghana. However, as Luk (2007) points out, most of the internet connections found in hospitals were not usable for long stretches due to power or connectivity outages, so that most of the professionals surveyed explained that the online component of their work (email and research) occurred at weekends, either on their home connections or in internet cafes (as evidenced by the presence of Busy Internet, an internet cafe chain, as the main source of connectivity at Korle-Bu, Ghana's main teaching hospital (busyinternet.com). In a 2004 report, Foster et al. found that less than 10 per cent of health care facilities have leased-line internet connectivity. Thus the encouraging figure of 62 per cent of health

professionals using ICTs may not be representative of the actual internet provision capacity of hospitals.

Table 6.2 e-health in Ghana, 2007

Percentage of health institutions using ICTs (including government hospitals, university hospitals, pharmacies, etc.)	36%
Percentage of health institutions with access to the internet	46%
Percentage of professionals using ICTs for medical purposes	62%
Purposes of ICT use among health professionals:	
Telemedicine	2%
Continuing medical education	6%
Health awareness	11%
Medical Research Work	17%
Systems applications	22%
General administrative work	42%

Source: UNECA (2007b)

The broad categorisation of ICTs in the policy literature, ranging from landline phones to the internet, makes it possible to interpret these statistics in various different ways. If ICT access can mean anything, from the presence of computer hardware in the workplace - whether connected to the internet or each other, or not - to the capacity to do research online, some of these indicators seem inadequate. Even the internet access indicator, which seems to presuppose the existence of a fairly sophisticated ICT structure in health institutions, does not guarantee that the internet works well, or regularly. A search of the available literature on the e-health project in 2010 shows continued policy interest and planning but no documentation or evaluations of any existing initiatives. The main obstacles seem to be, as with the ICTed initiative, cost, and a lack of connectivity in poor and rural areas of the country (Luk 2007).

6.3.3 Agriculture

The Ghanaian government's initial policy envisioned the use of ICT in agriculture for extension and research activities, weather and price information, and 'business' activities including processing, packaging and marketing of agricultural products. (GoG 2002a). Similarly to the e-health initiative however, a review of the evidence available shows that the agriculture initiative had not progressed beyond the policy stage. There are strong and viable private-sector initiatives relating to ICTs and agriculture such as the work of Esoko, an SMS service for farmers that provides weather and

market information. The policy initiative, however, is still at the stage of planning to collect data on future inputs, as can be seen from the government's framework for data collection (UNECA 2007b).

6.3.4 e-government

The aims of Ghana's e-government initiative involve linking government departments for better communication and information sharing, the digitalisation of national population data, and moving certain citizen-government interactions such as business and marriage licensing online. The government's most recent evaluation of its progress in this initiative (GICTeD 2009) shows that it remains at the planning stage and has not yet progressed to any practical applications. The statistics produced by the government with UNECA (UNECA 2007b, and Table 6.3 below) show that 70 per cent of government offices have internet access.

Table 6.3 e-government in Ghana, 2007

Percentage of government offices and agencies with a website	56%
Percentage of government offices with internet access	69%
Percentage of government workers who use ICTs	85%

UNECA (2007b)

However, the figures quoted here should not be assumed to indicate that all civil servants have access to the internet, or that government functions are available online. During the policy interviews and other contact with government during the research for this project, I found that it was unusual for government officials to have an internet connection for use during the working day. According to several communications policymakers interviewed in Accra, many of their colleagues conduct public business from internet cafes near their ministries.

Thus the public sector aspects of Ghana's ICT4D policy show limited success at the time of writing, nearly a decade after the initiatives were instituted. ICTs in education have failed to gain traction amongst educators, possibly due to a lack of equipment and connectivity to back up the policy's aims to get more students using computers and the internet. In the health sector, workers are reported to be more interested in using ICTs for their work (possibly because they are perceived as having direct relevance by both administrators and medical staff), but hospitals and clinics lack both

computer equipment and internet connections. The agriculture sector shows some development of online tools such as market information applications, but has no monitoring or evaluations available with which one can gauge whether farmers are gaining access to ICTs or not. Finally, the e-government initiative appears to be moving forward slowly, with internet access available to the majority of government workers but the relevant programmes remaining in the planning stage. The next section looks at the private sector aims and programmes in Ghana's ICT4D initiative, assessing their aims and the progress made toward them so far.

6.4 ICTs' development potential in the private sector

Beyond its public sector aims, Ghana's ICT4D policy conveys a strong focus on private sector development and wealth creation. While acknowledging the need for transformation in terms of human capacity (IT education) and awareness, the document fundamentally frames the potential of ICTs as economic growth, with social benefits as possible externalities. The policy document (GoG 2003a) names a set of private-sector priorities: building an 'ICT products and services industry', a 'value-added services sector', and 'research and development', along with 'ICT community buy-in' and 'human resource development'. The press release that followed it states that:

> 'a nation's capability to accelerate its socio economic development process and gain global competitive advantage and improve the well-being of its people depends very much on the extent to which it can **develop**, **use** and **sell**, ---- **information**, **knowledge** and **technology** in one form or other' (GoG 2002b –emphasis in original).

As noted earlier, this vision of leapfrogging the industrial stage of development through an all-out effort to become a knowledge economy – what might be described as a 'magic bullet' approach – permeates the policy and popular understanding of ICTs in Ghana. Over the course of the 2000s, the Ghanaian press has printed a stream of press releases from government departments about the potential economic benefits of ICTs, particularly in terms of job creation for the country's young and underemployed population. This vision is particularly evident in the aspects of the policy framework dealing with the private sector, where the government's agenda shows a strong bias toward highly advanced, capacity-intensive IT enabled services (ITES), ranging from software development and e-commerce to business process outsourcing (BPO) activities (GoG 2003a).

The policy framework (GoG 2003a) acknowledges the problem of adoption capacity when it notes that these objectives require a higher level of education and capacity among workers. When the framework began to be formulated in the late 1990s the country's IT educational capacity was

virtually nonexistent, with little teaching of programming or hardware skills, and most of the country's IT professionals active in the global market having studied abroad. Since then several technology schools have started up, almost all in Accra or Kumasi, the two economic centres of Ghana. These include NIIT (an Indian IT education provider) and IPMC (Intercom Programming & Manufacturing Company Limited, a Ghanaian company), and one intergovernmental collaboration, the Ghana-India Kofi Annan Centre of Excellence in ICT. They are accompanied by an increase in technology-related startups, but these remain a tiny sector within a country that overall has a huge lack of qualified IT workers (Mangesi 2007, Beletre 2009).

One way in which the country's ICT4D strategy has addressed the lack of capacity is by promoting Business Process Outsourcing (BPO) as the focus of the private sector ICT agenda. These businesses conduct back-office work for other firms, generally situated in countries where labour costs are higher. BPOs mainly take the form of call centres and data transcription services, and do not require a high level of technological skill from their workers. As such, they could represent one way to bridge differences in knowledge and skills between users and potential adopters – but given that BPOs have only been set up in urban locations in Ghana so far, this does not address the larger skill and knowledge gaps represented by rural and low-income populations.

India and the Philippines have been particularly successful with BPOs, the best known being the case of Bangalore (GoG 2002a, Infodev 2005, Benning 2006, UNCTAD 2008: 50). The World Bank, in an overview of its African ICT programmes in 2007, stated that

> 'The eGhana project is expected to increase ICT-based jobs from 2,000 currently to potentially 40,000 over five years with equal opportunities for women, and increase export-led revenues generated by ICT/ITES industry by about US$750 million.' (WB 2007: 14)

The government has taken three steps to facilitate the growth of IT firms including BPOs: providing financial incentives, establishing intermediaries to help companies move into the sector, and creating infrastructure. First, it included IT businesses under the country's Export Processing Zone (EPZ) regulations, offering tax breaks, easier licensing and customs procedures and easier repatriation of profits for companies investing in Ghana. There are two intermediary bodies, the Ghana Association of Software and IT Services Companies (GASSCOM) and the Information Technology Enabled Services (ITES) secretariat. GASSCOM publicises the opportunities for foreign IT companies, with a focus on BPOs, to invest in Ghana, and the ITES secretariat acts as a 'one-stop-shop' for foreign investors in Ghana's ICT sector (ITES 2010). Third, the government

announced that it would build an 'ICT park' for technology companies. All these provisions had the stated aim of creating '60,000 ITES-BPO jobs in Ghana by end of the year 2012' (ITES 2010).

While these plans focus on Ghana's South, there has also been a discourse among policymakers about the potential of the internet to create jobs in the impoverished North. This idea emerged from three main sources: first, the director of ITES, who outlined a scenario where businesses could be encouraged to move to the North where labour is cheaper, bringing employment and opportunity with them. He suggests that the problem of living standards for company executives unused to conditions of extreme poverty could similarly be solved via connectivity, for example tackling the issue of the lack of proper healthcare in the North through telemedicine:

> 'you say you need a functioning hospital, suppose that what I'm visioning happens, someone that can sit in New York and do the teletreatment, right? Or just sit and watch the video and say, 'cut this place, stitch here, no' and direct the other medical team. Wonderful. This is the vision I have.'
> --Alhassan Umar, ITES director. (Interview, 27.8.09)

A 2009 conference on outsourcing in Ghana (Beletre 2009) shared this vision of connectivity bringing business to 'enable all IT-led initiatives wherever in Ghana', and John Mahama, a northerner, Ghana's former Minister of Communications and then Vice President (and now President) was also quoted as hoping that BPOs might bring jobs to the North.[13]

However Ghana appears to have landed far short of its goal of 60,000 BPO jobs by 2012. Despite the initial public discourse about how Ghana was about to 'strike gold' (Ghanaweb 2003, ITWorld Canada 2003, InfoDev 2006, BizCommunity.com 2009), BPO growth has been slow. Six firms were set up after the initial policy announcement in 1999 (GASSCOM 2010), by 2005 there were seven (Infodev 2005), and in 2010 there were still roughly the same number, according to the director of ITES, Alhassan Umar. Umar estimated[14] that the sector employs 5,000 Ghanaian workers, more than double the 2,000 reported by the World Bank in 2007, but a long way from the stated goal.

This failure of the sector to grow at the hoped-for rate was attributed by the professionals and policymakers interviewed to two main problems: infrastructure and human capital. Interviewees

---

[13] Mavis Ampah, World Bank. Interview, 9.9.09
[14] Email communication, 24.11.2010

indicated that there has been a high rate of turnover among these companies due to the government's failure to keep its promises with regard to infrastructure, and human capital is specifically named as a problem in the 2005 Infodev report on the country's readiness for BPO investment. The report (Infodev 2005) included a survey by Hewitt Associates that ranked Ghana last among its competitors in the global BPO sector (India, China, the Philippines, Romania and Mexico) because it had been 'unable to capitalize on its people resources' despite having a surplus of educated English-speaking workers.

This issue of human capital also emerged clearly from the interviews conducted with the managers of the government's flagship BPO company, RisingData, which was selected by the government to formulate a national training agenda. Em Matias, Director of Human Resources at RisingData, described the realisation that Ghanaian training was not up to international standards:

> 'What we've found interesting here is that people are quick to learn, they are adaptable and flexible, but they need skills. They teach basic skills in universities here, typing, MS Office, Word, Excel, but very basic. We are running all those same courses ... Before the training we ask participants to rate themselves in using the software, they usually say 9, or 10 – then we ask them to do so again afterwards retrospectively, and they say they were at a level of 2 or 3 but didn't know it.'
>
> -- Em Matias, interview, 21.7.09

This problem is replicated at higher levels of the IT sector. The national policy framework's background information section (GoG 2003a) notes that in 2003 Ghana had among the world's lowest totals of qualified technology professionals, with only 30 scientists and engineers per million of its population involved in the research and development activities that might build the hoped-for new economy. In comparison, in 2003 the UK had 2,984 such R&D specialists, and Finland 8,005.

The problems observed with human capital in the case of BPOs are symptomatic of the larger problem of adoption capacity. Examples of a lack of usership and understanding have also been seen in the ICTed project (Mangesi 2007) where an almost complete lack of interest in using ICTs was found among educators. This research also uncovered similar problems with the e-government initiative, finding from interviews with government workers that few in the central government have the necessary understanding of ICTs to engage with such a change. Examples include the finance ministry's continuing use of unencrypted email accounts as a channel for official communications, and the hacking of the Minister of Information's own (public) email account in

1998, which provoked Ghana's first internet security legislation. These stories suggest that although the policy discourse is highly positive about ICTs, in reality usage and confidence is lacking among public sector workers and officials, and the private sector cannot find qualified ICT-literate workers.

There is another class of barriers to private sector provision which have surfaced in chapters 4 and 5 of this study, and can be brought together under the heading of policy-related obstacles to internet diffusion. One is the 25-per-cent import tax on computer hardware, which leads commercial internet cafes to use the oldest machines imported by second-hand traders because these are the cheapest and therefore the only ones affordable once tax is added. These machines, however, are frequently as old as 1997-vintage Pentium II versions, and are thus ill-designed to withstand the environmental conditions in Ghana. A second barrier relating to policy is a lack of financial infrastructure so that those seeking to start internet cafes cannot buy hardware or software from abroad. This lack of infrastructure in manifested in a lack of credit card provision by domestic banks, and the lack of an e-commerce infrastructure that would allow people to order software or hardware from abroad, and the lack of a regulatory model for distinguishing authentic from fraudulent uses of the methods available, so that online purchases where the customer is identified as being in Ghana are automatically revoked and the account in question closed down. Third, there are regulatory issues where software may be banned based on the business interests of a monopoly provider, as in the case of Skype, whose use was banned in Ghana until recently. When national regulators relaxed this ban in 2008, the national internet provider, Vodafone, pursued an unofficial policy of informing customers such as internet cafe owners that Skype was risky software which would destroy their operating systems. This benefited Vodafone as a dual provider of internet and phone services, since Skype's facilitation of free calls over the internet decreased people's use of their phones. This leads to the last policy barrier, that of granting monopolies to national internet providers. When Vodafone bought Ghana's national telecoms company in 2008, a time-limited monopoly was granted which had three effects that were highly detrimental for internet cafes: the price of connectivity was set artificially high (constituting 37 per cent of cafes' overall expenditure, on average); accurate information on bandwidth provision that would enable owners to choose between different plans was withheld, and repair services when cafes' connections failed were conditional on bribes being paid.

This points out an important gap in the country's ICT4D policy: it assumes that demand creates supply in terms of ICT literacy. However, as research on adoption capacity shows (Park et al. 2007), a supply of adopters does not simply appear as the technology first becomes available.

Instead it grows out of people's understanding of the technology, which is in turn gained from a wider context of technology usership. Thus Ghana's private-sector ICT policy – and, by inference, its public sector policy as well – suffer from an axiomatic problem: internet-based initiatives for growth and development cannot gain traction unless people are already starting to use the internet. The next section reviews the telecentre project within the national ICT4D initiative – a component designed to contribute to building adoption capacity and usership amongst the general population – and asks whether it may constitute a solution for bringing new users online.

6.5 National ICT diffusion: Ghana's telecentre project

Perhaps the biggest obstacle to adoption of internet user in Ghana is the 'digital divide' between North and South. While there are upwards of 1,000 internet cafes in Accra alone (Burrell 2007), only 67 in total were found by this researcher in the three northern regions which comprise half of Ghana's territory. This is important because home internet services are not yet available outside the major cities of the South, Accra and Kumasi. As described in Chapter 1 (see figure 1.2), the country's internet connections and subscribers are clustered in these two cities due to the layout of the country's high-speed connectivity backbone, which forms a ring around the south of the country, with a single spur reaching the largest towns in the North but leaving most of the country without coverage. Just as the national averages for poverty or literacy rates mask a huge North-South divide (Ghana Census 2000), the same appears to be true for estimates of technology diffusion: national usage and subscription statistics are not disaggregated by region, and therefore do not reflect spatial inequalities in access.

The public telecentre initiative was set up to remedy this divide by providing connectivity to poor and rural locations. It offers connectivity through Community Internet Centres (CICs) attached to District Assemblies (local government bodies). The first telecentre was piloted in the North in 1997 by the Dutch government-funded International Institute for Communication and Development (IICD), which remains the main funder of the project today. In the early 2000s more were set up as a collaboration between the UN's International Telecommunications Union (ITU) and the Ghanaian government, and the project was expanded nationwide in 2005 with the aim of setting up 230 telecentres using World Bank, IICD and UNDP funding.

Ghana's telecentres are designed to promote adoption among new users, and to provide guidance to those users on how to benefit economically from the internet. The sponsor, IICD, lays out the project's aims:

> 'A CIC's basic responsibility is not just to provide Internet cyber café services to the community …the CICs have been mandated to provide ICT training opportunities in the area of basic computer literacy to people living in these communities. Furthermore, the CICs are to support business activities in rural communities by providing marketing information on improved agricultural production and extension services. More importantly, the CICs are strategically positioned to disseminate and educate rural folks on government policies, programmes and projects, especially in the areas of health, education, agriculture, environment, local government by-laws, tourism potentials and investment opportunities in their own localities and how they can tap those using ICT tools.' (IICD 2008)

Thus the telecentre initiative is designed both to promote adoption and to make use of that adoption toward specific development objectives. The telecentres have so far been funded in two ways: grants and loans from donors (initially the World Bank and IICD) and through tax concessions that make their computers exempt from the high import taxes that imposed on all other imported computer hardware, including that used by internet cafes. Telecentres are thus given a significant and ongoing comparative advantage over commercial internet cafes in terms of the cost of acquiring and maintaining equipment, and in terms of subsidised connectivity.

Despite these advantages, telecentres did not do well in terms of sustainability. One of the main three funders, the World Bank, carried out its mid-term assessment in 2009, two and a half years into the project, and found that the CICs had not so far achieved sustainability as had been hoped.[15] After pressure from the Ghana government to continue funding the telecentres despite this lack of sustainability, the World Bank continued to support ten CICs across Ghana. As of 2012, there are five CICs in the North of the country, one of which is financially sustainable (CTA 2012). The next section analyses the problems experienced by the project, and asks whether it has been able to achieve its objective of expanding usership and promoting the internet as a source of economic empowerment.

6.5.1 Has the telecentre model succeeded in expanding internet usership?

Telecentres have seen mixed results as part of ICT4D initiatives worldwide. Heeks (2009) describes the telecentre movement worldwide as consisting of three stages: 'failure, restriction, and anecdote'. He notes that this model was the archetype of ICT4D over the 1990s and 2000s, and that the problems which have frequently led to its failure were sustainability, scalability and a lack of real

[15] Mavis Ampah, World Bank (interview, 9.9.09)

evaluation. This section shows that this 'failure, restriction, anecdote' progression appears also to characterise Ghana's telecentre initiative, which has suffered from each of the problems identified by Heeks.

The use of telecentres as a solution to providing connectivity in Ghana was suggested by evidence of success in other contexts, notably India (e.g. Vasanthi 2005), where telecentre projects have achieved great reach and sustainability. However in India telecentres were rapidly overtaken by commercial internet cafes and home internet connections (Thirumavalavan and Garforth 2005). Despite this, path-dependence in India has led to the continued funding of telecentres despite their not being the most effective internet providers (ibid). The same progression has occurred in Ghana: after a decade of expansion, there is little evidence that telecentres are being effective at providing connectivity to the underserved.

One main issue for Ghana's telecentres is nepotism, which arises from the design of the initiative. A decision was taken to associate the telecentres organisationally and geographically with local government authorities, making them prime targets for patronage by giving assembly members the opportunity to employ their often unqualified relatives as managers on a government salary. The owner of an IT education centre in Tamale that offers training services and facilitation to the northern telecentres, explained that these managers were seldom technically adept:

> 'Sometimes they just bring computers and put them there but don't connect them, and they don't work because the CIC managers themselves don't know computers. They hire them because of nepotism...'
>
> --Simon, Tamale, interview 19.3.09

Another, possibly more serious, problem relates to the structuring of the telecentres' connectivity. Unlike the commercial internet centres in the North, the CICs are connected to the national telecoms provider in Accra rather than the local branch of the 'communications backbone'. Their direct connection to Accra meant that whenever there was a problem with internet service (more than once a week on average), it had to be fixed by Accra technicians rather than local ones. Simon explained that this impacts their sustainability and their ability to carry out their stated aims:

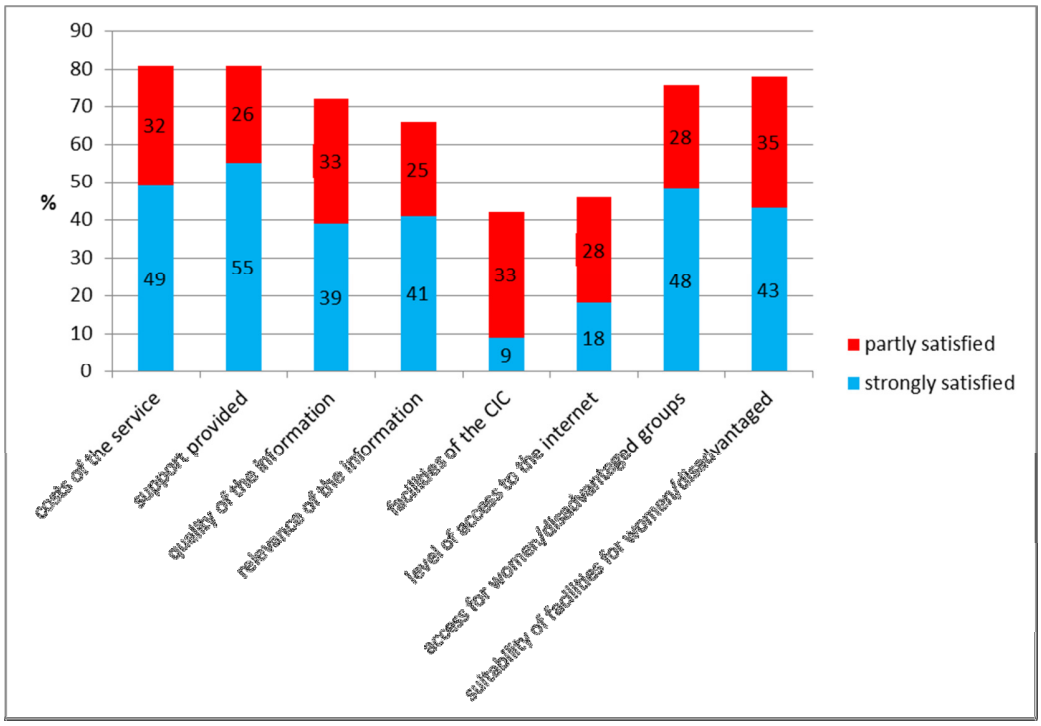
> 'The District Assembly has an agreement with GT [Ghana Telecom, the national provider] to pay yearly. So they give them some money, and then GT doesn't worry about how the service is working because they are in a year's contract and will not opt out of paying if the

service is bad. Some CICs don't make money, and the assemblies see that, and leave it for the managers to manage as they like.'

--Simon, Tamale, interview 19.3.09

A survey conducted by IICD (2008) of the users of CICs illustrates these problems (Figure 6.3). It found that only 18 per cent of users said they were 'strongly satisfied' with the level of internet access the CICs provided, and 28 per cent were 'partially satisfied'. Similarly, only 9 per cent were strongly satisfied with the telecentres' facilities, although 33 per cent were partially satisfied.

Figure 6.3 IICD Telecentres (CICs) Survey: satisfaction with services and facilities



Source: IICD (2008)

These low rates of approval from users seem to stem from a lack of connectivity: a majority of respondents noted that the telecentres had no internet connection. Samples of their responses include:

- 'the CIC Bimbilla, has not been connected, therefore, my hopes/aims of making researches for professional uses are shattered.'

- ‘I could not get the information because I understand the place has not yet been connected to the internet.’

- ‘the centre has not been hooked to the internet making it very difficult for me.’

- ‘Yes the service has helped me gain computer skills but not all what I was looking for because there is no internet service’.

The second most common response was that the centres had very few computers, and was not equipped to deal with local demand, which is clearly high:

- ' the centre should try and add more computers to the already existing ones -the centre should make sure that the internet is in progress, since we desire a lot for it.’

- ‘The centre should be equipped with the needed computers and internet facilities to enable users access information’

IICD’s survey also asked whether the centre served the population well. It found that 58 per cent of respondents agreed with the statement ‘The information from the centre reaches mostly the privileged’. This answer is highly problematic in the context of a public initiative designed to reach the underserved and disadvantaged, and along with the evidence presented above indicates that the telecentre project has not succeeded in achieving its stated goals.

These problems seem to have caused customers to move from public to private-sector internet centres, since the latter were far more numerous in the North at the time of this study (67 internet cafes, compared to 10 CICs). Managers have also moved from the public to the private sector: since commercial connections have become more affordable with the arrival of broadband in more remote areas starting in 2004, many of those involved in running CICs have defected to the private sector to establish commercial internet cafes. Cafe owners purchase connectivity directly from the local branch of the national provider, and can have problems fixed by local repair staff. Evidence of this shift toward commercial provision can be found in donor records: in seven out of ten of the towns where Dutch donor NGO IICD sponsors telecentres (IICD 2012), commercial internet cafes have also been established in direct competition with the CICs. One former telecentre manager now running a private internet cafe explained that the organisation of CICs’ connectivity drove him into the private sector:

> ‘I tried to work with the district assembly's CIC for a year, but things were not going well. Their problem is that they negotiated a dedicated line with Ghana Telecom in Accra for the CIC, so when it goes down they have to call Accra for technicians to work on it. They do not come - I had to fix it myself. But now the manager doesn't know much about networking, so he is calling Accra for repairs and it takes a long time.’
>
> James, Navrongo (interview 27.5.09).

Despite these apparent problems, at the time of writing the telecentre project continued to receive support from both the Ghana government and from IICD. This may be explained by path-dependence, as seen in India’s telecentre movement, or by the fact that government officials were incentivised to expand it since the district assemblies receive funds to build the telecentres, and local officials can benefit from them by placing relatives as managers. In 2012, the CTA reported that the CICs had not achieved the objectives set out for them by the government, for reasons to do with staff motivation, a lack of funds and equipment, and a lack of Ghanaian internet content which might make them more relevant to the local public (CTA 2012: 5-6).

Heeks (2002, 2010) calls telecentres the most ‘emblematic failure of the ICT4D movement’. This failure, he says, ‘arose in part because the main ICT4D model – the rural telecentre – was one drawn from the global North which incorporated design assumptions and requirements that significantly mismatched local realities in the average developing country village.’ The story of Ghana’s telecentre project seems to corroborate this view, and to add to it the problems of local and national politics and patronage. The evidence presented here suggests that telecentres have so far not been successful in increasing adoption capacity due to their low numbers and their frequent lack of connectivity. Instead, they appear to have been overtaken by private-sector internet provision through internet cafes, which are greater in number and have greater efficiency in terms of arranging their own connectivity. The relevance and potential of this alternative model for increasing usership and access is examined in the next section.

6.6 Internet cafes: a private-sector model for increasing adoption

Chapter 4 has outlined the growing population of internet cafes in Ghana, and the various strategies by which cafe owners establish and make their businesses viable. This section looks at the contribution these commercial cafes are making to building absorptive capacity for ICTs, and the relevance of that contribution to Ghana’s ICT4D aims. As noted in Chapter 4, 67 cafes were found in the northernmost three regions of Ghana (the Northern, Upper East and Upper West). These cafes

outnumber telecentres, and can be assumed to be serving the majority of users in these areas. In particular, they were found in poor and remote areas to a greater extent than telecentres. Although the majority were found serving urban populations in regional capitals (32 were found in Tamale, 12 in Bolgatanga and 9 in Wa), 15 were found outside these main towns, including extremely remote areas such as Nalerigu, Lawra and Bawku. All 67 were serving primarily local customers, and all offered free training for new users as a way to build their customer base. The fact that internet cafes outnumber telecentres and are also more widespread geographically supports the first main hypotheses of this thesis as set out in Chapter 1 (section 1.2), that internet cafes lead to more equal distribution of internet access and thus play an important role in diffusing the technology to new places and users.

In order to assess the role of the private sector in building adoption capacity and human capital, a survey of internet cafe users was conducted in four cafes, one in each of the regional capitals and one in Navrongo, a town close to the main border crossing to Burkina Faso. The survey was conducted over several days in each location and had two main aims. The first goal was to understand the demographics of internet users and the relative importance of the internet compared to other technologies in these relatively remote (though urban) locations, which would contribute to answering the question set out in Chapter 2 regarding how adoption capacity is built in remote and disadvantaged areas. The second was to chart how people were using the technology: which applications and uses of the internet were most popular and whether people conceived of the internet as building human capital. This aim builds on the first in terms of understanding how the gap between non-users and users may be bridged in remote and disadvantaged areas, and also goes toward understanding whether and how these private sector cafes are contributing to Ghana's ICT4D aims.

In order to provide a baseline for these questions, as noted in Chapter 3, Wolcott et al.'s 'sophistication of use' measure (2001) was applied through observation at each cafe where the survey was conducted. This scale involves four levels, three of which apply to people already using internet cafes: no usership; minimal usership, where users can only use the simplest applications; conventional usership, where they change some established practices to incorporate the internet (e.g. by using email instead of postal services); transforming usership, where they develop new applications and significantly change processes or practices; and innovating usership, where a portion of users are able to push the boundaries of the technology. Each of the towns where the user survey was conducted offered users in the minimal and conventional categories, with the least sophistication of usership in Bolgatanga and Navrongo, where broadband service (and with it more

widespread public access) had most recently begun, and more sophisticated use in Tamale and Wa where broadband access had begun in 2004.

6.6.1 Who uses the internet, and why

Table 6.4 below shows that most of the respondents were young: 24 per cent were under 19 years old and 64 per cent were under 25. This is in line with Ghana's overall demographics, which are skewed toward the young. Out of the seven age categories offered, the majority placed themselves in the 19-25 age group. The largest number of users accessing a single cafe during the survey period was found in the main town in the North, Tamale. There were smaller groups from Wa, a university town in the Upper West, and from Bolgatanga and Navrongo, significant towns in the Upper East region, which is the poorest in Ghana. These numbers are in line with the populations of these towns.

Table 6.4 User survey respondents

					Current educational level			
	N	Average age group	Male (%)	Female (%)	less than High School	High School	Tertiary	% literate in area
Tamale	135	19-25	68.75	31.25	35.5	27.41	37.03	43
Wa	73	19-25	69.27	30.73	26.02	21.91	52.05	28
Bolgatanga	34	19-25	70.59	29.41	8.82	61.76	29.41	28
Navrongo	11	19-25	72.72	27.27	9.09	27.27	63.63	25

Respondents were predominantly male, reflecting a gender divide in terms of internet cafe usership which appears to be a national issue. Several young women interviewed for this project said that they were not comfortable in internet cafes, since the predominance of young male customers and the activities (such as sakawa, discussed later) made it an unfriendly environment for them. This was one area in which telecentres seemed to offer an advantage over internet cafes: the telecentre users surveyed by IICD (Figure 6.3) indicated that these were friendlier environments for women, possibly because their mission to teach specific skills meant they users were more closely observed and controlled by their managers. The educational level of respondents was disproportionately high compared to the average literacy of the regions surveyed (Ghana Census 2005). This finding is in line with the theory on adoption capacity (Park et al. 2007), which assumes that those with the highest levels of human capital will also be those who find it easiest to adopt new technologies. The

survey did not ask about respondents' income levels, so it is not possible to determine whether ability to afford the cost of time online was also a factor.

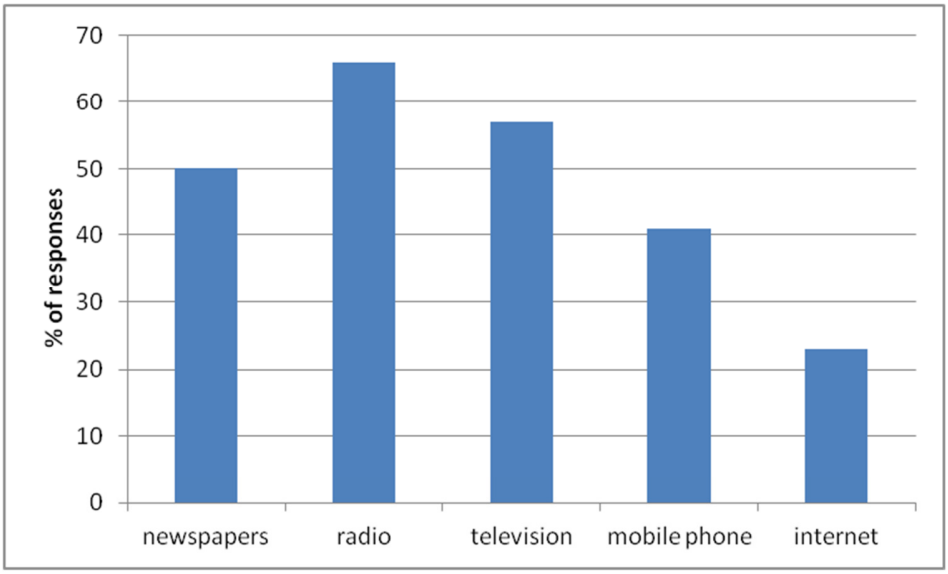
Since the survey was conducted in internet cafes, it only represents the preferences of those who are already online. Respondents, however, appeared to be using the internet regularly in all the locations surveyed. Nearly half said they were using it daily (see Table 6.5), and 80 per cent claimed to be using it at least once a week. This would suggest that once users adopt the technology, at least some of them use it in ways that require regular access such as emailing and checking news. These are explored further below in the section on how people use the internet (6.6.2).

Table 6.5 'How often do you use the internet?'

Frequency of internet use (%) N=235	
daily	47.66
weekly	33.19
monthly	14.04
<monthly	5.11

In order to look at why people choose to use the internet rather than other communication technologies, respondents were asked to categorise various forms of communication available to them in order of importance. The categories offered were 'very important', 'quite important' or 'not important'. The answers to this question are interesting: the internet shows up as relatively unimportant compared to radio, television and newspapers (Figure 6.4), and to mobile phones. The comparative unimportance of mobile phones compared to radio, television and newspapers is interesting given the amount of research dedicated to these in the literature on ICTs, but may have been influenced by the age range of respondents, a significant share of whom may have been too young to have mobile phones.

Figure 6.4 'How important is each of these to you?'

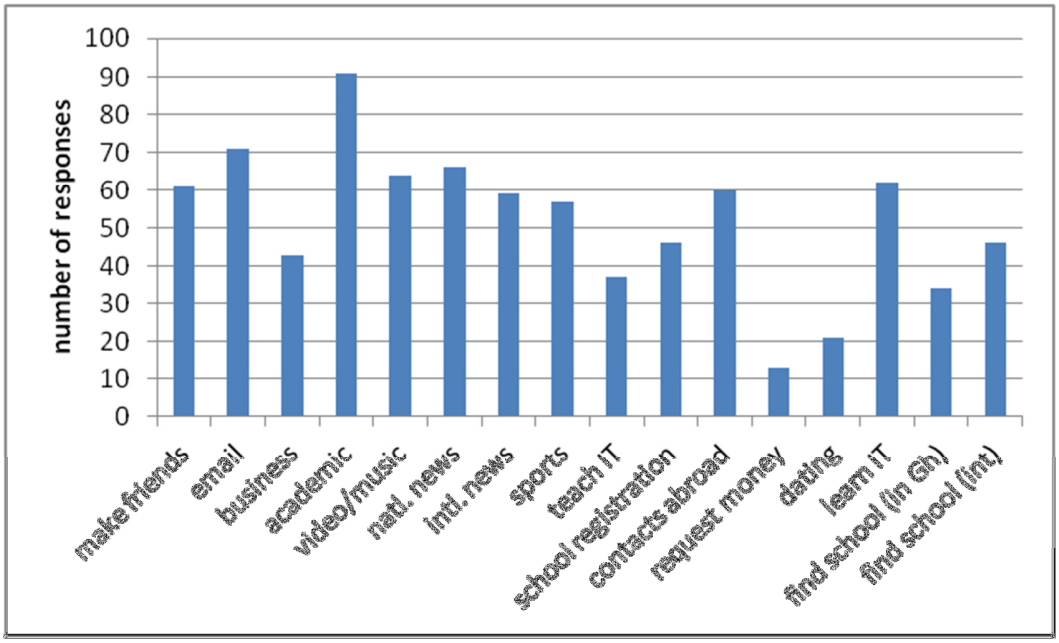


The importance of radio may be explained by particular local events: the regions surveyed were the locations of various long-running ethnic conflicts and had seen serious election violence shortly before this research was conducted. Radio was the chief medium for finding out about these events in the local area, which went virtually unreported by national newspapers, television and on the internet. This violence also affects the safety of travel both locally and across the border to Togo, which constitute two important economic resources for the local population, many of whom work as traders. Thus the internet is not yet a resource for information about local events, but is being used for other reasons, as explored in the next section.

6.6.2 How the internet is used

The survey asked respondents to categorise their internet use into various pre-determined areas, as shown in Figure 6.5. In all four locations, academic research was listed as most common online pursuit, a finding which supports the proposition in ICT4D theory that the internet is having positive effects on human capital. However, this response was more prevalent among university than among high school students. Whereas 24 per cent of high-schoolers reported using the internet for academic purposes, 49 per cent of tertiary students reported doing so, suggesting that web search skills are more common among the university population than among school-level students. Overall, 62 per cent of students reported using the internet for academic purposes, but entertainment was an equally important use among this group, with the same proportion saying they used the internet to watch videos or listen to music. The next most popular activities were emailing and searching for news.

Figure 6.5 'How do you use the internet?'



It is interesting that email, by far the most common internet application worldwide, here comes in second to academic uses – and, among students at least, to entertainment as well. Only 27 per cent of people overall listed email as a usual online pursuit. There are two possible explanations for this. One is that since only 9.6 per cent of Ghanaians use the internet (World Bank 2011a) only a limited proportion of people's friends and associates can be emailed, and email thus has limited usefulness. This was true even for students, who formed the most numerous group of users but only 25 per cent of whom reported using email. Another, possibly overlapping, explanation is that given unreliable internet service, mobile phones, and particularly texting, are a far more immediate and reliable form of communication in a country where mobile achieved 63 per cent penetration in the year of this survey (ITU 2009). When those who were emailing or using social networking sites were asked with whom they were in online contact, the most common answer was other Ghanaians (54 per cent), with a smaller proportion (43 per cent) saying they communicated with friends living outside the country. Only 17 per cent said they were doing business online.

The 'school registration' category in Figure 6.5 reflects a government policy promoting the use of ICTs. The government put secondary-school registration, exam registration and results collection online in 2006, creating a strong market for internet cafes. Internet cafe owners interviewed for this project said that school and exam registration, which are seasonal, represent a majority of their business at those times and are an important source of reliable income. School registration may in

some cases lead to adoption by people who would not otherwise use the internet, particularly those in older generations. However, internet cafes also make a profit by offering 'secretarial' services to fill out the necessary forms for school registration, meaning that this may not in fact lead to adoption of the technology by new users. This survey was not able to determine which was the case, since it was conducted at a different time of year from the school registration deadline.

Two categories of internet use reported - 'contacting people abroad' and 'making friends' - at first seemed innocuous, but were further explained by interviews conducted with users, who claimed to be pursuing a variety of different types of contact online with people abroad. The first type was a competition between young boys to see how many foreign 'friends' they could collect through social networking applications. The second was common among boys from their late teens onwards, and involved making contact with people living abroad both for interest, and to see if they could get their friends to send them gifts of money or other presents. The last type of contact involved making contacts abroad for the purposes of online scamming. Each of these forms of social networking had until recently been pursued mainly through the Hi-5 social networking application and Yahoo chat, but were now moving onto the Facebook and Skype platforms instead, which users explained enabled them to reach people in the US and EU more easily.

Online scamming has become a large issue in Ghana since the availability of broadband internet (Burrell 2008). Over the last decade Ghana has increasingly become a large-scale player in internet fraud, known locally as 'sakawa' (a term deriving from the Hausa word for 'put it inside', as in, 'put the money inside my pocket'). In practice, sakawa consists of befriending foreigners via sites such as Facebook or Myspace, often using a proxy identity to build a relationship that culminates in transfers of money. Another form of sakawa involves setting up false companies with stolen credit card details to do business with unsuspecting clients abroad, then collapsing the company once the client has made a payment for the transfer of nonexistent goods. The Ghanaians interviewed claimed that sakawa had been imported by Nigerians, hence its other common name, '419', which refers to the section of the Nigerian penal code dealing with online fraud. During this research, public discourse about the 'sakawa problem' reached the level of a national moral panic, with daily stories in the media, denunciations and warnings from high-level government and religious authorities.

Despite this negative aspect of internet use, the activities reported generally reflect the kinds of use the national ICT4D policy hopes to promote. Users claim to be employing the internet primarily for educational purposes, and internet cafes are important locations for school registration and

accessing exam results – one of the few e-government applications currently available. The responses show that users are also emailing, and educating themselves and others about IT, all activities aligned with the national policy aims for ICTs. This survey, then, demonstrates that internet cafes are the location for many activities that are aligned with national ICT goals, albeit as part of less focused and more diverse patterns of use than envisaged by the telecentre policy. The negative aspects of online activities are also important in the national discourse about the utility of ICTs, however, and are widely seen as an argument for a more controlled environment where users' activities are monitored more closely by managers as in telecentres. The next section explores users' general perspectives on the internet to assess whether internet cafe users see their use of the technology as aligned with national development goals.

6.6.3 Are internet cafes supporting national development?

Users were asked first whether they felt the internet was a positive or negative force in Ghana. Responses to the question, 'is the internet bringing negative changes to Ghana?' brought out anxiety about young people's involvement in social networking and viewing pornography online. Typical answers include:

> 'yes because it brings about internet fraud and also expose the youth to pornography'.
>
> 'some youngsters now use it as a means to make money, use it to watch pornography, and some for cheating friends abroad'
>
> 'it exposes people to the vices of other cultures, especially negative western practices such as pornography and 419 or sakawa'.
>
> 'the rate of internet fraud is increasing which is making most companies collapse due to bankruptcy and others losing their jobs'

Asked about these concerns, cafe owners claimed that viewing online pornography had been highly popular when broadband first arrived, but that they were ordered by local elders to restrict their clients' freedom to view it because even boys of primary school age were joining in. The owners stated that they also policed people's viewing of pornography for pragmatic reasons, since pornographic websites are rife with viruses which constitute a serious problem for cafes in the absence of access to good antivirus software forcing owners to reformat their machines every few days. Owners also reported warnings from police that they must stop their clients pursuing fraudulent social networking activities, but this has proved more difficult. This is partly because it is

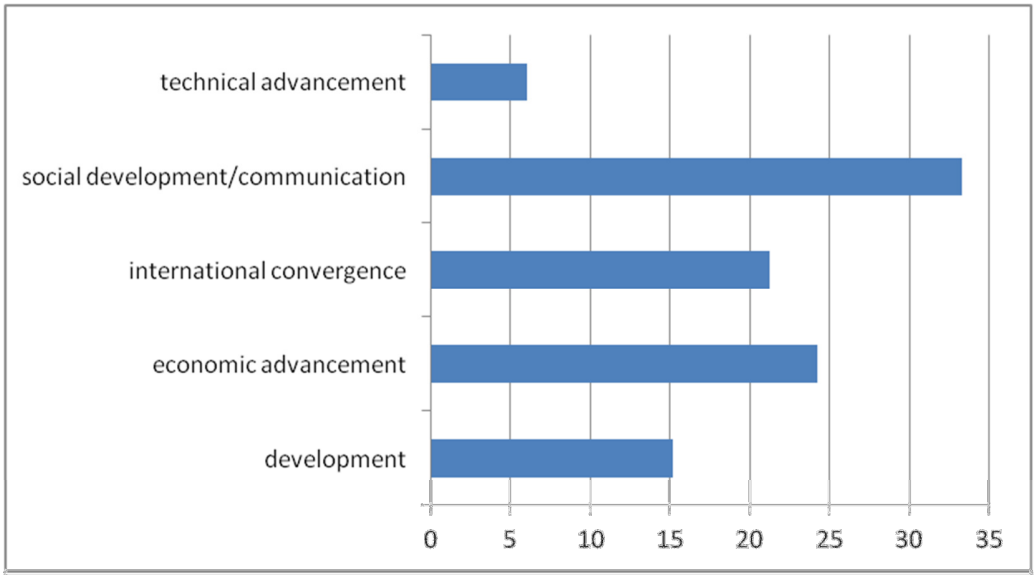
almost impossible for owners to tell innocuous from 'bad' social networking, and restricting people's access to social networking sites would result in a huge loss of business for cafes. Social networking thus represents a double-edged sword for internet cafes, since it is both an important source of revenue and a threat to their existence.

The question about the positive aspects of the internet, in contrast, drew a huge variety of responses. Some focused on education, with one calling the internet an 'educational revolution'. These responses were closely aligned with the idea of distance learning, although in a more informal context than that visualised by the national ICT policy. One respondent noted that the internet was good 'because students communicate with their instructors and lecturers who stay outside the country', indicating that the internet is able to bridge gaps that occur through teachers' international mobility, something which had been identified as a major problem in education by the students interviewed.

Responses indicated that the internet is also bridging gaps for business, another area prioritised by ICT policy. One user wrote that people '… are able to sit in their countries and transact business with others far away without having to meet them face to face', while other responses named 'efficiency' and ease of international communication as important benefits of the internet. These gains in efficiency of communication seem also to relate directly to the private sector objectives of the ICT policy. They also build on these advantages by enabling people to keep up their business activities at home while travelling. Most of these gains in efficiency named were through fairly simple applications of the technology, however, and mainly through email. E-commerce was not a subject of the responses since it is still under development along with Ghana's financial infrastructure, and most of the applications used by businesses in industrialised countries such as bookkeeping or client management software are not available in the areas surveyed.

A third question asked 'is the internet important to Ghana's future?'. The 80 per cent of 'yes' responses are categorised (using a post-hoc typology based on the answers received) as shown in Figure 6.6 below. These answers are broadly aligned with the aims of development policy regarding ICT use, with the possible exception of focusing most strongly on social development and communication rather than economic or technical advancement.

Figure 6.6 'Is the internet is important to Ghana's future?' – total responses. ('Yes' responses only included)



Some examples of these responses follow, by category and unedited:

Technical advancement:

'everything in the world is turning to electronic'

'every[thing] will be done on the net'

'for a country to successfully develop it need to alert with the changes of technology. internet access can therefore help to acquire this new changes.'

Social development/communication:

'to help us find solutions to all the corruption in Ghana.'

'because it create comfort and make life easier and lively. '

'it help make communication very easy and simple.'

'because is making us more intelligent'

International convergence:

'it opens our eyes to foreign cultures and ways of doing work and business'

> ‘So that we can catch up with developed countries and get to know more about issues going round the globe’
>
> ‘to close the gap of the global village in communication and information.’

Economic advancement:

> ‘It is very important for Ghana because we need technology to develop both economically and infrastructural[ly]’
>
> ‘it will bring more investors to the country’
>
> ‘it will bring about the use of debit cards in the country’
>
> ‘[the internet] makes Ghana a component part of the global trade and investment’
>
> ‘the world is a competitive market that circulates with information. Technology needs to be invested in this country.’

Development:

> ‘because through the internet Ghana will be able to move from 2nd class country to 1st class country.’
>
> ‘because it increases access to diverse views and opinions therefore business and development ideas.’
>
> ‘for development’

These responses are interesting in the context of the national ICT policy because they show a close alignment between the vision of users, in even these remote locations, and policymakers’ vision of ICTs’ development potential. This may have been conveyed by the national media, and may also have been suggested by the framing of the question, since Ghanaians live in an environment with many NGOs and development organisations, and are thus frequently exposed to the discourses of international development. Despite this possible influence, the responses display various points of agreement with the vision of ICT4D: the potential of the internet to reduce corruption, to help develop financial infrastructure, and to create a place for Ghana in the global cultural and economic landscape.

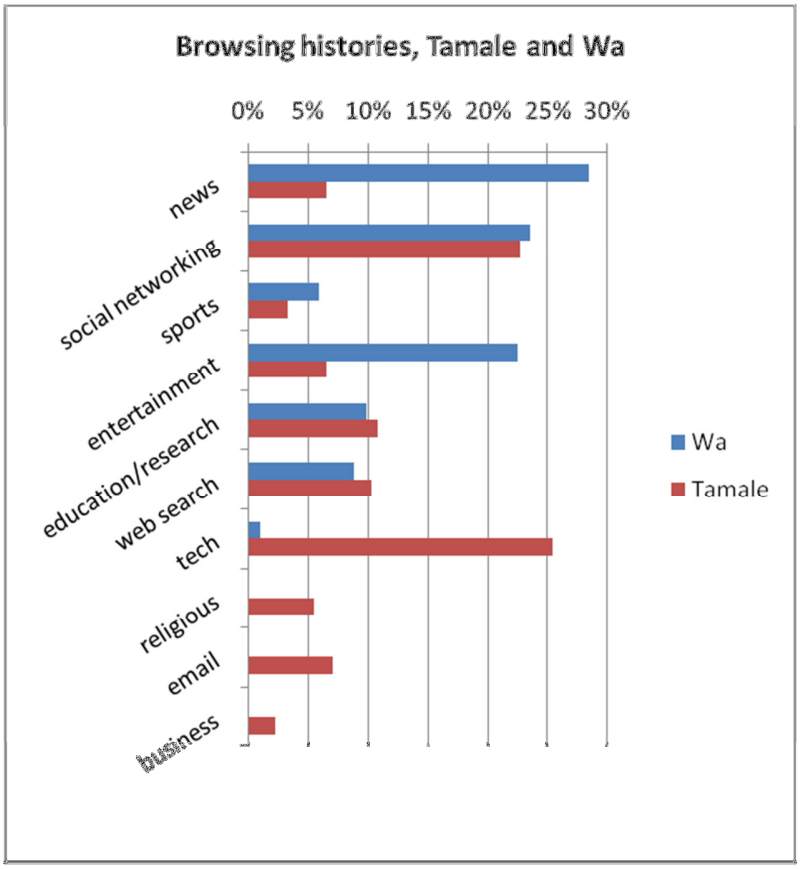
6.6.4 Limitations of the user survey and how they were addressed

The survey of users was limited most by the lack of a counterfactual. It cannot tell us much about internet cafes as sites of technology adoption, because only those who were already using the internet could participate. There was therefore no way to know what proportion of people tried but did not succeed in adopting the technology, or what proportion of adopters used telecentres instead (although the latter can be inferred from the fact that internet cafes are more prevalent than telecentres and interviews indicated they were more effective at providing connectivity). This is related to the problem that internet surveys generate unknown selection effects since respondents choose whether to participate or not, and thus the survey may attract more motivated respondents, or those who are more enthusiastic about the internet. A second limitation was that users' responses were not verifiable, in the sense that they could have been claiming different uses from their actual activities in order to promote a positive image or to conceal what they were actually doing online.

In order to address this second limitation, a comparative exercise was conducted on different days in two of the cafes where the internet survey was administered in Tamale and Wa. Using a methodology based on that of Johnson et al. (2010) and Du (2006), who gathered data on which websites users were visiting by capturing URL traffic through servers, cafe owners noted the URLs visited that day from each of the cafes' browser caches and these notes were compared to people's responses to the survey. This offered a (non-generalisable) idea of the most recent internet traffic each day, and may serve as an indication of how actual usage compares to the responses given in the survey.

Figure 6.7, which compares the Tamale cafe's URL traffic with Wa's based on these browsing histories, shows that the activities charted in the browser histories contrasts sharply with the survey responses. In Tamale in particular, there is markedly less educational use and much more social networking and searches for technical applications than in the survey responses. The applications classified here as technical are 'proxies' (software that hides the user's identity) and tracking software to follow the online activities of others. These are very much in line with the indication from the user survey and from the cafe owners interviewed that Tamale users are primarily active in social networking, and that a high proportion do so for financial gain, hiding their identity while targeting users abroad for financial transfers.

Figure 6.7 Control study



Source: 'Fastconnect', Tamale (20.5.09); 'Wacafe', Wa (6.9.09)

In contrast to Tamale, in the university town of Wa social networking is equally popular but searches for anonymising software are almost nonexistent. Interestingly, email sites were missing from the browser histories in Wa, which may indicate that users were employing chat programmes or messaging through social networking sites instead. As in Tamale, the URLs collected in Wa show a much lower proportion of academic use than the survey responses claim. One explanation for this offered by the cafe owners who downloaded the browsing histories was that academic use was highly seasonal and intensified when exams were nearing or end of term assignments were due, at which point it constituted the majority of use. The user survey was conducted at the midpoint in school and college term time when there was less academic pressure.

These browser histories show a different balance of online activities from those claimed by survey respondents. In this they balance out the survey responses, which may reflect an optimistic view of people's internet use. However, since they represent a cross-section of daily activities and the

survey questions were designed to gain a more general picture of people's usage, they may be less contradictory than they initially seem.

6.7 National policy and internet cafes: the question of mobility

The preceding sections have explored the ways in which internet cafes serve as locations for many of the activities Ghana's national ICT4D policy seeks to promote, including education, e-government functions and business activities. Internet cafes are also aligned with policy goals in terms of bringing connectivity to remote and rural populations, and thus helping promote more inclusive adoption of internet technology. Internet cafes appear to have numerous advantages over telecentres in these respects: they are more numerous and responsive to consumer demand, their connectivity does not rely on a long-distance contract with the national provider, and they appear to be more efficiently managed. However, there are serious obstacles to the formation and viability of internet cafes, as chapters 4 has demonstrated. These include a gap in credit services for businesses of internet cafes' size and type, and restricted access to hardware and software due to high import taxes.

Chapter 4 has also demonstrated, however, that internet cafe entrepreneurs are overcoming these obstacles using international mobility, which fills these gaps and remedies credit market failures by providing access to remittances earned abroad. These findings are supported by other research on the impacts of the Ghanaian diaspora on various dimensions of development in their home country (e.g. Black and Ammassari 2001, Kabki et al. 2004, Mazzucato 2005) including several that show that Ghanaian Home Town Associations send computers home (Orozco 2005, Kleist 2009) and a further strand that explores technology transfers by highly-educated members of the diaspora (Schmelz 2009, pp32-33). Thus, if internet cafes are to be considered part of the solution to Ghana's connectivity challenge, a policy question arises regarding how migration policy can take account of the flows of finance and equipment that are feeding the development of independent internet cafes, and what kinds of action might be taken to connect migration policy with Ghana's ICT goals.

There is, in fact, already some recognition in Ghana's national ICT4D policy that mobility represents a resource for ICT diffusion. The main policy document draws a connection between the mobility of the highly educated and ICT diffusion, noting that it would be useful to 'fund vacation and sabbatical visits of expatriate ICT experts and researchers to facilitate the process of knowledge and expertise transfer and sharing through collaboration with local counterparts' (GoG 2003a: 67). The policy does not, however, connect this type of transfer to lower-skilled migrants. Nor, as

importantly, are connections to entrepreneurship found in Ghana's migration policy, which in fact does not address questions of the contributions of the diaspora in general.

Ghana's first comprehensive migration policy was established only recently, in 2011, and represents the country's first articulation of an explicit strategy for migration management (GIS 2011). The issue of diaspora relations, however, is not part of the migration policy but is instead part of the mandate of the Ministry of Tourism (IOM 2009). This mandate, moreover, relates only to the African-American diaspora and not to other Ghanaian migrants. No government institution has therefore been made responsible for keeping contact with other diaspora groups, or for strategies regarding those who do not emigrate permanently. Ghana's current development strategy as articulated in the country's second Poverty Reduction Strategy Paper (GoG 2006) does recognise the diaspora as a potential source of financial remittances, although there is no mention of other potential links between this overseas community and development policy. Although there are numerous diaspora involved in community-level development projects, their involvement remains informal and uncoordinated (IOM 2009). There are some small-scale projects under the auspices of the IOM and the Netherlands, the first matching potential returnees with skilled jobs in Ghana, and the second arranging temporary placements in Ghana for emigrant health professionals living overseas, but overall, across migration, ICT and development policy, there is no explicit mention of migrants in general as a resource for development.

It appears from these documents overall that the elements of a potential strategy to use migration and mobility in the service of technology diffusion are present: there is a recognition that the diaspora can be agents of technology transfer and education; that they are already contributing to development projects through various informal associations, and that it is possible for government institutions to pursue these contacts proactively. However, these elements are each voiced in different sections of development, ICT and migration policy, and relate to different departments and discourses within the Ghanaian policy sphere. The 2011 migration policy does not form the basis for connections with elements of development policy, such as ICT4D, since it lacks a recognition that the internationally mobile population may constitute a resource in terms of development. If such connections are to be drawn, they must therefore begin elsewhere, either in ICT policy or in development policy overall.

6.8 Conclusion

This chapter has explored the potential relationship of internet cafes to Ghana's ICT policy aims, and has sought to define the ways in which these might interact to the benefit of the country's

ICT4D goals. It has identified the ICT4D policy as consisting of what are essentially 'top-down' processes, focusing on specific sectors and types of internet use. These include increasing the reach of universities through using the internet for distance education programmes; providing computers and internet connectivity to health workers for record-keeping and research purposes; promoting the internet to farmers as a tool for more efficient access to information, and establishing various e-government initiatives as a way to better connect citizens to government services and to increase efficiency within the government bureaucracy. The policy also sets out a strategy for ICTs in the private sector which involves using them to leapfrog the industrial stages of development in order to create a knowledge economy. It envisages both building the ICT sector and promoting ICT use as a source of increased efficiency in order to achieve this strategy.

This ICT4D policy, however, appears not to be achieving its aims: public-sector projects are largely stalled and the hoped-for private sector growth based on ICTs has not occurred. It is argued here that this is due to a lack of adoption capacity amongst the general public, in line with theories of diffusion which state that adoption capacity must precede technology diffusion. Ghana's internet usership has not increased at the rate necessary for these policies to gain traction, and this lack of adoption represents a bottleneck where many understand the potential benefits of ICTs in theory, but few have the skills and experience to realise them in practical terms. This gap in adoption capacity is attributed to the lack of a viable model for broadening general access to, and familiarity with, the internet. Instead the country is currently realising the scenario described by Steinmuller (2000), of 'enclave' ICT-based production, 'based on direct foreign investment and a well-educated labor force'. Yet the lesson from economies where this has occurred is that the enclave remains an enclave: Steinmuller warns that 'the temptation to overestimate the spillover from these investments should be resisted'. This is exactly the situation that is being created in Ghana, where the diffusion of the internet in the most technologically and economically rich areas has so far not created spillovers of knowledge or innovation for the rest of the country. The review of Ghana's ICT4D policy shows that it does contain a 'bottom-up' element which aims to build usership among the general public so that they can engage with ICTs as a development tool. This element is manifested in a national telecentre initiative designed to drive this increase in adoption, which has received significant support from international donors. The telecentre movement, however, has stalled due to design flaws in the initiative and the increasing popularity of commercial internet cafes, and has as a consequence been de-funded by one of its two main donors.

This chapter has argued that commercial internet cafes have demonstrated themselves to be more effective than telecentres in providing connectivity in poor and remote areas, and thus in promoting

adoption. A survey conducted in internet cafes across the North of the country suggests that there are several ways in which people's use of the internet in these locations reflects the priorities of ICT4D policy, but that there are also important ways in which internet cafes differ from telecentres. Whereas telecentres are demonstrated by donors' evaluation to be relatively ineffective in providing connectivity, their development-related mission means that they are set up to manage people's internet use more closely than internet cafes. Internet cafes are more effective providers of connectivity, and are driven by a profit motive to train new internet users and thus contribute to adoption of the technology. However, this private-sector model is more unpredictable and less within the control of policymakers than telecentres, which may explain why internet cafes have gone unrecognised and virtually unsupported as a resource for access and capacity building. Instead, they are identified principally as locations for internet fraud and tend to be policed rather than supported.

Despite the fact that internet cafes trump telecentres as providers of connectivity in several important ways, they are subject to more obstacles than are telecentres in terms of their formation and viability, namely restrictions in their access to equipment and finance. In contrast telecentres receive preferential treatment in terms of imports of hardware and software, donor support and government-sponsored connectivity. The fact that internet cafes greatly outnumber telecentres despite the lack of a level playing field in terms of finance and access to equipment suggests that they are indeed a more efficient option. The success of internet cafes, however, has been demonstrated by this study to be substantially related to their use of international mobility, which they use to get around obstacles to accessing financial and material resources. This use of international mobility thus bears a direct relationship to these private sector providers' ability to contribute to Ghana's ICT policy aims.

The review of Ghana's policies regarding international mobility shows that its potential relevance to development is not recognised in most areas. Although ICT policy does note that the mobility of experts and the highly-skilled could potentially contribute to technology transfer and building human capital, there are two problems with this recognition. One is that it focuses only on the highly-skilled and therefore leaves open the gap identified in theories on adoption capacity, regarding how the low-skilled and less-educated can learn how to use new technologies if they are being diffused primarily by elites. The other is that it deals only with expatriates living permanently abroad, and does not address the potential contribution of temporary and circular migration – a very common form of mobility amongst those involved in entrepreneurship at home. More joined-up thinking about international movement on the part of policymakers could help to incorporate the

private sector model as a driver of inclusive connectivity, but these connections have not yet been drawn.

This makes a strong argument that Ghana's national development policy should adopt the path that the country is already following, and actively seek to support internet cafes as a model for increasing adoption of internet use among the general public. There are many ways in which the government can creatively engage with the private sector as an engine of ICT diffusion. These include building internet regulation, financial infrastructure and legislation in ways that do not penalise commercial internet providers or users, and capturing the benefits of private sector activity and building on its positive aspects. In order to use the advantages of this private sector model, however, some understanding must be developed of the constant and diverse international mobilities which facilitate and sustain it. Either mobility can be taken into account and worked into the policy framework of ICT4D, or the obstacles that stand in the way of the small-scale private providers must be removed. Given that mobility's benefits go beyond helping entrepreneurs overcome the obstacles of resources and promote the flow of IT-related ideas, skills and knowledge across borders from every part of the world, there is a case for doing both.

7 The digital dirt road: diversions, obstacles and new destinations

7.1 Introduction

This thesis has examined the relationship between internet diffusion and international mobility in Ghana, and has found mobility to be a potential asset both to individuals and to public policy that can be activated in different ways depending on the social and economic resources available. Mobility is what links the small-scale entrepreneurs who provide internet access in poor and remote areas to international circuits of knowledge, provides ways to access material resources such as hardware and software and to remedy gaps in credit provision for small businesses. In all these ways it helps to level the playing field in terms of entry to the internet cafe sector, and increases the chance that these small-scale businesses will remain viable despite difficult conditions. This study has also shown that international mobility is central to the ability of aspiring Ghanaian IT workers to progress in in the sector's higher value-added businesses, by connecting them to international circuits of influence and knowledge and offering ways to remake the opportunity structures within which they operate. In each of these cases mobility takes a variety of forms, including travel by family members and associates.

This study has also brought to the surface various problems and potential avenues for exploration in ICT policymaking, most importantly that there is a conflict between the objective of inclusive adoption of the internet and the policy focus on public-sector internet provision. The findings show that although Ghana has a strong and developed ICT4D policy, its aims are reliant in important ways on more inclusive diffusion of internet technology amongst the general public. First, because this will add up to greater adoption capacity on the part of public and private-sector workers when faced with the new technologies involved in the country's internet-related development strategies, and second, because broadening usership of the internet increases the potential that the general public will also use it for their own purposes, potentially finding routes to socioeconomic development that go beyond those set out by policy. Thus adoption capacity and access are at the centre of the internet's development potential, but these need to be built in a bottom-up way – whereas current policy strategies skip this essential step by assuming that e-initiatives will gain traction while incorporating only minimal measures to broaden access to the technology.

These findings arise from a micro-level, mobility-centred perspective which makes it possible to analyse the specifics that make up the larger picture of internet diffusion: the 'how', the 'who' and the 'where' of a process that has too often been assumed to be uniform and classless. This

perspective foregrounds the capacity to adopt, with the assumption that access to new technologies and the resources and capacity to use them must evolve together. Mobility is shown to be a catalyst for the flow of new technological knowledge into technology-scarce regions, and an important factor in moulding the opportunity structures that shape people's ability to engage with the business of internet technology on all levels. However it is seen in context, taking into account the fact that not everyone can afford to be internationally mobile, and addressing mobility as one important and under-researched element of a set of strategies that are combining to produce adoption capacity and access to technology.

This concluding chapter offers an overview of the main findings of the research and their theoretical and practical implications. It first draws together the empirical findings and offers a discussion of their implications overall. Next, a section reviews the findings in the context of Ghanaian ICT-based development and suggests possible entry points for both ICT and migration policy. The next section reflects on the methodological implications of the combined use of fuzzy-set Qualitative Comparative Analysis and Social Network Analysis. The following section reviews the limitations of the research and how they were addressed, and the possible generalisability of the findings. The concluding section draws the lessons together and suggests possible next steps for research in this area.

7.2 Empirical findings

This study set out to answer three questions. The first question regarded the importance of international mobility for the formation and viability of commercial internet cafes. The hypothesis was that mobility can facilitate entry to the sector, leading to increased opportunities for access and usership among remote and marginalised populations. This hypothesis has been demonstrated to be true in the findings set out in Chapter 4, which showed that mobility, while acting in different ways for those with different levels of starting resources, leads to international connections both to family and associates from home and to others around the world which open up new business opportunities, facilitate flows of information and goods, and stimulate international and local knowledge transfer. Those internet cafe entrepreneurs who are older and better-resourced tend to travel internationally in order to access equipment for their businesses, whereas younger, newer entrants to the sector cannot afford to travel but use a diverse range of mobilities, including friends' and associates' travel and 'virtual mobility' – forming ties with people visiting from abroad – in order to access knowledge of business practices and technological solutions, which in turn allows them to start out and survive in the business despite lacking the privileges of age and resources. In particular, working abroad helps these younger entrepreneurs to increase their efficiency (measured

by their ROI), an effect not found amongst the older cafe owners. Interestingly, financial remittances represent only a small proportion of transfers from abroad: receiving software and IT equipment or information about business and technology is far more common, and the technical and business skills acquired through this international networking seem to be a stronger determinant of entrepreneurial success than formal education.

The second research question this project has sought to answer is how international mobility influences Ghana's IT sector overall – i.e. the whole range from internet cafes to larger firms with more resources. The hypothesis was mobility creates opportunity for those with lower social status, less business experience and/or fewer resources, and that long-term migration is not the most important form of mobility in this context. This hypothesis has also been demonstrated to be accurate: the analysis of IT sector professional networks (Chapter 5) showed that cafe owners and IT managers' mobility is based on, and gives rise to, extensive professional networks, which can increase workers' changes of progressing in the IT field. This is shown by the analysis of the flow of new technical information into Ghana through cafe owners' networks and by the similar practices among IT managers in Accra, whose professional networks have a strongly international and mobile character, and who also benefit from the mobility of visiting professionals in terms of building an international field of contacts to support their career progression.

The analysis of professional networking also showed that even in a context where there is some mobility amongst friends and associates, a closed, dense network can act as a constraint on the free flow of new information and mobility may therefore not lead to the opening up of opportunity structures seen amongst the IT professionals in Accra. This was found in the case of the ethnically and religiously homogenous cafe owners in poorer Northern areas such as Tamale.

Network composition has been shown here to be key to opportunity and also tied to mobility: those with a greater degree of relational embeddedness and broad, loose-knit networks – the Accra IT managers, who have significant opportunities to network overseas, and those internet cafe owners who are most internationally connected and least locally embedded – are involved in forms of learning and exchange that enable them to participate in the global IT sector. The others, who are more strongly embedded in local systems of exchange and reputation, have tightly knit professional networks with shallower, less sustainable relationships. These entrepreneurs' businesses tend to remain smaller and less technologically sophisticated.

These personal and local network structures also reflect and interact with larger opportunity structures which frame people's potential and agency within the IT sector. The analysis has shown

that these can be influenced and changed by migrating or by making the right international contacts at the right time. 'Network resources', i.e. those residing within one's network, are easier for those studied here to access, but 'contact resources' are more valuable, since they have the power to open doors to international-level engagement in IT. These contact resources are predominantly found from overseas. They appear to be the main determinant of differences in opportunity and activities at both the levels of the IT sector studied here. Mobility is also found to act as a catalyst for changing opportunity structures, either through international travel for work or education, or where structured exchanges take place through the in-migration of those with wider networks. This mobility can be either in the form of short-term, need-specific international interactions or longer-term international relationships with greater depth. Both are necessary for the development of Ghana's IT sector, since the first drives competition that builds usership and access at the grassroots level whereas the other informs the higher-value-added activities that are potentially transformative for the Ghanaian economy.

The third question this study sought to address was whether the private sector's contribution to diffusion has implications for Ghana's ICT policy strategy, and how understanding that contribution might contribute to making this strategy more effective. The hypothesis here was that better understanding the roles of all the different actors in diffusion could lead to gains in efficiency and inclusiveness in extending ICT diffusion to poor and remote populations. The findings laid out in Chapter 6 show that Ghana has adopted a badly calibrated ICT-for-development policy which prioritises a concentrated form of technology adoption over nationally equal access, and that the private sector has an important but currently undervalued role in remedying the resulting asymmetries in access and usership.

The study has identified a bottleneck where public sector workers have been designated as early adopters of the internet and who are supposed to drive initiatives such as e-health, e-government and online education – but where these workers generally lack the skills, experience and enthusiasm to make these applications work. Furthermore, it has found that the lack of a base of adoption capacity among the general public means that there is little practical support for these ICT-based initiatives. The objective of building adoption capacity is shown to exist in national ICT4D policy, but to have been addressed through an inefficient telecentre model that is not scalable enough to support the nation's ICT4D strategy, so that there is no effective model for broadening general access to, and familiarity with, ICTs. This, along with the earlier conclusions about the vitality of the internet cafe sector and of the IT firms in Accra, suggests that the private sector does indeed have a potential role to play in increasing access and usership nationally.

Despite this possibility, however, the potential of the private sector is not being used. The current national policy design serves those who can already use ICTs, but hardly provides a model for exposing the rest of the country to possible spillovers of knowledge and innovation. Internet cafes are often makeshift, their owners and managers generally lack of formal training, and most have inadequate equipment, connectivity and electricity. Despite these problems, their numbers and the fact that entrepreneurs are highly incentivised to make them work make them a potentially flexible and efficient way of building internet access and usership, and unlike telecentres are potentially scalable since they train new users and multiply in respond to consumer demand. However for their potential to be realised numerous barriers need to be removed, ranging from fears regarding cyber-crime which have led to these businesses being policed rather than supported, policies that levy high taxes on hardware and software, and inadequate infrastructure.

Given that mobility has been shown to be an important resource in overcoming these barriers, policies relating to migration could have the side-effect of facilitating ICT diffusion. Some connections have been made – for instance the recognition in the ICT4D policy documents that much of the country's IT talent has emigrated abroad, and that exchanges of knowledge and technology transfers are necessary to spur innovation and opportunity in Ghana – but an understanding of the mechanisms underlying these exchanges, and how to create the conditions for them, is lacking. Migration policy could help to create these mechanisms, but is currently limited to addressing only the mechanics of migration rather than its implications for the country's development.

Bringing these questions and findings together, the overall research question of the project was whether international mobility acts as a significant catalyst for the diffusion of internet access and usership in Ghana, and if so, how this process works. The hypothesis was that mobility acts as a mediating factor in the process of increasing access to the internet by allowing those in the IT sector to overcome market and resource gaps and expand their opportunities for engagement with technology, and that it does so specifically by enabling flows of knowledge and resources to areas of scarcity, and by expanding opportunity for participation in the sector. The questions and findings laid out above show that this hypothesis is accurate, and that international mobility has the potential to extend the benefits of entry into the IT sector beyond the highly skilled and educated who have the resources and skills to be early adopters of internet technology. It has been shown to do so by offering access to new knowledge circuits, and ways to sustain that access. This finding is connected to a larger one: that small-scale private sector activity in the shape of internet cafes is important in extending internet diffusion into remote and poor places. Internet cafes are numerically

greater than telecentres, their public-sector counterparts, and are found in just as remote areas, and sometimes more remote. They have also been demonstrated to be at least as efficient as telecentres at providing connectivity to the general public, in fact – as the small amount of comparative data indicates – significantly more so despite lacking the facilitating policies that sustain telecentres.

The study has used the idea of contact zones, the international spaces where knowledge circuits meet, to show how technological knowledge is reshaped and reconfigured to make it relevant to the concerns of the internet cafe owners and IT managers who are the subjects of this research. This repurposing has been shown to be key to the expansion of IT-related opportunity and functionality in Ghana, since it enables people to go beyond simply transplanting technology to using it in ways that answer Ghana's specific needs.

The qualitative work in the form of in-depth interviews conducted alongside the internet cafe survey has been essential in helping to ground these conclusions in a more detailed understanding of the challenges facing cafe owners, and the ways in which they must improvise to deal with them. For example, a discussion of the seasonality of broadband service and the unreliability of the provider, and of individual owners' relationships with the broadband provider, helped explain why very few cafes were able to offer clear financial data on their revenue, profits and expenditure. The fluctuating nature of the broadband service due to rain, power outages and unexplained cutoffs, combined with the bribes that were necessary to ensure its reconnection by the provider's engineers, created a highly flexible understanding on the owners' side of 'monthly income' with distinct and stable categories for recurring expenses. Furthermore, knowing that many cafe owners were running multiple ventures simultaneously in order to ensure a consistent income to support their families helped to explain why the figures given for the business takings in the survey responses differed seasonally and month-to-month. Perhaps the most useful result of using the in-depth interviews to triangulate and explain the survey responses was the notion that cafe owners were using their identity and status as technology entrepreneurs to leverage people's respect for their other ventures, and to establish themselves as businessmen when they were still, in local terms, too young to be counted serious members of the local business community. Thus having an internet cafe has been shown to be a risky option, but led to status and respect which could offer significant gains down the line.

7.3 Discussion

These findings regarding the importance of mobility for technology diffusion can inform our understanding of diffusion and knowledge transfer in several ways. First, they address the question

of how adoption capacity can be built despite significant differences in education and technological understanding between current and potential users. This study has demonstrated that one way in which the evolution of adoption capacity in poor and remote areas occurs is through a process of knowledge translation by locals who travel and come into contact with new technologies, then become providers of the technology and promoters of adoption in their places of origin. It has also explored a related process where individuals form international connections that bridge different circuits of knowledge and skill and similarly translate between foreign or international circuits of knowledge to those at home. Thus mobility serves to bridge gaps in understanding and experience via the movement of people who learn in one environment (a contact zone which may be overseas, an international virtual space or a home-country business environment involving foreign experts) and put the learning into practice in their home context. As well as bridging between circuits of knowledge, mobility also promotes technology adoption through bridging gaps in resources such as hardware, software and finance for business formation.

7.3.1 International knowledge transfer

These processes of knowledge translation and the context of contact zones also provide answers regarding mechanisms of knowledge transfer. Technological knowledge of different kinds appears to be differently embedded, and the findings of this research allow us to classify the types of knowledge transmission identified in this study according to Blackler's framework of embodied, embrained, encultured and embedded knowledges – with a focus on the latter three, since embodied knowledge is not central to building IT adoption capacity. First, there are embrained forms of knowledge such as computer programming and creating new internet applications – i.e. new uses for the technology. These are transferred mainly through studying abroad, as in the case of the IT managers studied in Chapter 5, and are therefore found to be transmitted by extended co-presence in overseas contact zones. Second, encultured knowledge is found in this study in several forms, such as junior IT managers' ways of behaving and negotiating progress their companies, and practices of account-keeping among internet cafe owners. This type of knowledge is similarly found to be conveyed by co-presence, but this co-presence can occur in contact zones at home as well as overseas, such as those formed when foreign experts are brought in to run departments of an IT firm. Last, embedded knowledge is found in the form of practical skills and problem-solving, such as how to network an internet cafe's computers or how to address virus problems by reformatting a computer. This thesis has shown that this last type of knowledge is transmitted in contact zones abroad, where people travel; contact zones at home where international travellers visit and technological knowledge is exchanged, and also in online contact zones where people reach out for

answers to specific questions. Networks facilitate all these transfers of knowledge by acting as transnational social fields, and particularly in the case of embedded knowledge are the medium that links distant circuits of information together and forms a conduit for knowledge across online or physical space.

Thus embrained knowledge is transmitted twice, once in a contact zone where Ghanaians meet and experience new technologies, and again in a contact zone that forms when they return and that knowledge is shared. Encultured knowledge tends to move with the individual who originates it, so that a contact zone can be formed when a foreign expert visits for work or participates in an event such as a conference. These two types of knowledge contribute to the higher-value-added end of the IT sector, whereas embedded knowledge is relevant to all parts of the sector, since it is an instrument for problem-solving and learning in cases where a specific question can be articulated. These categories of knowledge also empirically support and extend Williams' theory of knowledge transfer as occurring at the edges of migrants' productive activity in a receiving country, since any engagement of the migrant with the receiving society has the potential to form a contact zone for the transmission of technological knowledge. Those who are mobile potentially have access to all three types of knowledge, whereas those who lack the resources to travel can still gain access to the third through online contact zones.

7.3.2 Diffusion of technology

A new type of knowledge is constituted by each of the processes of transmission discussed above: the innovative use of technology in a new environment. Where computer and internet technology is reconfigured and evolves for new uses, this is also a product of international processes of knowledge transmission. This research has shown that the sharing and reconfiguring of technology occurs at the micro-level in a range of ways, including but not limited to formal environments (Chapter 4, Section 4.1.2), and that virtual and physical contact zones interact and complement each other both on the level of individual learning and in learning that occurs within professional networks. They often coexist, overlap and feed into each other, with virtual contacts leading to actual mobility, and vice versa. Together they contribute to greater global presence and greater equality in international interactions.

This mixture of the virtual and the physical is a particular feature of technology diffusion in a developing-country environment. Their complementarity allows diffusion to occur under conditions of low resources and limitations on people's international mobility, since a minority can travel and bring home challenging new technologies learned abroad, and those who stay home can pick them

up and reconfigure them for local users, using virtual or visiting foreign contacts to fill gaps in their technical knowledge. This demonstrates why a place such as the northern Ghanaian town of Tamale should be such a good starting point for internet adoption (with at least 32 internet cafes) despite its remoteness, since it has both dense, local networks and looser, more open ones, and a low level of international migration is supplemented by a flow of temporary visitors from abroad. This configuration seems to be optimal for the flow of technology information, which in turn provides new operators with a competitive advantage that helps compensate for a lack of access to credit since they can be as efficient as possible with the resources they have.

Knowledge transfers originating overseas are therefore an important driver of technology diffusion in a situation such as Ghana's, where domestic technological knowledge and innovation are clustered in a few locations and there is insufficient adoption capacity for spillovers to occur to other groups or parts of the country. In this scenario mobilities play an important role in creating adoption capacity and providing the resources necessary for internet diffusion into new areas.

This process is carried out by small-scale internet providers who are mainly in the private sector. Yet although it has welcomed the private sector as a provider of national-level connectivity infrastructure, the Ghanaian government has not yet recognised private providers as key to internet diffusion the on the local level. Instead, the private sector is subject to barriers that include high taxes, monopolistic regulation and the environmental obstacles associated with working in a resource-poor environment. These barriers are highest for the local-level providers who play a primary role in facilitating and developing usership. There are many ways in which the government can creatively engage with private sector as an engine of ICT diffusion. These include creating internet regulation, financial infrastructure and tax legislation that do not penalise commercial internet providers or users; capturing the benefits of private sector activity and building on its positive aspects, and most of all, acknowledging the importance of IT entrepreneurship in bridging the national digital divide. Without efficient local provision, ICT-based interventions appear incongruous: e-government without e-citizens; e-learning without materials or interaction; telemedicine systems without doctors and patients.

One reason for this policy blind spot is the challenge posed by developing-country environments to processes of technology diffusion. The factors posited by diffusion theory as key to the adoption of a new technology are awareness, capacity and choice on the part of potential adopters. However, this study has shown that there are more fundamental barriers which also need to be taken into account: environmental conditions which may force adopters to reconfigure the technology in order

to use it; regulatory constraints such as those around Skype which are then continued by private providers because they increase profits; policy issues such as state-granted monopolies which increase the price of connectivity, and socioeconomic inequalities that restrict access to the technology for many people.

Other important obstacles to diffusion in developing country environments are pervasive social and economic inequality, which lead to technologies becoming isolated in the areas of economic concentration where they are first adopted, and particular infrastructural issues such as where poverty leads people to dig up wire and cabling to sell, or where adverse environmental conditions in tropical countries such as extreme heat and rains demand reconfigured hardware and higher investment from providers. These kinds of barriers to adoption are referred to by Mansell (2010) and Heeks (2010) when they note that ICTs alone cannot alleviate poverty, but must be accompanied by other reforms in order to operate as a tool for development. These barriers are not particular to developing countries: there are many in technologically advanced nations who lack adoption capacity due to barriers of education and income. However these obstacles are more prevalent and serious in developing nations, and might usefully be taken into account in the literature on the diffusion of innovations, which predominantly looks at early-adopter populations of industrialised countries and does not make a serious attempt to theorise around adoption capacity in developing countries.

7.4 Implications for development and entry points for policy

7.4.1 The internet in developing countries

This study's conclusions complement existing research on ICT adoption in developing countries in that here the focus has been the private sector, whereas the majority of other adoption studies have looked at publicly funded telecentre projects. The findings laid out above strongly supports the conclusions of Rangaswamy (2008), who found that access is the most important factor in people's adoption of the internet, but in contrast to Rangaswamy this study has gone further into detail to show the components and processes that come together to form the conditions for access. The study thus also supports Heeks and León Kanashiro's conclusion (2009) that distance is an important factor in the 'choice' to adopt, if choice is the right term in a context of physical inaccessibility. The user survey conducted for this project has offered findings which to some extent support those of Prado et al. (2011) and Parkinson and Lauzon (2008) in Brazil and Colombia respectively, i.e. that the young are most likely to adopt the internet, and that there is an aspirational aspect to adoption in terms of wanting to build professional skills. However, the findings of this study come from

private-sector points of internet access rather than telecentres, and therefore may be less biased given that they are not constrained by the public telecentres' mission to educate and enable users to learn professional skills. In the case of the users surveyed for this study, a diverse range of functions drew (mainly young) users to adopt the technology, principally relating to an interest in the rest of the world, and specifically in global culture and connections.

.

The impacts of the internet on development identified by this study are still at an early stage, but several themes are becoming clear. First, the internet is giving rise to new virtual contact zones that present opportunities for knowledge and resources to flow into developing countries. This is one of the ways in which the internet's importance can be distinguished from that of mobile phones, which also increase ease of communication but do not offer a way to expand a user's social or professional network beyond their existing circuit of knowledge. In contrast Ghanaian internet users tend to reach out to as many users overseas as possible, as evidenced by the owner who contacted NASA for technical advice, and the respondents to the user survey who claimed to be making friends 'outside' online as much as possible. This desire to interact with users from other countries, and particularly with those in the US and EU, is driving a shift in social networking from predominantly African social networking platforms such as Hi5 to global ones such as Facebook and LinkedIn, as demonstrated by Google Trends analysis,[16] and as Burrell (2012) also observes in her study of the users of Accra internet cafes.

The development of local content would be a step forward that might fulfil some of the functions envisaged by development policy. More domestically generated content could create a virtuous circle in the local internet economy where increased traffic incentivises businesses to advertise online, which in turn funds the development of more content and increases the value of adopting the technology. One critic of the CIC (telecentre) project is quoted as saying that

> 'The missing link… is content. There is no locally relevant content at the CICs, and very little effort is being made to change this.' (Steven Agbenyo, quoted in CTA 2012).

Beyond the domestic sphere, local content could also provide more links between those at home and the diaspora. The development and use of local content, however, is dependent on the provision of

---

[16] Googletrends shows that for Ghana in 2009, the most searched-for term was 'Ghana', followed by 'Facebook', which was also the fastest-growing search term that year.

more reliable connectivity, and on achieving a level of adoption of the technology by the general public that drives the development of an online economy. Most Ghanaian content has so far been oriented toward users among the diaspora, who widely use news and discussion sites and network online for jobs at home.

Without this local content, the internet is nevertheless a potentially huge resource for information and self-education in environments where education provision is still poor, but this information may come at a price since the internet is likely to direct users' attention toward the places which create the most content. The reasons for this are embedded in the technology itself: the internet does not discriminate in terms of cost as phones do between the local, the regional and the global, instead privileging those websites with the most links from other websites, i.e. from places with the most online content (Hindman 2008). This in turn may shape the way Ghanaian internet users see the rest of the world, and in turn their aspirations in terms of mobility and opportunity.

This thesis has contrasted the breaking down of certain borders – spatial, cultural and economic – with the continuation of others. International borders form the greatest barriers for those with the fewest resources, so that for each internationally mobile Ghanaian, there are many thousands who must stay home. However as contact zones shift more towards international and virtual spaces, people are increasingly exercising their agency in the international sphere, whether or not they can travel. The evolution of this type of mobility will overlap and interact with that of the availability of technology, and there is no way to know yet whether that technology will drive or take the place of physical mobility. However this may evolve, the preceding chapters have made the case that human mobility belongs at the centre of the study of the diffusion of technology into poor and remote areas.

7.4.2 Policy implications

This study has focused on the micro-level problems of providing access to the internet and building adoption capacity, positing that solving these is a *sine qua non* for internet usership to increase nationally in Ghana, and thus, at a larger scale, for diffusion to be said to have occurred. The thesis has also, however, set these micro-level findings in context by conducting a meso-level study of the activities of institutions such as the Information Technology Enabled Services (ITES) Secretariat of the Ministry of Communications and the Dutch funder IICD, working to build the IT sector. The findings have also been contextualised, as far as possible, in terms of the larger picture of national governance through the analysis of the national ICT-for-development policy in Chapter 6.

This study has aimed to analyse in depth the first of these levels, the micro-level, and to provide answers to the question of how adoption may occur among populations formerly excluded or marginalised in terms of access to the internet. It has found that the private sector is an important player in this process of building adoption capacity, and that its ability to play a role is largely facilitated by international mobility. It has also sought to produce findings with relevance to the meso-level, namely those dealing with larger companies in Accra, and has shown that the firms building the IT sector as a national and international presence are similarly reliant on mobility to fill gaps left by policy and resource scarcity. The thesis, however, has not aimed to contextualise these processes within the higher-level context of Ghanaian internet access by including a full analysis of factors such as national-level technology policy, national broadband infrastructure provision, regulatory conditions or internet-related legislation. This was because these factors were not within the scope of the study: they could not have been analysed without radically expanding the field both in terms of background and theory, and in the empirical research conducted.

The findings presented in this chapter do, however, touch on these higher-order issues in several ways. The analysis of micro-level local processes of provision includes local manifestations of national regulatory frameworks, such as the fact that at the time of the research Ghana had a single monopoly provider of broadband (Vodafone). This forms one explanation for the faulty broadband service and demands for bribes from company technicians which constituted two of the main challenges faced by internet cafe owners, since a lack of competition meant that the provider did not need to make itself accountable for its failures or abuses. Another manifestation of national policy on the local level was the cost of hardware and software, attributed by owners to the national import tax framework which demanded a duty of 25 per cent on technology goods entering Ghana. A lack of infrastructure has also been explored and forms the basis for much of the analysis in the thesis, since cafes providing the internet in locations outside the national fibre optic backbone form a substantial portion of the northern group of entrepreneurs. The mobility and networking strategies analysed here also represent a response to this lack of infrastructure, since cafe owners have to seek the technical knowledge to make other types of connection (dialup or satellite) work in the absence of technical support. In each of these instances the macro-level is discovered at work within the micro-level, through the strategies with which individuals respond to the challenges created by national policy and the actions of multinational firms.

This leads to several implications for policymakers seeking to promote internet diffusion, both in Ghana and in other countries where lack of resources makes shared-access computing an important component of usership. First, that small-scale private sector actors merit attention and support as an

important engine of technology diffusion and adoption capacity, and that attention should not be focused solely on public-access provision through telecentres. Although the telecentre movement can undoubtedly play an important supporting role in terms of internet provision to remote and rural places, this thesis has shown that once perceptions of the internet as a business opportunity spread amongst entrepreneurs – which in the case of Ghana has occurred at a very early stage in diffusion of the technology – small-scale private sector actors seem to be very effective and persistent drivers of internet provision, while the lack of a profit motive among telecentres makes it difficult for them to be as active in overcoming challenges such as remote locations and intermittent connectivity. The lesson that the private sector is an underused resource in driving the general adoption of the internet is reinforced by the proliferation of internet cafes in comparison to telecentres, in the case of northern Ghana outnumbering telecentres on a scale of nineteen to one.

Another lesson for policymakers is that the private sector will get around the obstacles posed by short-sighted policy, such as import tariffs and monopoly provision of connectivity – but that it would be better to avoid putting these obstacles in place altogether. This lesson applies to governments and funders across the developing world who have prioritised the telecentre model over the more general, mixed model that emerges as ideal in the conclusions of this thesis. Heeks (2009) has outlined the general failure of the telecentre-only model, and this thesis supports his conclusions.

A third lesson is that mobility is the most common method for getting around the obstacles put in place by geography and policy. For policymakers, this suggests first that restrictions on technology imports should be removed and costs lowered, but second that mobility has become established as an important source of technological knowledge, news about innovations and access to the newest technologies, and that it is therefore likely to remain an important contributor to IT sector growth even if current obstacles to access are resolved. This thesis suggests that working a consciousness of the importance of mobility into technology policy – and vice versa – would be a smart policy move, and a relatively easy contribution to a slow-moving IT sector where growth is being prioritised. This conclusion is relevant not only to Ghana, but to countries across Africa, Latin America and Asia which are seeking to promote the IT sector, and most of which are not taking into account the importance of international connections and movement. The rest of this section breaks down these larger policy-relevant findings into actionable units and explores how they might be operationalised.

These small-scale providers of internet access face significant obstacles, especially in the case of the young and new entrants to the field who are often the most technologically knowledgeable but the least financially robust. Their activities are restricted by tax policy in terms of imports of equipment and software, fiscal policy in the shape of a lack of credit programmes for businesses not categorised as farms or microenterprises, and the structuring of economic policy in the shape of a lack of incentives to local providers, and the allowing of monopolies by large-scale providers of connectivity who are not incentivised to provide connectivity to the poorest or most remote locations. Mobility is one important way around this problem for nonelites, but is also restricted by lack of access to visas and lack of agreements between sending and receiving countries.

The outcomes that are the common goals of ICT4D strategies across the developing world – 'leapfrogging' to middle-income status through ICTs – have moved down Ghana's list of priorities as the country instead achieved this status in 2011 through the discovery of oil. However, this has shifted the question to one that is relevant for a wider group of developing countries: once an economy is growing, how a rise in national income can be translated into development outcomes rather than fuelling inequality. In this new landscape the objectives of the ICT4D policy become more important than before, since the primary development challenge changes from one of wealth creation to wealth distribution. In a context of increased resources but persistent inequality, ICT literacy represents a potentially powerful mechanism by which opportunity can be extended to the majority who still remain disadvantaged and isolated from the locations and activities that give access to the new wealth.

The central policy-related conclusion of this thesis is that equality of access is smart ICT4D policy, since equity is good for both diffusion and the growth of the sector as a whole. Much of this missing equity can be found in the activities of small enterprises which are busy diffusing internet access and usership to poor and remote locations. A realistic and effective internet diffusion policy would therefore involve capturing the benefits of private sector activity and building on its positive aspects. As a mechanism for technology diffusion to the poorer segments of society in developing countries, the private sector is often more flexible, economical and responsive than the public sector. In poor and remote regions where internet access is hard to achieve and sustain, and where the state has a very limited role in service provision for most people, a policy vision that does not take into account the potential power of small-scale private sector actors can be, at best, only partially relevant.

Given these conditions, the challenge for policymakers becomes how to create the conditions for the kinds of knowledge and technology exchange that benefit small enterprises engaged in IT-related services. This challenge can be further divided into supporting the private sector in doing business, and supporting its efforts to gain the resources it needs. The first would involve making structural changes to decrease the barriers to running an IT business or internet cafe, particularly in poor and remote areas. Breaking down the division between public and commercial provision would be an important first step in creating a freer flow of information, knowledge and equipment in the IT sector. For example, if public telecentres were made into public-private partnerships, this could address many of the problems caused by this division. This would decrease the disadvantages of public sector provision – for instance through competitive hiring practices for managers and competitive tendering for the provision of connectivity by local providers – without losing the benefits of the public telecentre environment such as the mission to teach new users. It would also potentially allow telecentres to become financially sustainable through expanding commercial activities such as photocopying and secretarial services.

To further help promote local internet provision by internet cafes or hybrid public-private telecentres, internet fraud would need to be addressed in ways that did not halt the growth of internet cafes across the board. Two solutions are possible: first, to continue the current policy of policing people's internet use in public spaces but in greater collaboration with cafe owners rather than by treating them as the enemy. The policy incentives noted above would make their businesses more profitable and less risky, and decrease the need to accept the risks of customers pursuing illegal activities. Alternatively, internet cafes could be made into less fraud-friendly places if tax incentives were established to subsidise educators in cafes who could teach people to use open-source applications in entrepreneurship, or by promoting usership among women in order to change the perception of internet cafes as lawless spaces that are only for young men. Related to this, policy can also play a role in encouraging the development of local online content. The promotion of blogs and micro-blogging, online forums and peer-learning environments could create the kinds of contact zones within the Ghanaian population that are currently missing. This could be done through competitions, and by publicising new virtual learning environments through commercial internet cafes, school and university computer centres and public telecentres where the young predominantly go online.

In terms of decreasing the obstacles to necessary resources for the private sector, this study has shown that capital, hardware and software form the three greatest challenges. It is almost impossible for small-scale IT entrepreneurs to find the capital to start a business without going abroad or

receiving remittances because microfinance programs are targeted at farmers or female microbusinesses owners and formal loans are expensive, and subject to corrupt practices that increase the cost still further. Small-scale entrepreneurs need new formal or semi-formal modes of finance that also promote account-keeping and more professional business practices. These could either involve collectives that would provide an incentive to form the associations that are currently lacking, or could be modelled on the venture capital schemes that exist in developed countries.

Making computer hardware more available is a simpler challenge: it involves decreasing or removing import taxes on computers entirely, as has already been done for public sector organisations and NGOs. This would make it possible for internet cafes and IT businesses to use newer and more viable equipment. Software provision, however, is more difficult because it requires developing financial infrastructure and renegotiating the anti-fraud provisions constructed by international e-commerce sites to keep out consumers from African countries. One important way around this involves the development and local teaching of user-friendly open-source software to offer the applications that are central to productivity in the industrialised world, but which Chapter 4 noted that Ghanaian internet cafes are not yet using. In order for Ghana to make use of these, knowledge, capacity and download speeds would have to be increased. The first two could be addressed by similar methods to the capacity-building activities described above, but the third needs to be addressed by technical specialists on a national level by reconfiguring the country's internet for greater security and less junk traffic.

Finally, this study has identified international mobility as a chief factor in promoting knowledge sharing and the development of IT entrepreneurship at all levels. While much can be done through creating the conditions for contact zones accessible to those who cannot travel internationally, the benefits of physical migration are also important to the sector, particularly in terms of providing capital and skills learned through direct experience of more technologically sophisticated environments. This argues for a national migration policy that recognises the benefits of international exchange and circulation in building capacity at home, rather than solely aiming to incentivise the permanent or temporary return of diaspora members.

Increasing opportunities for entrepreneurs to travel internationally to learn and acquire new technologies would also, however, require policy changes on the part of many receiving countries. Instead, in the current climate of migration management and restriction, many destination countries in the global north are increasing the barriers to international mobility by citizens of developing countries (Broeders 2009, Black and Sward 2009). Policies to incentivise circulation rather than

emigration would include multiple-entry visas for entrepreneurs, traders and students that would allow them to make repeated trips to address knowledge and resource gaps rather than having to achieve their objective in a single visit, as is increasingly the case with limited-term visas. A model for encouraging circulation can be found in the new destination countries visited by many of the entrepreneurs in this study, such as China and Dubai, which have low barriers to temporary and repeated entry both in terms of vetting visa applicants and the cost of visas. These destinations are seeing increasing levels of circular migration by entrepreneurs, traders and students, particularly those involved in technology (Cantens 2012).

The diaspora also represents an important source of IT knowledge and skills (Borkert, Cingolani and Premazzi 2009), but programmes geared toward involving them in technology transfer have so far been small-scale and have seen relatively little participation, largely because they involve coming back to Ghana to teach or mentor in a formal context. This study, in contrast, highlights the potential of online contact for building capacity around ICTs. Contact with IT professionals, whether diaspora members or not, need not occur in person or in a formal context in order to have positive impacts. Online contact with those willing to mentor those starting out in the IT field has the potential to form the kind of relational embeddedness, in the shape of sustainable and reciprocal relationships with those abroad, that have been shown here to be potentially transformative. Models for this kind of activity may be found in the Open Source movement, which has a history of devising ways to exchange knowledge that are horizontal and inclusive rather than hierarchical, often using online environments (Stallman 2006). These forms of 'open education' include 'unconferences', collaborative open source software development, consensus-based discussion and participatory learning using methods such as Agile, to name but a few. These methods may be more responsive and relevant in the context of small business development and learning new technology than more formal mechanisms of knowledge transfer.

7.5 Methodological contributions of combining fsQCA and Social Network Analysis

This study has used fuzzy-set Qualitative Comparative Analysis in combination with Social Network Analysis in order to look at causal factors in business outcomes, which constitutes a new topic for this type of mixed-methods approach. Researchers have begun to conceptualise useful interactions between QCA and SNA (Yamasaki and Spreitzer 2006), but the few analyses that have been carried out are almost exclusively in the field of policy analysis, and use complete network

datasets (Maggetti 2009, Fischer 2011). One study using this combination was found in the field of sociology (Smilde 2005), but it used the presence of social ties (rather than actual network data) in a crisp-set QCA analysis – a much more basic use of each methodology. This study therefore represents an innovative combination of fsQCA with SNA methods, extending these techniques outside the field of political science to the fields of transnational activities and egonetworks. These two features of the dataset made it necessary to develop a method for conceptualising and calibrating transnational egonetworks into fuzzy membership sets (as detailed in Annex 1), in a dialogue between the theory on transnational networks and detailed case knowledge from the survey and interviews conducted.

Given that the majority of social network analysis has been either conceptual or anecdotal (Provan et al. 2007), there is methodological value to conducting causal analysis (provided this is aligned with the research question, as was the case here). Taking an analytical approach that aims to attribute causality, however, is particularly challenging when the data available, as in this study, is cross-sectional and involves egonetworks rather than complete networks since without a complete network dataset many of the analytical tools available for network research cannot be used. Given these restrictions in the type of data available, the combination of fsQCA and SNA increased the explanatory power of each method and made it possible to increase the rigour of the analysis.

These tools strengthened each other's analytical power but also helped reduce each method's weaknesses due to a combination of structure and flexibility. The advantage of the social network approach is that it provides structure to data by offering a systematic way of classify configurations of people. Its drawback is the inflexibility of its assumptions regarding the results of particular configurations: i.e. the stipulation that if people are connected in a certain way, certain types of interaction such as collaboration, exchange or regulation of behaviour must be occurring. Thus the methodology makes assumptions about the content of relationships based on their network structure (Boyd and Crawford 2011). The advantage of fsQCA's classification system is that it is based on thick description of cases as much as theoretical assumptions, and therefore demands that the researcher overcome some of the simplifying assumptions of network theories. The disadvantage of fsQCA is that it is focused on preserving diversity in the data, so that if, as in this study, one is using micro-data, thick description can easily come to outweigh theory and the analysis can descend into case-by-case specifics and thus lose explanatory power. This tendency is partly remedied by the uniform assumptions of the network perspective.

In classifying the network and business data for the analysis in Chapter 4 a dialogue developed between the diversity of the case data and the structured network approach. Using the formal tools of SNA meant that the same criteria were applied systematically in calibrating the cases, while fsQCA relaxed some of the too-uniform assumptions of SNA methodology through the use of fuzzy sets, so that a transnational network or the contributions of network members were not used as unitary concepts. Instead egonetworks could be classified in relation to each other as more or less transnational, and individuals similarly as gaining more or less from their overseas contacts. The configurational approach involved in fsQCA also contributed to a more nuanced network analysis since it assumes that each configuration of network and other factors may be acting in a heterogeneous way to produce the outcome, which at an aggregate level of analysis further mitigates any tendency toward unitary thinking in the network approach.

Thus fsQCA offers greater flexibility and context to the network approach, and the network approach lends a more systematic way of classifying configurations of relationships and exchanges. The latter is particularly important in the context of transnational egonetwork data, where there is only information about the 'ego's' end of these configurations and exchanges and analytical reach is correspondingly reduced. The case detail involved in calibrating data for fsQCA results in a more textured and nuanced analysis than is usually achieved in network studies, and in this case the process of nuancing and texturing was intensified by having to take the transnational nature of networks and the highly contingent flows of goods and ideas into account. Thus the dialogue between the two methods turned out to be particularly fertile given this study's context. Finally, the combination of transnational, micro-level and network data constitutes another step in the evolution of fsQCA by further developing the methodology beyond its original application to states, political parties and welfare systems (Ragin 1987, 2000, Rihoux 2006).

7.6 Limitations and generalisability

This study was subject to several limitations. First, the potential undercounting of internet cafes during data collection. The process of finding all the internet cafes in a large region of Ghana was subject to trial and error, and it is possible that some businesses were missed despite the precautions taken in order to ensure a complete count. There is also the potential problem of accuracy in the financial information gathered from these business owners, since most had no formal accounting procedures or record keeping practices, making it impossible to cross-check the financial information given. Various measures were taken to mitigate this potential inaccuracy, as described in the methodology section, most notably the use of less quantitatively specific outcome variables in

the qualitative comparative analysis section of the study – breaking even and entering the sector recently, rather than comparative levels of profit or return on investment.

There is also the risk of description bias and interpretation bias in this study, given the cultural and linguistic differences between the subjects and the researcher. To mitigate these, local research assistants accompanied me on each of the interviews to help interpret people's responses and to translate my questions if necessary (as described in Chapter 3, section 3.2.1). This risk of interpretation bias was especially great in the case of the internet cafe user survey, since individuals responded to questions online rather than in person, and it was not possible to double check where answers were unclear. This risk was mitigated as far as possible by testing the survey in advance among locals in the areas where the surveys took place, by having local cafe managers and owners explain the survey and answer people's questions, and by going through the responses with a local research assistant to check any where the meaning was not clear.

There are also potential limitations with regard to the generalisability of the study, mainly because of the QCA methodology used, which leads to conclusions that are biased toward internal rather than external validity. This limitation was mitigated by the choice to conduct a complete count of the cafes in the North of Ghana, rather than to sample them. This makes it possible to draw conclusions based on the entire population of these businesses in a particular type of region – poor and remote – and to make arguments about processes of diffusion in other similar regions. These arguments would have to be based, however, on areas where a number of similar conditions prevailed: the barriers for businesses in accessing resources, poverty levels, and the general political environment, since conflict or significant political instability would change the initial conditions for, and relevance of, ICT policy in development.

The study is also subject to a larger limitation in that it is cross-sectional and lacks counterfactuals at several levels, and thus cannot answer questions about trends over time or about those who do not engage with the IT sector in the ways studied here. The internet cafe survey, for example, was oriented toward looking at the effects of mobility within the existing population internet cafes at a given moment in time (early and mid-2009), and thus cannot tell us what led to the formation of these businesses in the first place, or what proportion of cafes have failed, or what led to their failure. At the individual level, the survey of internet users only looks at those who are online, and thus cannot tell us anything about non-adopters and why they do not use the internet. There are therefore important questions regarding adoption and provision that this study does not seek to

answer, although the research conducted for this project may indicate further directions for research, as outlined in the final section below.

Despite these limitations, the findings of this study may provide insights into processes of internet diffusion in other developing countries since the challenges to diffusion analysed here are common to many countries across sub-Saharan Africa and beyond. These are, first, how to build adoption capacity despite a low level of technological development and knowledge among the general public; second, how to overcome conditions of scarcity in terms of computer hardware and software, and financing for small businesses in the IT sector. Third, many countries present environmental conditions that necessitate the reconfiguring and reworking of technologies for local users. This could consist of a challenging physical environment involving limited electricity and telecoms infrastructure such as is found in the lowest-income countries, but also to climatic conditions that limit connectivity, especially in the tropics. Fourth, this study has presented conclusions about the influence of international mobility on diffusion, even where that mobility is restricted, a common condition across developing countries.

This research also has relevance for the many African countries with ICT4D policies similar to Ghana's. The UN's African Information Society Initiative (AISI) is currently the framework for ICT policy formation in at least 28 African nations (AISI 2011), most of which share many of the challenges addressed by this thesis. This correspondence in policy potentially makes this study's findings regarding ICT policy effectiveness relevant across the continent. The direction of ICT policy is also an important component in determining comparability, because it has the power to mitigate most of the constraints to wider adoption and usership.

7.7 Potential directions for future research

This study has developed several further questions that have value for future research on the diffusion of technologies in developing countries. The network perspective offers a useful framework for understanding how technologies, and technological knowledge, are transmitted internationally: future research could go beyond the egonetwork focus of this study to identify complete networks that cross national borders, and thus investigate dynamics that this project was not able to explore. Studying whole networks rather than egonetworks would offer the opportunity to trace learning processes among migrants in receiving countries, and to ask more in-depth questions about how different forms of technological knowledge are made transmissible across borders. The question of virtual contact is also worth exploring further, since this study leaves open questions as to the nature of knowledge transmission in online contact zones, specifically whether

contact via affinity spaces can, like direct contact with migrants, bridge gaps in people's educational and technological background.

There is also room for better understanding of how small businesses involved in developing country technology diffusion survive and evolve. Longitudinal research looking at forces of competition among these small-scale enterprises could chart the outcomes of the early 'gold rush' phase of IT that occurs with new technologies such as mobile phones and the internet, and could help us understand the relationship between early-stage IT-related enterprises and technological innovation. Does the kind of innovation necessary to start and sustain an internet cafe lead to other forms of innovation and to engagement with the IT sector on the part of entrepreneurs, or do they behave more like venture capitalists and identify other 'gold rush' opportunities in different sectors? This question leads to a broader one about what kind of resource the many internet cafes springing up in developing countries represent: whether these entrepreneurs constitute a base for the development of developing-country IT sectors beyond their current clustered configurations, or whether they are making an important but time-limited contribution to local technology diffusion.

This thesis has also opened up questions for ICT4D research regarding the value of the private sector as a force in diffusing technology in areas where that diffusion has till now been the focus of institutional interventions. There is an implied understanding in the literature that the private sector will take over from these interventions once usership reaches a certain point of critical mass, but this research has suggested that that point might be earlier than conventional wisdom dictates. There is value to understanding more about the balance between public-sector and private-sector contributions to diffusion and how they can be encouraged to interact, since private-sector activities have been shown here to be more sustainable, although more socially problematic, and might benefit from the kind of development-oriented thinking that originally conceptualised telecentres as a safe, productive space to promote internet adoption. Further research into how these two can be balanced and how national or international authorities can build on the positive aspects of each has great potential for gains in efficiency regarding local internet provision.

Finally, this study has demonstrated that regulating mobility may have unforeseen social and economic effects on developing countries, such as restricting people's ability to adopt and use new technologies. The relationship between technology and mobility is bi-directional: innovations such as the internet and mobile phones have decreased the need for some types of movement, but have also lowered the barriers to others by facilitating social connections. In the case of most developing countries, international mobility is set to increase as incomes rise, suggesting that this relationship

will continue to evolve and may play an important role in the technological landscape of emerging economies.

8 References

Ackah, C., Medvedev, D (2010) 'Internal Migration in Ghana: Determinants and Welfare Impacts'. Paper presented at CSAE Conference 2010, Economic Development in Africa, 21st - 23rd March 2010, St Catherine's College, Oxford.

Acs, Z.J., Hart, D.M. (2011) 'Immigration and High-Impact, High-Tech Entrepreneurship' Paper No. 6, Issues in Technology Innovation. Washington DC: Brookings Institution.

Adey, P. (2009). *Mobility*. London: Routledge.

Adams, R., Page, J (2003) 'International Migration, Remittances and Poverty in Developing Countries'. World Bank Poverty Reduction Group, Working Paper 3179.

Adams, R.H. (2007) 'An Overview of Data Contained in the 2005/06 Ghana Living Standards Survey (GLSS 5) (Sub-sample) on Migration and Remittances'. World Bank Development Research Group

Ahmed, I. (2000) 'Remittances and their economic impact in post-war Somaliland', *Disasters*, 24(4): 380-89

AISI (2011) 'National Information and Communication Strategies, country pages'. Available online at (http://www.uneca.org/aisi/nici/). Accessed 10.1.12

Aker, J. C. (2010). 'Information from markets near and far: Mobile phones and agricultural markets in Niger'. *American Economic Journal of Applied Economics*, 2(3), 46-59.

Alfieri, A, Havinga, I, and Hvidsten, V (2005) 'Definition of remittances and relevant BPM5 flows' UN ECOSOC meeting notes. Accessed 6.1.10 at http://unstats.un.org/unsd/tradeserv/TSG percent2002-05-Paris/tsg0502-16.pdf

allafrica.com (2007). Ghana: Remittances From Diaspora Increase to U.S. $4.3 Billion. http://allafrica.com/stories/200708290809.html.

Almeida, P. and B. Kogut (1994).'Technology and Geography: The Localization of knowledge and the Mobility of Patent Holders'. Working Paper. The Wharton School of Business.

Ammassari, S (2003). 'Intercontinental Mobility and Return Migration of Elites to the Ivory Coast and Ghana'. Thesis, DPhil in Development Studies, University of Sussex

Ammassari, S. and Black, R. (2001). 'Harnessing the Potential of Migration and Return to Promote Development: Applying Concepts to West Africa'. IOM Migration Research Series.

Anarfi J., Kwankye S, Ababio O-M, Tiemoko R (2003) 'Migration from and to Ghana: A Background Paper'. Working Paper, Brighton: Development Research Centre on Migration, Globalisation and Poverty

Andersen, K.V. and Lorenzen, M. (2007). 'The Stretching of Weak Ties: Clusters, Pipelines, and the Creation of Small Worlds'. Paper presented at the Druid-Dime Academy Winter 2007 PhD Conference on Geography, Innovation and Industrial Dynamics, Aalborg, Denmark, January 25 - 27, 2007.

Aneesh, A. (2008). *Virtual Migration: the Programming of Globalization*. Durham: Duke University Press.

Arrow, K. J. (1962). 'The Economic Implications of Learning by Doing'. *The Review of Economic Studies*, 29(3), 155-173.

Arunachalam, S. (2002). 'Reaching the unreached: How can we use information and communication technologies to empower the rural poor in the developing world through enhanced access to relevant information?' *Journal of Information Science*, 28(6), 513–522.

Avgerou, C. (2010): 'Discourses on ICT and Development'. *Information Technologies & International Development* Volume 6, Number 3, Fall 2010, 1–18

Balancing Act (2009): 'Ghana ranks 28 in Internet penetration in Africa'. (Accessed 10.1.11 at www.balancingact-africa.com.)

Bamiro, O.A. (2006): 'The Vision and Challenges of ICT Production in Africa: Computer Hardware Production'. African Economic Research Consortium Framework paper (accessed 10.7.12 at http://www.aercafrica.org/documents/ICT_project_working_papers/BamiroF_%20ComputerHardwareProduction.pdf)

Barr, A. (1998): 'Social Capital and Technical Information Flows in the Ghanaian Manufacturing Sector' Oxford Economic Papers, July 1998.

Bauböck, R. (2003). 'Towards a political theory of migrant transnationalism'. *International Migration Review* 37(3) 700-23.

Beletre, S (2009): 'Ghana, Africa's premier BPO destination?' Sylvain Béletre, 3.8.2009. accessed 10.11.2010 at http://africa.bizcommunity.com/Article/83/16/38526.html#contact.

Benning, K (2006): 'Business process outsourcing activities in Ghana'. Presentation at UNECA ICT, Trade & Economic Growth Forum, Addis Ababa, March 14-16 2006.

Best, M. & Kenny, C. (2009) in ICT4D. Unwin, T. (ed.). Cambridge: Cambridge University Press.

Black, R. and Castaldo, A. (2007). 'Migration, work experience and entrepreneurship amongst returnees to Sub-Saharan Africa'. Unpublished paper, Sussex Centre for Migration Research.

Black, R. and Ammassari, S., (2001). 'Harnessing the Potential of Migration and Return to Promote Development: Applying concepts to West Africa', IOM Migration Research Series, 5, International Organization for Migration, Geneva.

Black, R., King, R. & Tiemoko, R. (2003) 'Migration, Return and Small Enterprise Development in Ghana: A Route Out of Poverty?' Sussex Migration Working Paper 9. Sussex Centre for Migration Research.

Black, R. and Sward, J. (2009) 'Migration, Poverty Reduction Strategies and Human Development'. Human Development Research Paper 2009/38. United Nations Development Programme.

Blackler, F. (2002). 'Knowledge, knowledge work and organizations: an overview and interpretation'. In Choo, C. and Bontis, N. (eds.) *The Strategic Management of Intellectual Capital and Organizational Knowledge*. New York, Oxford University Press Inc: 47-64.

Borgatti, S., Foster, P. (2003): 'The Network Paradigm in Organizational Research: A Review and Typology'. *Journal of Management* 29(6) 991–1013

Borkert, M., Cingolani, P. and Premazzi, V. (2009). 'The State of the Art of Research in the EU on the Take up and Use of ICT by Immigrants and Ethnic Minorities'. JRC Scientific and Technical Report. Brussels: European Commission.

Bourdieu, P. and Wacquant, L.J.D. (1992) *An Invitation to Reflexive Sociology*. Chicago and London: Univ of Chicago Press.

Boyd, D., Crawford, K. (2011) 'Six Provocations for Big Data.' Conference paper: A Decade in Internet Time: Symposium on the Dynamics of the Internet and Society, Oxford Internet Institute, September 2011.

Broeders, D. (2009) *Breaking Down Anonymity. Digital surveillance of irregular migrants in Germany and the Netherlands*. Amsterdam: Amsterdam University Press.

Bure, C. (2006). 'Grounding GEM for Telecentres: The Experiences of Ecuador and the Philippines'. IDRC: Ottawa; Available at: http://www.bcoalliance.org/system/files/GEMforTelecentres.pdf

Burrell, J (2007): 'Producing the Internet and Development: an ethnography of Internet café use in Accra, Ghana'. Doctoral thesis, London School of Economics.

Burrell, J. (2008). 'Problematic Empowerment: West African Internet Scams as Strategic Misrepresentation'. *Information Technology and International Development* 4(4), 15–30.

Burrell, J. (2012). *Invisible Users: Youth in the Internet Cafes of Urban Ghana*. Cambridge: MIT Press.

Burt, R. (2001): 'Structural holes versus network closure as social capital'. In *Social Capital: Theory and Research*. Lin, N., Cook, K., Burt, R. eds. De Gruyter: New York.

Cantens, T. (2012). 'Informal trade practices'. World Customs Organization Research Paper No. 22.

Carmody, P. (2011). 'The Informationalization of Poverty in Africa? Information and Communication Technologies and Economic Structure'. Institute for International Integration Studies (IIIS) Discussion paper no. 370. Trinity College Dublin.

Clark, G (ed.) (1988) *Traders Versus the State: Anthropological Approaches to Unofficial Economies*. Boulder,. Colo.: Westview Press.

Clark, G. (2010): 'Gender Fictions and Gender Tensions Involving "Traditional" Asante Market Women'. *African Studies Quarterly*, Volume 11, Issues 2 & 3.

Cohen, W.M., Levinthal, D.A. (1990) 'Absorptive Capacity: A New Perspective on Learning and Innovation' *Administrative Science Quarterly* Vol. 35, No. 1, Special Issue: Technology, Organizations, and Innovation (Mar., 1990), pp. 128-152

Coleman, J. S. (1988). 'Social capital in the creation of human capital' *American Journal of Sociology* 94: 1, S95-S120.

Coleman J.S. (1990) *Foundations of Social Theory,* Cambridge, MA. Belknap Press/Harvard University Press.

Cresswell, T. (2006). *On the Move*. London: Routledge.

Crovella, M.E. and Bestavros, A. (1997) 'Self-similarity in World Wide Web traffic: evidence and possible causes'. IEEE /ACM Transactions on Networking, 5(6).

CTA (2012) 'ICT update'. Wageningen Technical Centre for Agricultural and Rural Cooperation. Issue 66, June 2012.

Davis, F. D.; Bagozzi, R. P.; Warshaw, P. R. (1989) 'User acceptance of computer technology: A comparison of two theoretical models', *Management Science* **35**: 982–1003.

Dawson, J. (1988). 'Small-Scale Industry Development in Ghana: A Case Study of Kumasi'. London: Overseas Development Administration, ESCOR.

Démurger, S., & Xu, H. (2011). 'Return Migrants: The Rise of New Entrepreneurs in Rural China'. *World Development*, *39*, (10), 1847-1861.

Denzin, N. (2006). *Sociological Methods: A Sourcebook.* Aldine Transaction.

Dercon, S (2002). 'Income risk, coping strategies and safety nets'. *World Bank Research Observer* 17 (2): 141-166.

de Klerk, G. J.; Havenga J. J. D. (2004): 'SME networks and clusters and their impact on economic growth: an exploratory overview of Africa'. Working paper, Faculty of Economic and Management Sciences, North-West University, Potchefstroom, South Africa.

De Silva, H. & Ratnadiwakara, D. (2009) 'Using ICT to reduce transaction costs in agriculture through better communication: A case-study from Sri Lanka', E-Agriculture. Retrieved from http://lirneasia.net/wp-content/uploads/2008/11/transactioncosts.pdf

de Vreyer, P; Gubert, F; Robilliard, A (2010): 'Are There Returns to Migration Experience? An Empirical Analysis using Data on Return Migration and non-migrants in West Africa'. Workshop on Migration in West Africa: Governance and Links to Labour Markets. Dakar, 25 March 2010. [Accessed 29.3.10 at http://www.oecd.org/dataoecd/31/63/44806127.pdf]

Donner, J. (2007). 'The use of mobile phones by microentrepreneurs in Kigali, Rwanda: Changes to social and business networks'. *Information Technologies & International Development*, 3(2), 3–19.

Du, B., Demmer, M., and Brewer, E. (2006). 'Analysis of WWW traffic in Cambodia and Ghana'. In Proceedings of the 15th International Conference on World Wide Web (Edinburgh, Scotland, May 23 - 26, 2006). WWW '06. ACM Press, New York, NY, 771-780.

Dustmann, C., & Kirchkamp, O. (2002). 'The optimal migration duration and activity choice after re-migration'. *Journal of Development Economics*, 67, (2), 351-372.

Edgerton, D (2006) *The Shock Of The Old: Technology and Global History since 1900*. London: Profile

EdStats (2010): World Bank education indicators database. Available at: http://data.worldbank.org/data-catalog.

Esselaar S, Stork C, Ndiwalana A, Deen-Swarray M. (2007): 'ICT usage and its impact on profitability of SMEs in 13 African countries'. *Information Technologies and International Development*, 4(1): 87–100. Available at: http://www.mitpressjournals.org/doi/pdf/10.1162/itid.2007.4.1.87

Fafchamps, M. (1999): 'The Role of Business Networks in Market Development in Sub-Saharan Africa' http://www.economics.ox.ac.uk/members/marcel.fafchamps/homepage/ediconf.pdf

Faist, T. (2000): *The Volume and Dynamics of International Migration and Transnational Social Spaces*. Oxford: Oxford University Press.

Findlay, R. (1978): 'Relative Backwardness, Direct Foreign Investment, and the Transfer of Technology: A Simple Dynamic Model", *Quarterly Journal of Economics,* Vol. 92, pp. 1-16.:

Fischer, M. (2011). ' Social Network Analysis and Qualitative Comparative Analysis: Their mutual benefit for the explanation of policy network structures'. *Methodological Innovations Online* (2011) 6(2) 27-51.

Fishbein, M. & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.

Foster, W., Goodman, S.E., Osiakwan, E., Bernstein, A. (2004): 'Global diffusion of the internet IV: the internet in Ghana'. *Communications of the Association for Information Systems*, Vol 13: 38.

Frempong, G (2009) 'Mobile telephone opportunities: the case of micro- and small enterprises in Ghana'. *Info - The journal of policy, regulation and strategy for telecommunications*, 11(2), pp. 79-94(16)

Frese, M (2000): *Success and failure of microbusiness owners in Africa: a psychological approach*. Westport, Quorum Books.

GASSCOM (2010): http://www.gasscom.org.gh/industry.html

Gee, J. P. & Hayes, E. (2009) 'Public Pedagogy through Video Games: Design, Resources & Affinity Spaces. Game Based Learning'. Accessed online 4.5.12 at http://www.gamebasedlearning.org.uk/content/view/59/.

Ghanaweb (2002): 'Tariff Structure for Imports 2002'. Accessed online 23.9.12 at http://www.ghanaweb.com/GhanaHomePage/economy/import_duty.php

Ghanaweb (2003): 'Ghana jumps into BPO' (accessed 12.11.10 at http://mobile.ghanaweb.com/wap/article.php?ID=34799)

GICTeD (2009): 'Electronic/Mobile Government in Africa: Building Capacity in Knowledge Management Through Partnership. Ghana country presentation.' Presentation at UNPAN conference, Addis Ababa, Ethiopia, 17-19 February 2009. (accessed online 23.11.10 at http://unpan1.un.org/intradoc/groups/public/documents/un/unpan033666.pdf)

Gillwald, A (2010) 'The Poverty of ICT Policy, Research, and Practice in Africa'. *Information Technology and International Development*, Volume 6, SE, Special Edition 2010, 79–88

Gillwald, A. and C. Stork (2007).'Towards an African ICT e-Index: Towards Evidence Based ICT Policy in Africa'. The Link Centre.

Globalenvision (2006): 'ICTs and accelerated development in Ghana', June 13. (Accessed 12.11.10 at http://www.globalenvision.org/library/7/1110).

GoG (2000). 2000 National Census.

GoG (2002a) The Ghana ICT for Accelerated Development (Ict4ad) Policy. Accessed online at http://www.ghanahealthservice.org/includes/upload/publications/Ghana%20ICT4AD%20Policy.pdf

GoG (2002b): The Ghana 'ICT for accelerated development' (ICT4AD) process. Statement by Hon. Owusu-Adjapong, Minister of Communications and Technology, 22.8.02. (Available at http://www.comminit.com/en/node/148264/308)

GoG (2002c): 'Implementation of tax policies and administrative measures based on the budget statement and economic policies of government for 2001-2006'. Accessed online 23.9.12 at http://www.mofep.gov.gh/sites/default/files/publications/taxpolicy.pdf

GoG (2003a): 'An Integrated ICT-Led Socio-Economic Development Policy And Plan: Development Framework For Ghana'. Accra: Government of Ghana. Accessed 12.11.10 at (www.ict.gov.gh/pdf/ICT4AD-Framework.pdf)

GoG (2003b). 2003 National Industrial Census. Available at http://www.statsghana.gov.gh/docfiles/2%20Phase%20I%20&%20II%20Report.pdf.

GLSS (2005): Ghana Living Standards Survey: Upper East, Upper West and Northern Region policy syntheses. Accra: Government of Ghana.

Granovetter , M. (1979): 'Placement as Brokerage - Information problems in the labor market for rehabilitated workers'. In D. Vandergoot and J. D. Worrall(Eds.), *Placement in Rehabilitation* (pp. 83-101). Texas: PRO-ED, Inc.

Granovetter, M. (1973). 'The strength of weak ties'. *American Journal of Sociology*, 78(6), pp. 1360-1380.

Granovetter, M. (1985) "Economic Action and Social Structure: the Problem of Embeddedness.', *American Journal of Sociology*, 91.

Granovetter, M. (1992): 'Problems of explanation in economic sociology', in *Networks and Organizations*, Nohria, N, and Eccles, R.G. eds., Boston: Harvard Business School

Greif, A (1989) 'Reputation and Coalitions in Medieval Trade: Evidence on the Maghribi Traders'. *Journal of Economic History*, Vol. 49, No. 4 (Dec., 1989), pp. 857-882.

Gribble, S (1995) 'System design issues for internet middleware services: Deductions from a large client trace'. Masters Thesis, UC Berkeley, 1995.

Guillen , Suarez (2005): 'Explaining the Global Digital Divide: Economic, Political and Sociological Drivers of Cross-National Internet Use'. Social Forces, 84: 2.

Gurbaxani, V. (1990) 'Diffusion of computing networks: The case of Bitnet'. Commun. ACM 33:12, 65–75.

Hagerstrand, T (1967) *Innovation Diffusion as a Spatial Process*. Postscript and translation by A. Pred. Chicago and London: University of Chicago Press

Hanafizadeh, M.R., Saghaei, A., Hanafizadeh, P. (2009). 'An index for cross-country analysis of ICT infrastructure and access'. *Telecommunications Policy* 33 (2009) 385–405

Hansen, M. T. (1999). 'The search-transfer problem: The role of weak ties in sharing knowledge across organization subunits.' *Administrative Science Quarterly*, 44: 82-111.

Heeks, R., Wilson, G. (2000). 'Technology, Poverty and Development.' In *Poverty and Development into the 21st Century*, ed. T. Allen & A. Thomas, 403-424. OUP.

Heeks, R. (2002): 'Information Systems and Developing Countries: Failure, Success, and Local Improvisations'. *The Information Society*, 18:101–112.

Heeks, R. and León Kanashiro, L. (2009). 'Remoteness, Exclusion and Telecentres in Mountain Regions: Analysing ICT-Based "Information Chains" in Pazos, Peru'. Development Informatics Working Paper Series, No.38/2009. Manchester: Institute for Development Policy and Management.

Heeks, R. (2009). 'The ICT4D 2.0 Manifesto: Where Next for ICTs and International Development?' IDPM Working paper no. 42, University of Manchester.Heeks, R. (2010) 'Do information and communication technologies (ICTs) contribute to development?' *Journal of International Development* 22, 625–640.

Herstad, S, Bloch, C, Ebersberger, B and van de Velde, E (2008): 'Open innovation and globalisation: Theory, evidence and policy implications'. Vision EraNet project report. Available online at <http://www.visioneranet.org/index.phtml?s=65&v_197=742>, accessed 18 April 2012.

Hindman, M. (2008) *The myth of digital democracy*. Princeton: Princeton University Press.

Holmes, T.J.; Schmitz, J.A. (1996): 'Managerial tenure, business age, and small business turnover'. *Journal of Labor Economics*, 14 (1).

Horowitz, M.C. (2010) *The Diffusion of Military Power: Causes and Consequences for International Politics*. Princeton: Princeton University Press.

Hughes, N., & Lonie, S. (2007). 'M-PESA: Mobile money for the "unbanked": Turning cellphones into 24-hour tellers in Kenya'. *Innovations*, Winter/Spring 2007, 2(1–2) 63–81.

Human Development Report (2001): 'Making new technologies work for human development'. New York: UNDP.

IICD (2008): Northern Ghana CIC survey (unpublished)

IICD (2009a): 'Different countries, different telecentres', website report (accessed 12.11.10 at http://www.iicd.org/articles/different-countries-different-telecentres).

IICD (2009b): 'IICD supported programme: ICT Policy for the Health Sector – Ghana'. Website publication, accessed 22. 11.10 at http://www.iicd.org/projects/ghana-moh

IICD (2012): 'IICD supported programme: Community Information Centre Initiative – Ghana'. Summary of evaluation by IICD of telecentre project, 2005-2009. (accessed 13.11.10 at http://www.iicd.org/projects/ghana-cic/?searchterm=None).

ILO (2002): *Men and Women in the Informal Economy*. Geneva: International Labour Organisation

IMF (2006) 'Ghana: Poverty Reduction Strategy Paper'. IMF Country Report No. 06/225.

Infodev (2005): Improving Business Competitiveness and Increasing Economic Growth in Ghana: The Role of Information and Communication Technologies & IT-Enabled Services. Washington, DC: infoDev / World Bank. Available at: http://www.infodev.org/en/Publication.170.html

InfoDev (2006): 'infoDev Study Shapes $40 million World Bank e-Ghana Project' (accessed 12.11.10 at http://www.infodev.org/en/Article.66.html)

Ingram, P., Roberts, P. (2000): 'Friendships among competitors in the Sydney hotel industry.' *American Journal of Sociology*, 106: 387-423.

IOM (2009) 'Migration in Ghana: a country profile'. Geneva: International Organisation for Migration.

IOM (2012) 'Migration for Development in Africa (MIDA). Webpage, accessed 2.8.2012 at http://www.iom.int/jahia/Jahia/mida-africa/

ITES website (2010): http://www.ites.gov.gh/About-Us.aspx

ITM (2008): Ghana - 1/500: A Travellers Reference Map.

ITU (2003): 'Visions of the Information Society: ICTs for education and building human capital'Geneva: ITU

ITU (2010): Measuring the Information Society 2010. Geneva: ITU

ITU (2011a): Measuring the Information Society 2011. Geneva: ITU

ITU (2011b): ITU Statshot. Issue 7: August 2011. (accessed 11.7.12 at http://www.itu.int/net/pressoffice/stats/2011/03/index.aspx)

ITU (2011c) 'ICT regulation toolkit'. (Accessed 6.9.12 at http://www.ictregulationtoolkit.org/en/Sections.html)

ITWorld Canada (2003): 'ACS expansion gives Ghana BPO vote of confidence' (accessed 12.11.10 at http://www.itworldcanada.com/news/acs-expansion-gives-ghana-bpo-vote-of-confidence/119901)

Jack, W., Suri, T. (2010) 'The Economics of M-PESA'. Working Paper, Massachusetts Institute of Technology. Accessed 15.3.12 at http://www.mit.edu/~tavneet/M-PESA.pdf.

Johnson, D.L., Belding, E.M., Almeroth, K., van Stam, G (2010): 'Internet usage and performance analysis of a rural wireless network in Macha, Zambia'. Paper delivered at 4th ACM Workshop on Networked Systems for Developing Regions, June 15th, 2010, San Francisco, CA.

Joinson, A. (2001) 'Self-disclosure in computer-mediated communication: the role of self-awareness and visual anonymity'. *European Journal of Social Psychology* 31, 177-192.

Kabki, M., V. Mazzucato and E. Appiah (2004). 'Wo benanE a EyE bebree: The economic impact of remittances of Netherlands-based Ghanaian migrants on rural Ashanti'. *Population, Space and Place* 10: 85-97.

Kempner, A. (2010): *Valuation of network effects in software markets*. Heidelberg: Springer-Verlag.

Kenny, C, Sumner, A (2011) 'How 28 poor countries escaped the poverty trap'. Guardian, 12th July 2011 (accessed at http://www.guardian.co.uk/global-development/poverty-matters/2011/jul/12/world-bank-reclassifies-28-poor-countries)

Ketkar, S.L. and Ratha, D. (2001) 'Development Financing during a Crisis: Securitization of Future Receivables' World Bank Policy Research Working Paper No. 2582.

Khan, F and Ghadially, R (2010). 'Empowerment through ICT education, access and use: a gender analysis of Muslim youth in India'. *Journal of International Development* 22, 659–673.

Kilic, T., Carletto, C., Davis, B., & Zezza, A. (2009). Investing back home: return migration and business ownership in Albania. *Economics of Transition*, *17*, (3), 587-623.

Kiri, K. and D. Menon (2006) 'For Profit Rural Kiosks in India: Achievements and Challenges' in Information for Development Online. (http://www.i4donline.net/articles/current-article.asp?articleid=700&typ=Features). Accessed 18 April 2012

Kleine, D. (2010) 'ICT4What?' *Journal of International Development*, Vol. 22, No. 5, 07.2010, p. 674-692.

Kleine, D. and Unwin, T. (2009). 'Technological Revolution, Evolution and New Dependencies: what's new about ICT4D?' *Third World Quarterly*, Vol. 30, No. 5, pp 1045–1067.

Kleist, N. (2009), 'African diaspora organizations and homeland development', briefing paper, Danish Instittue for International Studies (DIIS). Accessed online at http://www.diis.dk/graphics/Publications/Briefs2009/nkl_african_diaspora_organizations_2.pdf.

Kloosterman, R., van der Leun, J., Rath, J (1999) 'Mixed Embeddedness: (In)formal Economic Activities and Immigrant Businesses in the Netherlands'. *International Journal of Urban and Regional Research*, June, pp. 253-267.

Koehn, P. H. and Rosenau, J.N. (2002). 'Transnational Competence in an Emergent Epoch.' *International Studies Perspectives* 3(May): 105–27

Kranton, R. E. (1996): 'Reciprocal Exchange: A Self-Sustaining System,' *Amer. Econ. Rev*., 86(4): 830-851.

Kugler, M. and Rapoport, H. (2005). 'Skilled Emigration, Business Networks and Foreign Direct Investment.' CESifo Working Paper Series 1455, CESifo Group Munich.

Kyle, D. (1999). 'The Otavalo trade diaspora: Social capital and transnational entrepreneurship'. *Ethnic and Racial Studies*, 22, 422-44

Landolt, P. (2001) 'Salvadoran Economic Transnationalism: Embedded Strategies for Household Maintenance, Immigrant Incorporation, and Entrepreneurial Expansion'. *Global Networks: A Journal of Transnational Affairs*, 1(3):217-241

Latour, B. (2005). *Reassembling the Social: An Introduction to Actor-Network-Theory* (Oxford: Oxford University Press).

Levitt, P. (1998). 'Social Remittances: Migration Driven Local-Level Forms of Cultural Diffusion.' *International Migration Review* 32(4).

Liang, L (2009): 'Access Beyond Developmentalism: Technology and the Intellectual Life of the Poor'. Published on Publius Project (http://publius.cc). (Accessed 18.11.10 at http://publius.cc/access_beyond_developmentalism_technology_and_intellectual_life_poor/091109)

Lieberson, S. L. (1994), 'More on the Uneasy Case for Using Mill-Type Methods in Small-N Comparative Studies,' *Social Forces*, 72, 1225- 1237.

Lin, N (2001): 'Building a network theory of social capital' in *Social Capital: Theory and Research*. Lin, N., Cook, K., Burt, R. eds. De Gruyter: New York.

Lin, N., Cook, K. and Burt, R. S. (Eds.) (2001). *Social Capital: Theory and Research*. New Brunswick, NJ: Transaction Press

Luk, R (2007): 'Contextual design in the developing world: case study of a telemedicine system in Ghana'. University of California, Berkeley School of Information. (Accessed 17.11.10 at http://www.ischool.berkeley.edu/files/FinalPaper.pdf)

Macueve G, Mandlate J, Ginger L, Gaster P, Macome E. (2009). 'Women's use of information and communication technologies in Mozambique: a tool for empowerment'. In *African Women and ICTs*, I. Buskens, A. Webb (eds.) Zed Books: London; 21–32.

Mangesi (2007) 'ICT in Education in Ghana'. Survey of ICT and education in Africa, Ghana Country Report. World Bank, InfoDev.

Maggetti, M. (2009) 'The role of independent regulatory agencies in policy-making: a comparative analysis' *Journal of European Public Policy* 16(3).

Mansell, R (2009): 'The information society and ICT policy: a critique of the mainstream vision and an alternative research framework'. LSE research paper.

Mansell, R (2010a) 'Power and Interests in Developing Knowledge Societies: Exogenous and Endogenous Discourses in Contention'. IKM Working Paper No. 11.

Mansell, R (2010b) 'The information society and ICT policy: A critique of the mainstream vision and an alternative research framework'. *Journal of Information, Communication and Ethics in Society* 8(1)

Mariscal, J. (2009) 'Mobiles for Development: M-Banking'. Paper delivered at the 2009 Congress of the Latin American Studies Association, Rio de Janeiro, Brazil June 11-14, 2009.

Massey, D. S; Alarcon, R; Durand, J; and Gonzalez, H (1987) *Return to Aztlan: The Social Process of International Migration from Western Mexico*. Berkeley and Los Angeles: University of California Press.

Massey, D.S. and Parrado, E.A. (1998). 'International Migration and Business Formation in Mexico.' *Social Science Quarterly* 79 (1): 1-20.

Minges, M. (1998). 'Internet and developing countries', International Telecommunications Union Focus group, Promotion and use of internet infrastructure in developing countries, Bonn, 15-16 December 1998.

Mazzucato, V (2009). 'Informal Insurance Arrangements in Ghanaian Migrants' Transnational Networks: The Role of Reverse Remittances and Geographic Proximity'. *World Development* Vol. 37, No. 6, pp. 1105–1115.

Mazzucato, V. (2005) Ghanaian migrants' double engagement: a transnational view of development and integration policies. *Global Migration Perspectives* No. 48, 17 pp. (www.gcim.org/en/ir_gmp.html).

Mengeot, B. (2003) 'Refus de migrants au Burkina Faso: manque de place ou critère ethnique?' Université Catholique de Louvain, Faculté des Sciences (unpublished, available from www.compasss.org)

Mizruchi, M.S. (1992): *The Structure of Corporate Political Action: Interfirm Relations and their Consequences*. Cambridge: Harvard University Press.

Mowery, D.C., Oxley, J.E. (1995) 'Inward technology transfer and competitiveness: the role of national innovation systems', *Cambridge Journal of Economics* 19, pp. 67–93.

Newland, K. and Agunias, D.R. (2007).'Circular Migration and Development: Trends, Policy Routes, and Ways Forward'. Policy Brief, Migration Information Source.

Nsengiyumva et al. (2006) 'Towards an African e-index: SMS access and usage across 14 African countries'. Accessed online (5/1/10) at http://mobileactive.org/research/towards-african-e-index-sms-e-access-and-usage-across-14-african-countries.

Nussbaum (2003) 'Capabilities as fundamental entitlements: Sen and social justice', *Feminist Economics*, 9(2).

Nussbaum (2006) Frontiers of Justice: Disability, Nationality, Species Membership Cambridge, MA: Harvard University Press.

Nussbaum, M., Sen, A. (eds.) (2003) *The Quality of Life*. New York: Oxford Clarendon Press

Nziramasanga, M. T., Bhattacharjee, S. and Lee, M. (2009) 'Viability of Self-Employment', *Journal of Development Studies*, 45: 7, 1070 — 1092

Odoi-Larbi, S. (2010) 'Ghana receives $4.2bn in remittances'. Ghanaian Chronicle online. Accessed at: http://ghanaian-chronicle.com/ghana-receives-4-2bn-in-remittances/.

OECD (2003). 'ICT and Economic Growth: Evidence from OECD Countries, Industries and Firms'. Paris, OECD

OECD (2005). 'Good practice paper on ICTs for economic growth and poverty reduction'. Paris: OECD.

Orozco, M (2005) 'Diasporas, Development and Transnational integration: Ghanaians in the U.S., U.K. and Germany'. Institute for the Study of International Migration and Inter-American Dialogue. Accessed online at http://w.thedialogue.org/PublicationFiles/Ghanaian%20transnationalism.pdf.

Orozco, M. and R. Rouse (2007). 'Migrant Hometown Associations and Opportunities for Development: A Global Perspective.' Migration Information Source.

Osei, R. (2010). 'Reducing poverty through a social grants programme: the case of Ghana'. Institute of Statistical, Social and Economic Research (ISSER) working paper. Accessed at: http://www.pegnet.ifw-kiel.de/activities/events/documents_conference2010/darko_reducing-poverty-through-a-social-grant-programme-the-case-of-ghana.

Park, J., Yang, S. and Lehto, X. (2007). 'Adoption Of Mobile Technologies for Chinese Consumers', *Journal of Electronic Commerce Research* 8, pp.196 -204

Parkinson, S., & Lauzon, A. (2008). 'The impact of the Internet on local social equity: A study of a telecenter in Aguablanca, Colombia'. *Information Technologies and International Development* *4*(3), 21–38.

Peña-López, I. (2009) 'Three approaches of ICTs in development and an alert on leapfrogging' ICTlogy, #74, November 2009. Barcelona: ICTology.

Polanyi, M. (1967). *The Tacit Dimension*. London: Routledge: London.

Porter, G. (2012). 'Mobile phones, livelihoods and the poor in Sub-Saharan Africa: review and prospect'. *Geography Compass* 6(5): 241.

Portes, A. (2001). 'Transnational Entrepreneurs: The Emergence and Determinants of an Alternative Form of Immigrant Economic Adaptation'. Oxford: ESRC transnational communities research programme working paper WPTC-01-05.

Portes, A. (1995) 'Economic sociology and the sociology of immigration: A conceptual overview,' in *The Economic Sociology of Immigration*, A. Portes (Ed.), New York: Russell Sage Foundation, pp. 1-41

Portes, A., Guarnizo, L.E. & Haller, W.J. (2002): 'Transnational Entrepreneurs: An Alternative Form of Immigrant Economic Adaptation'. *American Sociological Review* Vol. 67, No. 2, pp. 278-298

Prado, P.; Camara, M. A.; Figueiredo, M.A. (2011). 'Evaluating ICT Adoption in Rural Brazil: A Quantitative Analysis of Telecenters as Agents of Social Change.' *Journal of Community Informatics*: Special Double Issue: The Internet and Community Informatics in Brazil, 2010-2011, Vol. 7 (Nos. 1 & 2).

Pratt, M.L. (1991): 'Arts of the Contact Zone'. *Profession 91*. New York: MLA, 1991, pp. 33-40

Provan, K.G., Fish, A., Sydow, J. (2007). 'Interorganizational Networks at the Network Level: A Review of the Empirical Literature on Whole Networks.' *Journal of Management,* vol. 33, 3: pp. 479-516.

Qiang, C. Z. W., Rosotto, C.M. and Kimura, K (2009): 'Economic Impacts of Broadband', in 2009 Information and communications for development: extending reach and increasing impact. Washington DC: IBRD.

Ragin, C. (1987) *The Comparative Method*. Berkeley University of California Press.

Ragin, C. (2000) *Fuzzy-Set Social Science*. Chicago: University of Chicago Press.

Ragin, C. (2008) *Redesigning Social Inquiry*. Chicago: University of Chicago Press.

Ragin, C. (2010) 'Calibration versus measurement'. In Collier, Brady and Box-Steffensmeier (eds*.), The Oxford Handbook of Political Methodology*. Oxford: Oxford University Press.

Raj, K. (2010) *Relocating Modern Science*. Basingstoke: Palgrave Macmillan.

Raj, K. (2011) 'The historical anatomy of a contact zone: Calcutta in the eighteenth century'. *The Indian Economic and Social History Review*, 48, 1 (2011): 55–82

Ramanathan, K. (2011): 'An Overview of Technology Transfer and Technology Transfer Models'. BusinessAsia.net (accessed 10.7.12 at http://www.business-

asia.net/Pdf_Pages/Guidebook%20on%20Technology%20Transfer%20Mechanisms/An%20overview%20of%20TT%20and%20TT%20Models.pdf)

Rangaswamy, N. (2007) 'ICT for development and commerce: A case study of internet cafés in India', 9th International Conference on Social Implications of Computers in Developing Countries, Sao Paulo, Brazil, May 2007

Ray, I. and Kuriyan, R. (2011) 'Information Technologies and Economic Capital'. *Information Technologies and International Development* Volume 8, Number 1, Special Issue, iii–viii

Reagans, R., McEvily, B. (2003): 'Network structure and knowledge transfer: The effects of cohesion and range.' *Administrative Science Quarterly* 48:240-267.

Rogers, E. (1993). *Diffusion of Innovations*. New York, Free Press.

Rogers, E., and Scott, K., (1997). 'The Diffusion of Innovations Model and Outreach from the National Network of Libraries of Medicine to Native American Communities'. draft paper prepared for the National Network of Libraries of Medicine, Pacific Northwest Region, Seattle, 1997

Rolleston, C. (2010): 'Educational Access and Poverty Reduction: The Case of Ghana 1991-2006' Unpublished paper, Department of Education and International Development, Institute of Education, University of London. Available at: http://www.csae.ox.ac.uk/conferences/2010-EDiA/papers/405-Rolleston.pdf (Accessed 18.5.2010)

Roman, R. (2003). 'Diffusion of innovations as a theoretical framework for telecenters'. *Information Technologies and International Development*, 1(2), 55–68.

Romer, P. (1990). 'Endogenous Technological Change'. *Journal of Political Economy*, 98(5), 71-102.

Rosenberg, N. (1970): 'Economic development and the transfer of technology: Some historical perspectives'. *Technology and Culture* 11(4):550–75.

Rosenberg, N. (1982). *Inside the Black Box: Technology and Economics*. Cambridge: Cambridge University Press.

Russell, S.S. Jacobson, K and Stanley, W.D. (1990): 'International migration and development in Sub-Saharan Africa'. World Bank discussion papers, Africa technical series, 101.

Saxenian, A. (1994). *Regional Advantage: Culture and Competition in Silicon Valley and Route 128.* Cambridge, MA, Harvard University Press.

Saxenian, A. (2006). *The New Argonauts: Regional Advantage in a Global Economy*. Cambridge, MA, Harvard University Press.

Saxenian, A. and J.-Y. Hsu (2001). 'The Silicon Valley-Hsinchu Connection: Technical Communities and Industrial Upgrading.' *Ind Corp Change* 10(4): 893-920.

Schindler, K. (2010) 'Credit for What? Informal Credit as a Coping Strategy of Market Women in Northern Ghana', *Journal of Development Studies*, 46: 2, 234 — 253

Schmelz, A. (2009). 'The Ghanaian Diaspora in Germany. Its Contribution to Development'. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), Economic Development and Employment Division. Accessed online at: http://www.gtz.de/de/dokumente/en-ghanaian-diaspora-2009.pdf.

Sen (1980) 'Equality of what?' Tanner Lecture on Human Values, Delivered at Stanford University, May 22 , 1979. Accessed 10.2.11 at: http://culturability.fondazioneunipolis.org/wp-content/blogs.dir/1/files_mf/1270288635equalityofwhat.pdf

Sen (2005) 'Human Rights and Capabilities', *Journal of Human Development and Capabilities*, 6(2)

Sen (2006) *Identity and Violence*. London: Allen Lane.

Sheller, M. and Urry, J. (2006). 'The new mobilities paradigm'. Environment and Planning A 2006, volume 38, pp. 207 – 226.

Skeldon, R. (2003). 'Migration and Poverty'. Paper presented at the conference on "African Migration and Urbanization in Comparative Perspective, Johannesburg, South Africa, June 4 – 7, 2003.

Smilde, David. (2005). 'A Qualitative Comparative Analysis of Conversion to Venezuelan Evangelicalism: How Networks Matter.' *American Journal of Sociology* 111(3).

Smith, D. M. (2009). 'Africa calling: mobile phone usage sees record rise after huge investment'. The Guardian. Retrieved from http://www.guardian.co.uk/technology/2009/oct/22/africa-mobile-phones-usage-rise

Soete, L. (1985) 'International Diffusion of Technology, Industrial Development and Technological Leapfrogging'. *World Development*, 13, 3, 409-422

Solow, R. M. (1956). 'A Contribution to the Theory of Economic Growth'. *Quarterly Journal of Economics*, 70(1), 65-94.

Solow, R. M. (1957). 'Technical Change and the Aggregate Production Function'. *Review of Economics and Statistics*, 3(3), 312-320.

Sorokin, P. (1941). *Social and Cultural Dynamics*. New York, American Book Company.

Stallman, R. (2006). 'The Free Software Movement and the Future of Freedom'. Lecture, Free Software Foundation Europe, March 9th 2006. Accessed at: http://fsfe.org/freesoftware/transcripts/rms-fs-2006-03-09.en.html

Steel, W., Webster, L (1991). 'Small enterprises in Ghana: responses to adjustment'. World Bank technical paper; no. WTP 138. Industry and finance series.

Steinmueller, E. (2001): 'ICTs and the possibilities for leapfrogging by developing countries'. *International Labor Review* 140(2), 193–210.

Takenoshita, H. (2009) 'Education and Labour Market Outcome Among Chinese Migrants in Japan. Mixed Methods Approach Using Regression and QCA', paper presented at Expert Roundtable on the Study of Strategies of Social Change Using the Method of Qualitative Comparative Analysis (QCA), Manchester.

Tambo, I. (2005) 'Poverty Reduction: the Role of National Development Plans for ICT'. Background paper for World Summit on the Information Society, 2005 (available at http://www.itu.int/wsis/documents/listing.asp?lang=en?&c_event=s|1&c_type=md|ap)

Tarde, G. (1903). *The Laws of Imitation*. New York, Henry, Holt and Co.

Thirumavalavan, R. and Garforth, C (2005): 'ICT4D and farming communities: success and failure of telecentres in Tamil Nadu'. Working paper, International Federation for Information Processing. (accessed 14.11.10 at http://www.ifip.dsg.ae/Docs/dc05_Thiru_Final.pdf).

Torero, M. and Von Braun, J. Eds. (2006). *Information and Communication Technologies for Development and Poverty Reduction*. Baltimore, MD, Johns Hopkins University Press.

Tsai, W. (2001). 'Knowledge transfer in intra-organizational networks: Effects of network position and absorptive capacity on business unit innovationa nd performance.' *Academy of Management Journal*, 44: 996-1004.

UNCTAD (2005): 'The Digital Divide'. New York: United Nations

UNCTAD (2009) 'Manual for the Production of Statistics on the Information Economy'. Geneva: United Nations.

UNDP (2001): 'Human Development Report: Making New Technologies Work for Human Development'. New York: United Nations Development Programme.

UNDP (2009) 'Impacts at origin and destination', in 2009 Human Development Report

UNDP (2010): 'What Will It Take to Achieve the Millennium Development Goals? - An International Assessment'. New York: United Nations Development Programme.

UNECA (1999): 'Developing National Information and Communications Infrastructure (NICI) Policies, Plans and Strategies: the 'why' and 'how'' (accessed 17.11.10 at http://www.uneca.org/aisi/nici/country_profiles/NICI%20in%20Africa.htm)

UNECA (2003): 'African Information Society Initiative (AISI)'. Geneva: United Nations. (accessed 12.11.10 at http://www.uneca.org/aisi/docs/AISIBrochure.pdf)

UNECA (2007): 'e-strategies: National Information and Communication Infrastructure'. Addis Ababa: Economic Commission for Africa.

UNECA (2007b): The Ghana Scan-ICT Phase 2 Report. (Accessed 17.11.10 at http://www.uneca.org/aisi/docs/GHANA%20SCAN-ICT-2%20FINAL%20REPORT.pdf).

United Nations (1998): 'Recommendations on Statistics of International Migration'. ST/ESA/STAT/SER.M/58/Rev.1

Unwin, T. (ed.) (2009a) *ICT4D Information and Communication Technologies for Development* Cambridge: Cambridge University Press.

Unwin, T. (2009b). 'Development agendas and the place of ICTs' in Unwin (ed.) *ICT4D: Information and Communication Technology for Development*. Cambridge: Cambridge University Press.

Urry, J. (2007). *Mobilities*. London: Polity Press.

Uzzi, B. (1999): 'Social relations and networks in the making of financial capital.' *American Sociological Review*, 64: 481-505.

Velenchik, A. D. (1995): 'Apprenticeship Contracts, Small Enterprises, and Credit Market in Ghana,' *World Bank Economic Review*, 9(3): 451-475.

Vertovec, S. (2003) 'Migration and Other Modes of Transnationalism: Towards Conceptual Cross-Fertilization' *International Migration Review* Vol. 37, No. 3, Transnational Migration: International Perspectives, pp. 641-665

Vertovec, W. (2010) *Transnationalism* (Key Ideas series). London: Routledge

Wahba, J., and Zenou, Y. (2009). 'Out of Sight, Out of Mind: Migration, Entrepreneurship and Social Capital'. CReAM Discussion Paper Series No. 30/09 (September 2011 revision).

Wasserman, S. and Faust, K. (1994): *Social Network Analysis*. Cambridge: Cambridge University Press.

Werbner, P. (1990). *The Migration Process: Capital, Gifts and Offerings Among British Pakistanis*. Oxford: Berg.

Williams, A. M. (2007). 'International labour migration and tacit knowledge transactions: a multi-level perspective.' *Global Networks: A Journal of Transnational Affairs* 7: 29-50.

Williams, A. M. and Balasz, V. (2008) 'International return mobility, learning and knowledge transfer: A case study of Slovak doctors'. *Social Science & Medicine* 67(11): 1924-1933

Wolcott, P., Press, L., McHenry, W., Goodman, S.E., and Foster,W. (2001). 'A framework for assessing the global diffusion of the internet'. *Journal of the Association of Information Systems*, 2(6), 1–50.

World Bank (2005): 'World Development Report 2005: A Better Investment Climate For Everyone'. Washington DC: World Bank

World Bank (2007): Connecting Africa. Washington DC: World Bank. (accessed 18.11.10 at http://siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/282822-1192592444071/ConnectingAfricaBrochure-Final.pdf)

World Bank (2009) 'About GICT'. World Bank: Washington, DC; (Available at: http://go.worldbank.org/VKHGDY6PY0)

World Bank (2011) 'Migration and remittances factbook'. Washington DC: World Bank

World Bank (2011a) World Data Bank. (online)

World Bank (2011b) Migration and Remittances Factbook 2011. Available online at: http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTDECPROSPECTS/0,,contentMDK:21352016~pagePK:64165401~piPK:64165026~theSitePK:476883,00.html

World Bank (2011c) 'Ghana Looks to Retool Its Economy as it Reaches Middle-Income Status'. Country briefing. Available online at: http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/GHANAEXTN/0,,contentMDK:22964653~menuPK:50003484~pagePK:2865066~piPK:2865079~theSitePK:351952,00.html

World Bank (2011d) 'GDP (current US$) Data in 2011'. [http://databank.worldbank.org/databank/download/GDP.pdf] Accessed August 15, 2012.

World Bank (2012) 'About the ICT Sector Unit' (accessed 10.7.12 at http://go.worldbank.org/VKHGDY6PY0).

Xu, B. (2000): 'Multinational enterprises, technology diffusion, and host country productivity growth', *Journal of Development Economics*, 62(2), 477–93

Yamasaki, S., Spreitzer, A. (2006) 'Beyond Methodological Tenets: the worlds of QCA and SNA and their benefits to policy analysis.' In Rihoux, B. and Grimm, H. (eds.) *Innovative Comparative Methods for Policy Analysis: Beyond the Quantitative-Qualitative Divide*. New York: Springer.

Yang, D (2006). 'Why Do Immigrants Return To Poor Countries? Evidence From Philippine Migrants' Responses To Exchange Rate Shocks,' *Review of Economics and Statistics*, v88(4,Nov), 715-735.

Zahra, S.A., George, G. (2002). 'The net-enabled business innovation cycle and the evolution of dynamic capabilities, *Information Systems Research* 13 (2), pp. 147–150.

Zhongdong, M. (2002). 'Social-capital mobilization and income returns to entrepreneurship: the case of return migration in rural China'. *Environment and Planning A,* volume 34, pages 1763 - 1784

Zumarimwe, J. and Kirsten, J. (2007): 'Social networks and social learning among small-scale rural non-farm enterprises: a case study in Chimanimani district in Zimbabwe'. *Labour and Management in Development,* Vol. 8.

8.1 Annex 1. Qualitative Comparative Analysis

Variables, by model: calibration and rationale

Table 8.1 Variables used in Model 1

Variable	Description	Fuzzy set calibration	Rationale
Business not older than 3 years	OUTCOME VARIABLE	N/A (dichotomous variable)	Defines a group of new entrants to the sector.
Other enterprise	The set of business that are part of a group owned by the same person	N/A (dichotomous variable)	Those who are already doing business are looking for opportunities in new sectors
Other salaried work	The set of businesses whose owner has another, unrelated, salaried position	N/A (dichotomous variable)	Public sector workers may seek to grow their savings through entrepreneurship
Formal credit	The set of businesses which have ever benefited from a bank loan	N/A (dichotomous variable)	Literature suggests formal credit is a key factors in SME formation
Informal credit	The set of businesses which have ever benefited from any other type of loan from an organisation	N/A (dichotomous variable)	Same rationale as formal credit

Table 8.2 Variables used in Model 2

Variable	Description	Fuzzy set calibration	Rationale
Business not older than 3 years	OUTCOME VARIABLE	N/A (dichotomous variable)	Defines a group of new entrants to the sector.
Migration	Set of businesses benefiting from long-distance migration	Fully in = 3 Neither in nor out = 1.9 Fully out = 0.1	Migrants who travel are more exposed to the potential commercial benefits of internet use, those going outside Africa most of all. Thus travelling outside Africa scores 3, outside Ghana 2, and outside the home region 1. Using 0.1 as the 'fully out' point weights the variable so that going outside Ghana counts as much as possible.
Non-Ghanaian contacts	Set of businesses with significant non-Ghanaian contacts overseas	Fully in = 4.9 Neither in nor out = 1.9 (more than one contact) Fully out= 0 (no contacts abroad).	Even if contacts are not yet contributing to the business, many businesses are seeking them in the hope of future contributions. The maximum observed value was 5 non-Ghanaian contacts, so that full set membership is set at 4.9. The mid-point distinguishes those with two or more contacts, judged to denote purposeful international networking.
Foreign inputs	Set of businesses that receive significant resources from overseas	Fully in = 1.9 Neither in nor out = 0.9 Fully out = 0	This variable denotes the number of contacts contributing to the business from abroad. Interviews suggest entrepreneurs are seeking to gain and use social capital via international networking. One is judged to be potentially a coincidence, and more than one to indicate that the entrepreneur is making an effort to gain resources from abroad.
Young/ uneducated	The set of businesses run by someone under 30 and/or without secondary education	N/A (dichotomous variable)	Those with relatively low social status will find it harder to do business in conventional sectors and may be seeking new venues for entrepreneurship. 'Young' is defined as being under the age of 30, according to interviews.

Table 8.3 Variables used in Model 3

Variable	Description	Fuzzy set calibration	Rationale
Breakeven	OUTCOME VARIABLE	N/A (dichotomous variable)	Does the business make a profit in an average month?
Broad networks	The set of businesses where the owner/respondent's network of contacts is diverse	Fully in =3 Neither in nor out =1.9 Fully out =0	Those with the broadest range of contacts are most likely to be able to mobilise social capital in the form of resources and problem-solving help. Those fully in the set have local, national and international contacts; the midpoint denotes those with national contacts only, and those fully out of the set claimed to have no professional networks in IT.
Formal education	The set of businesses run by formally educated individuals	Fully in=3.1 Neither in nor out= 1.9 Fully out= 0	Ghanaian high schools teach in English, the language of the IT sector. Those with more than primary-school education can keep accurate accounts, pay back loans, read contracts in English. Full membership is set as having completed tertiary education of any kind; the midpoint is those who attended but did not complete secondary school, and those fully out of the set have a primary education or less.
Formal accounts	The set of businesses which keep formal accounts	N/A (dichotomous variable)	Literature suggests formal accounting skills are key to SME viability.
Technical ability	Set of businesses run by someone with advanced IT skills	N/A (dichotomous variable)	Do they have a sideline in repairing hardware, building websites, software applications or networking computers?

Table 8.4 Variables used in Model 4

Variable	Description	Fuzzy set calibration	Rationale
Breakeven	OUTCOME VARIABLE	N/A (dichotomous variable)	Does the business make a profit in an average month
Migrated for work	Set of businesses where the owner/ respondent has worked abroad	N/A (dichotomous variable)	Any period spent working outside Africa enables people to learn different skills and approaches to business
Foreign inputs	Set of businesses that receive significant resources from overseas	Fully in = 1.9, Neither in nor out= 0.9, Fully out = 0.	This variable denotes the number of contacts contributing to the business from abroad. Interviews suggest entrepreneurs are seeking to gain and use social capital via international networking. One is judged to be potentially a coincidence, and more than one to indicate that the entrepreneur is making an effort to gain resources from abroad.
Maturity	Set of businesses run by comparatively senior members of the business community	Fully in = 1929 Neither in nor out = 1978.9 Fully out = 1991	Entrepreneurs over 30 are considered mature, senior members of the community in terms of credit eligibility and association-building. The maximum observed value was someone born in 1930, thus full membership is set at a date of birth in 1929; the mid-point is set at 1978 (i.e. someone 30 or under at the time of data collection), and those born after 1991 (i.e. 18 or younger) are fully out of the set of mature entrepreneurs.
Non-Ghanaian contacts	Set of businesses with significant non-Ghanaian contacts overseas	Fully in = 4.9 Neither in nor out = 1.9 (more than one contact) Fully out= 0 (no contacts abroad).	Even if contacts are not yet contributing to the business, many businesses are seeking them in the hope of future contributions. The maximum observed value was 5 non-Ghanaian contacts, so that full set membership is set at 4.9. The mid-point distinguishes those with two or more contacts, judged to denote purposeful international networking.

Table 8.5. Truth table: model 2

Migration	Non-Ghanaian contacts	Foreign inputs	Young/ uneducated	Number	Outcome = not older than 3 years	Consistency
0	1	0	1	5	1	0.947020
0	1	1	1	12	1	0.882300
1	1	1	1	11	1	0.880928
1	1	0	1	1	1	0.876950
0	0	1	1	1	1	0.829268
0	0	0	1	7	1	0.820365
1	0	0	1	6	1	0.741935
1	0	1	1	3	0	0.729198
0	0	0	0	3	0	0.701183
1	0	0	0	3	0	0.674923
1	1	0	0	7	0	0.642923
0	0	1	0	4	0	0.639261
1	0	1	0	3	0	0.621905
1	1	1	0	22	0	0.557583
0	1	1	0	5	0	0.543507
0	1	0	0	0	?	?

Table 8.6. Analysis of Necessary Conditions: model 2

Outcome variable: Business not older than 3 years

Conditions tested	Consistency	Coverage
Migration	0.530746	0.677850
Non-Ghanaian contacts	0.564627	0.726522
Foreign inputs to enterprise	0.506567	0.688438
Young/uneducated	0.567164	0.826087

Table 8.7. Truth table, model 3

Formal accounts	Technical ability	Formal education	International networks	Number of cases	Outcome= breakeven	Consistency
0	1	0	0	4	1	0.944444
1	1	1	0	2	1	0.866035
1	1	0	0	6	1	0.818027
1	1	1	1	8	1	0.804389
1	1	0	1	8	1	0.799397
1	0	0	0	2	1	0.794549
0	1	1	0	1	1	0.78487
0	0	0	1	15	1	0.739131
0	1	1	1	5	0	0.728033
0	0	0	0	10	0	0.695332
0	0	1	1	5	0	0.684878
0	0	1	0	2	0	0.665686
1	0	0	1	10	0	0.621543
0	1	0	1	2	0	0.618474
1	0	1	1	9	0	0.554367
1	0	1	0	4	0	0.552448

Table 8.8. Model 3, analysis of necessary conditions

Outcome variable: Breaking even

Conditions tested	Consistency	Coverage
formal accounts	0.515152	0.693878
technical ability	0.439394	0.805556
broad networks	0.525455	0.689326
formal education	0.555455	0.682936

Table 8.9. Truth table, model 4

Migrated for work	Foreign inputs	Maturity	Non-Ghanaian contacts	Number of cases	Outcome= breakeven	Consistency
1	0	0	1	0	1	0.834559
1	0	0	0	3	1	0.818672
1	1	0	1	7	1	0.814709
1	0	1	1	4	1	0.801399
1	0	1	0	0	1	0.772080
1	1	1	1	16	1	0.743525
0	0	0	0	10	1	0.708888
1	1	1	0	3	0	0.698530
1	1	0	0	3	0	0.697226
0	0	1	0	6	0	0.689600
0	1	1	1	14	0	0.676450
0	1	1	0	4	0	0.654788
0	1	0	1	13	0	0.616848
0	1	0	0	1	0	0.613184
0	0	1	1	3	0	0.598520
0	0	0	1	6	0	0.554065

Table 8.10. Model 4, analysis of necessary conditions

Outcome variable: Breaking even

Conditions tested	Consistency	Coverage
Migrated for work	0.424242	0.777778
Foreign inputs	0.526667	0.705071
Maturity	0.498030	0.714255
Non-Ghanaian contacts	0.551061	0.698483

8.2 Annex 2. Interviews

Category	Name	Organisation
International and NGO	Alan Jackson	Aptivate – NGO ICT funder, UK
	Bernadette Huizinga, Martine Koopman, Anne Marijke Podt	IICD – NGO ICT funder, Netherlands
	Eva Lokko	Organiser, Ghana Information Network For Knowledge Sharing (GINKS) and former Regional Programme Coordinator, UNDP ICT programme
	Mavis Ampah	ICT Policy Specialist, World Bank, Ghana office
	Kofi Agyen	Senior Operations Officer, Financial and Private Sector Development Department- West Africa, World Bank, Ghana office
Ghana government	AlHassan Umar	Director, Ghana IT Enabled Services Secretariat (ITES), Ministry of Communications, Ghana.
	Victor Adadjie	Ghana Ministry of Communications
Corporate	Anonymous interviewee	Senior Management, Vodafone Ghana
	Anonymous interviewee	Senior Management, Vodafone Ghana
	Mark Davies	CEO, BusyInternet, Accra
	Sarah Bartlett	Manager, Esoko (BusyInternet subsidiary), Accra
	Roberto Cossich	Data Manager, Tigo Ghana (mobile phone/internet provider)

	Herman Chinery-Hesse	CEO, BSL/Softtribe, Accra, Ghana
	Felix Hamidoo	Freelance Telecommunications Consultant, Accra, Ghana.
Individual	Anonymous interviewee 1	Internet fraud professional, Accra
	Anonymous interviewee 2	Internet fraud professional, Accra
	Anonymous interviewee 3	Internet cafe owner, Tamale
	Anonymous interviewee 4	Internet cafe owner, Tamale
	Anonymous interviewee 5	Internet cafe owner, Accra
	Anonymous interviewee 6	Management trainee, Business Process Outsourcing firm, Accra
	Anonymous interviewee 7	Management trainee, Business Process Outsourcing firm, Accra
	Anonymous interviewee 8	Management trainee, Business Process Outsourcing firm, Accra
	Anonymous interviewee 9	Management trainee, Business Process Outsourcing firm, Accra

Sample Interview 1 – two internet scammers (W & R)

Accra, 21.9.09

W: There are three things people are doing. One is friendship and internet dating. Another is credit card use (this is mainly in Accra), and the third is spam and letters, which is mainly done by Nigerians.
LT: Do you learn one kind and progress to a harder kind?
W: No, people choose a type, they don't progress from one to another.
LT: Which kind do you do?
R: I do the credit card kind. You have to get a Liberty Reserve account [he describes this as like paypal], you pay $20 to someone who will send you credit card details that work.
Once you visit internet cafes your friends will teach you. Hackers have sites where they put credit card information – the first four digits of the card, the city and the state. Then you buy one using Liberty Reserve. You use the US cards to buy things in the US only. You lie to a friend in the US to get him to receive the goods, then ship them to you in Ghana. It used to work, but now it doesn't often work. So instead we use the credit cards for 'customer service.' You create an account on Gmail, you buy cars, or containers, etc. you go to Google, look for sellers of these goods. You create an email for a shipping company, you tell the customer to contact your company with their location, information on the products, etc. The shipping company [i.e. the fake company] replies with a cost estimate. Then the customer tells you what it was. Then you tell him the shipping company will not take your credit card – so he has to run it through his card and do a bank transfer or western union. So you play the purchaser and the shipping company.
About 15 or 17 years ago the suspicion of this credit card fraud started. They investigate fast now. But for 3 days, 2 days you can get the money. We do this with the US, UK and Australia.
LT: Do you get caught?
R: It depends on your luck. One friend never got it to work, but you can make $5,000. A card doesn't last more than a week.
There's no victim in this crime. And if the police arrest you, you just tip them.
W: I join US dating sites using a credit card [again stolen via liberty reserve and hackers' lists]. I get a man, a 'client', give him female pictures from a porn site. We use mainly UK sites for this, because UK money is valuable. You make him love you more, then give him bill. First, internet bill. Then hospital bill – your mother has lung cancer.
Or, you're American and you send a picture of a white girl. You work for NGO, travel to Ghana for a contract. Then you have a problem – you were robbed, etcetera. Your card was frozen. If they want to talk, you can use 'magic jack' [a program like Skype]. With males, we get a girlfriend or sister who can do the talking. I do it myself though [does a convincing girl's voice].
LT: Is the client always white, or do you try African-Americans too?
W: African Americans do it too, not just white men. You look for Latino pictures. If the picture is too white they wouldn't fall for it. [because their language/accent is imperfect] So use Latino girls. You want to do college, cost $6,000 or something. Money for passports, visa fee, $350. Then he sends ticket money, say $2,000. You say you are coming with gold or diamonds from your family. You give the correct flight information, then you say the declaration fee [customs] is $50,000 or $20,000 for the gold. Say you are shipping gold. Most of the clients, when you get to gold side, they say they don't have it or stop talking. Chatting gets more money, but takes longer time. 3 months to get some money.
I have been doing this 3 or 4 years [they are both 24]. I had the idea on my own. It's all about trust – just like love. We do regret. A lot of times we confess. We feel bad, we have scammed them. My

last client, I apologised, showed him myself on the webcam, and he forgave me, and we are friends now.
Most clients are truck drivers.
LT: Do the dating websites look out for potential scammers?
W: The websites block Ghanaian IP addresses, so you use Anonymiser to hide your IP.
LT: Do you ever do gay chatting?
W: It's not common – all the gay sites know about scamming. I will quit soon. I would like to travel out. My aim is to be an actor or a program host in Europe. Europe is OK for me. I like the lifestyle there. I also studied computer networking.
R: I have always wanted to be a computer engineer. I've studied, I'm still working towards it. But you can't do it here in Ghana. It's who you know. I feel like, before I can quit this, I have to travel out. I tried to get a US visa last year.
W: To quit is to travel out.
R: IF you quit, you have to travel out.
LT: Have you travelled before?
W: I've been to Nigeria, Togo, Benin, Cote d'Ivoire, Mali.
R: I went to China. I did online ticketing through fraud. Hotel, everything. I went to Shanghai to see a friend from Ghana who had been living in China for a long time. It was interesting – a different culture. Shanghai was amazing. It's a business town – you meet the whole world. I stayed 21 days.
LT: Do you feel different when you come back?
R: You feel different when you come back. In Accra, landing, all the buildings were very small.
W: I am planning to travel to South Africa, the UK. It's a European lifestyle. You have the most fun in South Africa. I'm planning to go next month.
LT: Would you stay or would you return to Ghana?
W: I would come back. I'd open a big supermarket, or a nursery school. When I travel outside, I will spend 8 or 9 years. So by 32 years I'm back.
R: I'm also in the export/import business. I have a brother in Japan who ships motorbikes, and I re-sell them. I am not planning to spend more than 5 years outside. I would like to get married, go and come.
W: I have sent 2 sisters and one of their husbands to Germany [with the money from scamming]. I started a business for my father. I feel like I have to help them.
R: A lot of people do good things with the money – those who want to quit.
W: I have gained from it. It's OK if I quit. I have sent my family to Europe. If I should get a visa I'd quit. [explains that he can't get a visa. Both have tried to get UK visas but can't.]
LT: What about sakawa?
W: Those doing the ritual money – sika aduro – are scamming locally. They aren't online.
R: Those guys use scamming as something normal to cover up what they are doing – to camouflage the ritual aspect. Blood money people (Ghanaians and Nigerians) pose as scammers to cover up what they are doing.
W: Another side of it is scammers sometimes apply the ritual thing – if you have someone who won't pay, you can use juju to push them. It's mainly for guys without good English. Those who aren't good at what they do. You go to the juju man, give him exact details of the person [the client], he charms them by chanting.
LT: Does juju work on Europeans?
W: Juju works on Europeans. It works on everyone. It's the Christians that do this, not the Muslims. It's against our religion.
LT: Have you ever done it?
W: I have done it a little. Just when it's necessary to push someone.
LT: Does it work?
W: Oh yes, it works.

Sample Interview 2 – Mavis Ampah, ICT Policy Specialist, World Bank, Accra.

LT: how is the Bank engaging with the ICT4D perspective?
MA: I think on the Bank's side, I'm not sure whether it's good or bad, we take a broader perspective of the sector. And so our engagement initially was – I think we've had a very longstanding engagement. We go way back when it was just one fixed network, you know, and so the Bank was engaged in the early reforms – how do we liberalise the sector so there's competition, so that you can lower the prices so that more people can have access to telephones at competitive rates. Back in the 90s. The Bank provided the support for the privatisation, and then subsequent reforms in terms of the first telecom policy, then supported the ICT4D policy as well. I think it's fairly well documented. But I think the emphasis has been on the competitive nature of the sector. Making the regulations at least function, and the capacity for the regulator to be able to manage the sector, to strengthen that and to be sure that at the end of the day we're not using public resources, that they private sector is able to really engage in the sector and really roll out to rural areas. And so, the Bank's general strategy is that we will only invest where the private sector is uncomfortable or unable to invest. And so our universal access strategy has been really to focus on where is the least cost subsidy for any country, any region where it's underserved and the users are unable to afford the competitive rates. In the case of Ghana, if you look at the growth trend, it's been really tremendous even though – in 2003 I think the penetration was about 5%, in 2009 it's over 50%. Of total penetration, but it's about 90% mobile. But we're talking about – fine, the latest NCA statistics was about 10 million mobile phones, which means about another 10-15m people are without phones. But voice is just one side of the story. What you're looking at in the cafes and all that is also the data side. Which is very much lacking in Ghana.
LT: Is the Bank engaged with that at all?
MA: Well, we have been – there's one side of our work that focuses on the policy, the regulatory environment, then there's the other side that looks at investing in infrastructure. But again, only where through public private partnerships where the objective is just to stimulate the private sector investment, assuming that they cannot go it alone. In the case of Ghana we had the second privatisation of GT, I'm not sure if you followed, one of the issues was that the government also, well GT also had obviously the most widespread backbone in Ghana, so the initial discussion had been the perhaps to carve it off and have it managed privately, but on an open access basis. That was the bank's view. It didn't work as part of the privatisation, I think the outgoing government at the time decided to sweeten the deal to put it as part of the sale, and so that didn't work and so the Bank pulled back on that. Because the Bank and the IFC were both interested in supporting the government on a national backbone, that said Vodafone on its own has separated the backbone operations from the main operations and also have created this national backbone company. So, it's not ideal, but they're still proceeding with a national backbone company which is presumably supposed to be open access – we haven't really seen the details of it.
LT: Monopoly?
AM: I don't know what monopoly you're talking about. I'm talking about the Sat3 cable. The monopoly actually exhausted in2006
LT: but effectively they have the, I'm not contradicting you, effective3ly they have the monopoly.
AM: The other cables are expected to land any time soon. Glo has a license to land anyway. So I think by the end of the year all of this discussion will not be necessary. So I think whether or not in they have the monopoly, the reality is that Glo has a license to land a cable in Ghana, so I think on the international leg it's very possible that the competition will reduce the prices. And so in terms of widening the access to internet, I think there will be a tremendous difference. As to whether the access to the infrastructure translates necessarily into productive use of ICT, is a separate story.
LT: How is the Bank interpreting ICT4D in Ghana, what are the benefits we see happening?

AM: We have several entry points. One is that we're focusing increasingly on skills development using ICT. To a large extent we are focusing on vocational skills, but we're also engaging with the tertiary institutions to see how we can use ICT to improve their skills. At a different level we are working with government to introduce more ICT use into government systems and operations with the objective that at least the users will have better access to information and can engage better with government. And then on the SME side we have some grant programs and incubation programs that are expected – it's all pilot, I don'[t think it's a silver bullet to really address all the ICT for development issues, but certainly it's really a pilot program that is expected to provide some limited funds to incubate small and medium ICT-oriented businesses. So it's at several entry points, but at the same time we're working with the Ministry of Communications on an implementation plan for the ICT for development, because when they developed the ICT for development policy there was really no implementation plan. So we are working with them now. We have a project called e-Ghana... through that we have provided some resources for the ministry to work with consultants to really articulate what they intend to do in terms of really mainstreaming ICT at all the different sector levels.
LT: Lack of clarity among the government about what they might get out of ICTs.
AM: I think – I am still sceptical that that's a priority for government, as much as we all have good intentions. One thing that certainly we've been trying to get the government to focus a little more on is really the potential impact of ICT for development. With previous governments I don't think we were very successful.
LT: what impact?
AM: Bringing it to the level of migration, that every Ghanaian would be employable wherever they are. One of the reasons we have the ITES is that we realised that a lot of the young Ghanaians are fairly savvy with IT skills but really in a very unstructured way. So we started on a limited scale, we had some consultants develop some standards for an IT enabled services sector, on which we're expecting to train about 6,000 youth. Either from the tertiary, from vocational schools, to really be engaged in business process offshoring, data transcription, medical transcription – a lot of them, I think the challenge is really knowing where to target, because the problem is so pervasive at all levels, so that for us with our counterparts in government, I think the biggest challenge they had, was all these kids who are getting out of high school that just need a little bit of top up training to be employable – let's start from there. Most of them just require about 2-3 months of training in data entry, in the very low end of outsourcing. And we do have a lot of potential in Ghana, you know, one of the largest insurance companies in Ghana for example, is processed here. There is potential for virtual migration, which we have not even harnessed. I think [migration] it's a bigger problem, and more challenging to target. Those who would like to stay still don't have the option to. So for us, we're really looking at outsourcing in Ghana. Which, you were referring to India for instance, it's really virtual migration. If you create the opportunity and build the skills, it would be able to absorb quite a number of the employable skills in Ghana. So that's one area under the e-Ghana that we're really working very actively, and we have an industry association that is targeting, on a very small scale, 40,000 jobs in the next couple of years. So part of this training that we're working with the government on is really to be sure that they have the minimum skills when the opportunity comes. As I'm sure you're aware, we went through this discussion with government that do you train in anticipation of opportunities, or do you create the opportunities in anticipation that when it comes you will train? So for now, we still don't have the right strategy.
LT: What is the government's response to that question now?
MA: I think it's not entirely a priority. There are just too many problems, that even within the Bank, ICT tends to be an elitist – this is off the record – so it's very difficult, but it's getting better that we can work without agric colleagues that we can actually improve the output and the delivery and the market access., I think now within the Bank it's improving. 2-3 years ago I probably would not have given the same response. But I think the issues at least that we're beginning to work together a bit more. Just this morning I have a proposal from my health colleagues saying how can we use ICT

to improve access to information in the health sector. So I think we are beginning to work together. That said, when you come to Ghana, you have power shortages, you have water... For government it's difficult to get on the radar screen. And even for the bank. So we continue that uphill battle, it's always making the case that look, if we did things a little bit differently the outcome could also be a little different.
LT: How would you gauge success in your job now?
MA: I think if the average person in Ghana could have access to every government information in a transparent way, could participate in governance, if an SME could recognise that the productive use of ICT, if the rest of the world could actually – if Ghana could position itself that if you came to Ghana today, you can get all the skilled labour that you want for your work – that would be success.
LT: Hierarchy of needs?
MA: A lot of it is on skills. For me, skills skills skills. AT Kearney, one of the international rating agencies, did a review of the most attractive locations to do IT and IT-enabled services, business outsourcing. Ghana came out number – they ranked 50 countries globally, and Ghana has been progressively going up the ranks. The first time they did this 3 years ago Ghana was #25 or so. This year it moved about 10 – 12 levels. It's based on several things, the financial attractiveness, the people skills, the business environment. Ghana in terms of the attractiveness of the financial attractiveness, basically having the resources, being able to mobilise investments, Ghana came out #1, of 50 countries globally. Ahead of the US. Guess where Ghana placed on skills? 50 out of 50. So it shows you the extent of the problem. When you think of migration, I'd like to look at it from two angles. That the perception that there are no opportunities depends on what skills the person is bringing into the industry. And where we have not managed to build any skills, there will continue to be that perception that there are no opportunities. Whether it's here or anywhere else. Having also lived on both sides, you look at the entry points of a lot of migrants from Arica and what they have to go through when they've migrated, the degree of challenge depends on what skills they bring into the system. The reason why Indians have a much easier time surviving in other countries is because they come with a lot of skills. And so you begin to look at the question again, fine it's not - there really is no correlation between having skills and staying in your own country – it depends on the country context. The Indians who have migrated are coming back to create businesses. Why is it that Ghanaians are not investing in Ghana? That's a broader question. It's all policy, it goes beyond the ICT discussion. I work also in Nigeria, ad in spite of all the bad rap that Nigerians get, they invest in Nigeria. Nigerian returnees invest more in Nigeria than Ghanaians. Ghanaians do not invest, even after they have travelled. So I think there's a broader issue.
I came through IOM. I am probably one of the few who came and stayed. But I remember my first time around, there was a group of us who came through the IOM and the requirement is that you stay 2 years at least in your own country. So long ago, I can't remember [which program]. I was not with the Bank – I had just got a short term consultancy, I had just got out of graduate school, and I was required to find a job before the assistance would come. So the Bank arranged for me to come to Ghana, for a two year assignment. But then I stayed. After about 6 years I got fed up, and I left again to the US.
LT: Why?
AM: I guess for the same reason that a lot of returnees leave, there's very little political neutrality here and you get frustrated easily when you come from outside and you're really neutral. So depending on – when there's a transition between governments, if you're neutral it's perceived that you're not for this particular government. So either way you're likely to step on somebody's toes. Returnees come in have a serious problem with that, because a lot of them come really neutral. So I think it's an unsaid undiscussed issue, but a lot of returnees come because they really want to come back home, regardless of what the political situation is, or who is in power. Of course everyone has their own inclinations, but for me, I just got fed up because I had worked under a different government, another government would perceive that you were still quite aligned with the previous one. So I got fed up and left. If you look at most of the larger institutions in the financial sector, in

the telecoms, I would put my last salary on it that about 90% are returnees. So there's something about – people want to be home. Staying home is a privilege. So the environment often does not support that. I am from the Central Region, Cape Coast.
LT: I have a geographic question, it feeds into WB policy but also your personal perception. It seems the digital divide is not always between Ghana and countries that have more ICTs, it's between the North and the South.
MA: It's not only the digital divide. All kinds of divides. The Bank now is looking at Northern Development Strategy. That has a lot of history. A lot of it's down to the British. But that's not to say that it should not have been addressed. A lot of the clashes that are currently – you keep hearing of the clashes in the north, it has some basis in the north being neglected all this time. Every country in Africa has its north and south. Ghana is not peculiar. But I think that's likely to change now because you have more northerners in government. You have a vice president from the north, who was the former Minister of Communications. You have the Minister of Communications from the North, who is an MP in the North. So now we talk of outsourcing centres, he said 'if you don't put one in the North, don't come to my office.'
LT: How is that going to happen given the level of living standards in the North?
MA: I'm not sure if this is anecdotal or factual but the minimal development that you see in the North came when this administration was on the first time. So I suspect that it's going to continue. In their manifestoes of course they say all sorts of nice things, but I haven't really seen any efforts. On the Bank's side there's really increasing effort to develop programs up North. You've really hit the nail on the head – it's really a big problem. The North is a little bit worse than Volta, the issue is that it's also a cultural divide and a perceptual divide. Even when I was growing up you would hear racial slurs, you still do. It's religious, it's cultural. Even the way the South calls the North is very derogatory. [re: husband's show] in Sunyani, they walk across the desert. And about 90% don't make it. So one of the guys who made it came on his show to try and discourage other people from going. So he said he went with a guy, and he was talking – these are the perils that you go through. And the question, staring at him, the questioner said, 'but you survived, that's the most important thing.' So he said, I give up. I can't convince these guys. When I was in the US a lot of people would write, I want to come. And I would say I want to come home, why would you want to come? They said, just because you got the opportunity you want to discourage us from coming, and I said, that's not the point. What you said that's most interesting, is that multiple visa opportunity. I strongly believe that any country with a lot of exposure is so much better off. Trying to stop the flow makes it worse. The people who come back, there are simple things. In my neighbourhood I am constantly fighting, don't put this on the ground. Then my husband is saying honey they don't know that that's wrong. How many people can you convince? I feel ok, let this person go and live anywhere for 3 months, go to Singapore, and know that if you put a piece of paper on the ground you could be jailed. I keep making the case that I became more passionate about my country from another country. I almost kissed the airport when I got back. I didn't care. My husband said, honey are you ok? because the dust – but it smelled so good. Now I see my daughter, she just finished Brown, she had said I'm not going back. But the day she graduated from Brown, she said Mummy, I'm not going back. She's starting work with Price Waterhouse tomorrow. When there's lights off she says, 'this is so serene'. They have a different perspective. [discussion of price of migrating undocumented to UK, 3,000 pounds.]
MA: that I find inexcusable, if you have 3,000 pounds, I know what I could do with it. [When people contribute to someone's migration costs] it increases the responsibility. Now he [Latif] is obliged to the whole of Tamale. When I was growing up my mother would say, whatever service you cannot pay immediately, do not take it in Ghana. It's not only the explicit interest, but the rest of your life you are going to have to pay for it. So you almost have to have that very strict rule that in Ghana, everything comes with a very high price. And a lot of it, we have a very destructive culture as well. There are good aspects that I'm very proud of, but it really has a lot of negative implications for running a business. My sister runs a hotel in Kumasi, when we stay there we insist

on paying. And she has a problem. She says why do you have to pay you're family? I say, I don't want you to come to Accra and then I have to feed you. They think I'm crazy. But I really don't want to get into that. If I want to stay with her, I'll stay with her at her house. That's different. But if I go to the hotel and I want a room I don't see why it should be for free. When my husband is having his shows, everybody in Ghana will send a note, can you give me a free ticket? These are the rich people. We have this culture. In the US, your friends would support you, they would actually patronise and pay so that you will do well, but here everybody – you can imagine, he does it at the National Theatre, there's about 1,500 people. Almost everyone would want a free ticket. So I really worry, how do SMEs survive? You have to be mean. I mean, some of the things returnees get away with, they think we're all crazy so we can get away with anything. My sister called, said there's a funeral this Saturday. I said, do we know this person? My mom passed away about 5 years ago, my sister says, oh she came to mother's funeral. I said, 'so?' She said that's why I don't like talking to you about these things. You're supposed to come to the funeral. I said, no. I only go to funerals of immediate family. She said, you have to learn this culture of extended... I said no. I see my kids, they've been exposed to... they are extreme. They don't bring one single gift to my family. I say, I'm going to get into trouble. At least buy them something small. They say, why should we give them anything? So my youngest daughter who's at UPenn came to visit, I said at least call my sister she's at xyz, she said mummy, she's your sister, not mine. So things are changing. And more people are exposed... I'm not saying we should break the culture, but I think we need a little bit of individualism here. The extended community does help. That comes in handy. [But] obligations are multiple times worse. We call ourselves class of 80, whatever, depending on when we returned. And people who have been here even 10, 15 years have a different perception on what the priorities are in Ghana, what they can do to support Ghana, it's about Ghana. And I think we all picked it up from outside. Of course you pick up not all the good things as well.

LT: The ICT4D literature is this body of stuff that doesn't relate to what's happening on the ground.

MA: Yes.

LT: Stuff that's happening on the ground doesn't relate to those academic levels either.

MA: ICT for development unfortunately looks at what are the millennium development challenges, how do you link ICT with poverty reduction, so more on the theoretical macro-level. Off the record I find the Bank quite restrictive in that sense. A lot of development partners as well, you see more the NGOs and the small development institutions actually are a little bit more effective in getting onto the ground than we are able to. I had some discussion with one of my EU colleagues a few years ago, and I said, why aren't you u supporting us on ICTs? They said, we have to see the EU stamp on anything that we support, otherwise it doesn't make sense for us. So I think implicitly we like the sexy projects. It's branding, where you can see the EU car, the 'World Bank supported'... personally, it's funny, I have my work at the bank, but personally I feel I have to work at the community level. So I separate the two. Otherwise I feel quite unfulfilled. Because I feel my work at the Bank does not allow me to reach out to the people that really need the help. I think they do a lot of good, there's no doubt about that. If you can focus on – my background is in policy, so for me I think it's very useful when you have that vision, and when you have the policy direction and you can set the vision, and then you can have the right people implement, I really strongly believe in that. I think the Bank helps a lot in really making sure the environment is right. Even so, working with governments – I'm originally from Ghana, I'm only here for one year, nationals are not supposed to be in their own country.

LT: Are they going to send you to Nigeria?

AM: Pray not. Probably Benin or Cote d'Ivoire. I am looking at those two. My husband is still here, he refuses to go anywhere. And I was in DC for the last 5 years, and the long distance is just a little bit too much. So I asked for a year. [discussion of not liking DC any more]. But being a Ghanaian, working from the Bank, knowing how Ghana works and the Bank works, I find it very useful because you are immune from the local politics and at the same time you can really influence policy. So I think it works, but the Bank doesn't always think so. On the policy level, I think the

Bank is fairly... and in terms of providing resources for addressing some gaps, I think. Those who migrate, a lot of the investment goes into construction not business. So I'm not sure that access to credit necessarily translates into business. [LT challenges this] if you walk around East Legon, again this is anecdotal, every other building is under construction, find who is building it. But it's the environment that also spurs this type of investment. We don't really have adequate instruments for investment enough that the SME becomes comfortable.
LT: I'm talking about pre-migration need for credit driving migration, not desire for new house but shocks.
AM: That's true.
LT: Credit here is expensive and short term – it has a bad image. They look abroad instead.
AM: The financial sector here is really SME-unfriendly. In fact, how do you even define SME? From the Bank's perspective and from IFC, we get accused all the time that – I had Busy Internet here accusing us that we think $2m is an SME. From the IFC, they've been trying to get IFC investment. From IFC's point of view it takes as much effort to process under $5m transaction as it takes to process $50, $100m. So the whole strategy for Africa, it's only recently that they've been really hammered to lower the threshold that they're beginning to look at it. How many IFC investments are here? Zilch. Then they will ask you for some cofinancing, you know if we put in one you put in one, and SMEs cannot afford that. They are too small. And on purpose, MSME and the e-Ghana we're trying to have some small grants. But they're very small, and this is a big issue. So under the e-Ghana process we have $3m grants, that's just a drop in the bucket. It's unfortunate that we really don't have the instruments at the Bank – I think it's the small NGOs that are really making an impact at the grassroots level. Because they seem to fall outside of the radar screen of the World Banks and IFCs. On the CICs we looked at and under e-Ghana, the project that I'm managing, it really did not make much business sense. Personally, I am really sceptical about government just throwing away money, without really thinking through the process. So we looked at a couple of them, and I was very sceptical that if we threw more money... We were there at the start, but we assessed and our e-Ghana pack states very clearly that at midterm we would review it again. And see if the model makes sense. The start was 2.5 years ago, and midterm is this December. So we looked at the model and we weren't very – UNDP had just thrown in some funds early on, we looked at the business model, government was just putting all these buildings, we looked at it and we said we could not justify this, throwing more money into it. But the government at the time was really emphatic that we should support this and we said, ok, to be politically correct let's just say that at midterm review we will come back to it and see if any of them are profitable, and if there's some financial gaps, then we would...
LT: As far as I hear there are very few still functioning.
MA: It's so funny, we hear a very different story from the ministries. They are still making the case for us to support them. And for me, I think it's a bit of sending the wrong signals when these guys you've been talking to have been using every little penny that they have to run their own internet cafes, and we go and give money to government to throw it away on CICs. There are a couple in Accra that I've been to, and I was not impressed. It wasn't very clear, the sustainability of this. For a Bank project, we really have to make the case that it's going to be sustainable once the Bank pulls out. And we just couldn't make that. There were a couple – one was on the backbone, here, and we pulled out because again we weren't very comfortable. One thing that the Bank does well is where it feels that there will be some – we cannot really justify the sustainability and that we are crowding out the private sector, it becomes an issue.

8.3 Annex 3. Questionnaires and survey instruments

SME Survey Questionnaire – Ghana, 2009

Date of interview
District
Town
Business name
Interviewee
Interviewee/business phone
Interviewee/business email
Population of town
Literacy rate in town/district

SECTION 1a: Person 1's migration history This first section is about any travel you have done in the past.						
1. What is your position? (if not owner, also use section 1b)						
2. What is your DOB?						
3. Were you born in this region or elsewhere?						
4. What is/was your father's profession?						
5. What is/was your mother's profession?						
6. Why did you not go into your family's business?						
7. What is your level of education?						
8. Have you travelled outside the region of your birth? (if not go to next section)	☐ Yes					
9. Have you spent more than six months outside that region?	☐ Yes					
a) Which regions/countries?	1.	2.	3.	4.	5.	6.
b) When? (which years?)	1.	2.	3.	4.	5.	6.
c) Alone or with others?	1.	2.	3.	4.	5.	6.
d) How long for? (months)	1.	2.	3.	4.	5.	6.
10. Why did you go?	1.	2.	3.	4.	5.	6.
11. Have you ever travelled internationally without all the right documents?	☐ Yes					
12. Notes						

SECTION 1b: Owner/manager's migration history						
13. What is their position?						
14. What is their DOB?						
15. Were they born in this region or elsewhere?						
16. What is/was their father's profession?						
17. What is/was their mother's profession?						
18. Why did they not go into your family's business?						
19. What is their level of education?						
20. Have they travelled outside the region of their birth?	☐ Yes					
21. Have they spent more than 6 months outside that region?	☐ Yes					
a) Which regions/countries?	1.	2.	3.	4.	5.	6.
b) When? (which years?)	1.	2.	3.	4.	5.	6.
c) Alone or with others?	1.	2.	3.	4.	5.	6.
d) How long for? (months/years)	1.	2.	3.	4.	5.	6.
22. Why did they go?	1.	2.	3.	4.	5.	6.
23. Have they ever travelled without all the right documents?	☐ Yes					
24. Notes						

SECTION 2: Business The next section is to do with your business – how it was established and what kind of hardware you have.						
25. What services does this business provide?						
26. How many employees do you have?						
27. When was it established?						
28. When did the business first get an internet connection?						
29. How many computers do you have?						
30. When were the computers bought?						
31. Were they imported directly by yourself or someone else at this business?	☐ Yes					
32. Do you have a generator?	☐ Yes					
33. How much does your ISP charge each month?						
34. How much do you charge per hour of internet time?						
35. Avg time spent online?						
36. Average monthly revenue						
37. Average monthly expenditure						
38. Where did the money to start this business come from?						
39. Are you involved in other businesses as a manager or investor?	☐ Yes					
40. What kind of businesses?						
41. Which is most important to you financially?						

42. Notes						
SECTION 3: Connectivity The following section is about how easy it is to run an internet business in Northern Ghana, and what kinds of problems you face.						
43. Do you have a dialup or broadband connection?						
44. Who is your ISP?						
45. Do you have VOIP?	☐ Yes					
46. Is your business officially registered?	☐ Yes					
47. Do you have any friends or contacts in government?	☐ Yes					
48. Have you had any problems with local or national authorities?	☐ Yes					
49. If yes, how were they resolved?						
50. What would make it easier to run your business?						
51. Notes						

SECTION 4: Networks This final section is about your professional network – who you know, and where they are located.						
52. a) Are you a member of any business associations?	☐ Yes					
b) if yes, which? (note where)						
53. Do you have any friends, family or contacts outside Ghana?	☐ Yes					
54. Where are they?						
55. Do they ever help you with this business?	☐ Yes	☐ Yes	☐ Yes	☐ Yes	☐ Yes	☐ Yes
56. If yes, how?						
57. How did you meet the contacts who are not family – abroad or here?						
58. How many of your contacts based in other countries are Ghanaian?						
59. Notes						

Network Survey Questionnaire – Ghana, 2009

Date of interview
Place
Business name
Interviewee
Interviewee position
Interviewee phone
Interviewee email

1. Name									
2. Date of birth									
3. Sex	☐F								
4. Nationality									
5. In what country were you born?									
6. What is/was your father's									

profession?									
7. What is/was your mother's profession?									
8. What is your level of education?									
9. a) Have you spent more than six months outside the region where you were born? (If no, go to section 2)	☐ Yes								
10. Have you travelled outside Ghana? (if no, go to section 2)	☐ Yes								
11. a) Where, outside Ghana, have you travelled? (each trip one box)									
b) Did you go for education, work, a family visit or other reasons?									
12. a) Have you taken a course abroad? (if no, go to Q13)	☐ Yes								
b) if yes, at what level?									
c) in which country?									
13. a) Have you	☐ Yes								

worked abroad? (if no, go to Q14)									
b) if yes, how many jobs have you worked in outside Ghana?									
c) which countries did you work in?									
d) what kind of work was it each time?									
14. How many times a year do you travel outside Ghana?									
Notes									

SECTION 2: Group membership and migration capital **Now I'm going to ask you some questions about any associations you belong to, and how international those are.**									
15. a) Do you belong any associations, professional or otherwise? (if no, go to Question 16)	☐ Yes								
b) what is each of them based on – for instance, work, sports, social, or educational associations?									
c) where are they located?									
d) how do you stay in touch with other members?									
e) which is most important to you professionally?									
f) How often are you in contact?									
g) What proportion of members are Ghanaian?									
16. a) how do you use your professional contacts from outside Ghana - to raise investment, buy hw or sfw, get ideas or support for technology, or other things?									
b) are these contacts abroad primarily from family, education, work, or other things?									

SECTION 3: Professional networks (name generator)									
19. Who are your closest professional contacts? (20- may involve same names as (19) or different)	20. Which of these are you in contact with more than once a month?	21. Whom do you talk to when you need advice on technology problems?	22. Whom do you talk to for new ideas to do with technology ?	23. Whom do you talk to for financial or investment advice?	24. Whom would you talk to if you wanted to find a new job?	25. Who are your most important professional contacts outside Ghana?	26. Where does this person live?	27. How did you meet them?	28. How do you stay in touch?
1.	1.	1.	1.	1.	1.	1.			
2.	2.	2.	2.	2.	2.	2.			
3.	3.	3.	3.	3.	3.	3.			
4.	4.	4.	4.	4.	4.	4.			
5.	5.	5.	5.	5.	5.	5.			
6.	6.	6.	6.	6.	6.	6.			
7.	7.	7.	7.	7.	7.	7.			
8.	8.	8.	8.	8.	8.	8.			
9.	9.	9.	9.	9.	9.	9.			
10.	10.	10.	10.	10.	10.	10.			
11.	11.	11.	11.	11.	11.	11.			
…40	…40	…40	…40	…40	…40	…40			

Internet user survey (offline version)

PLEASE READ THIS TO RESPONDENT BEFORE BEGINNING THE QUESTIONS:
This survey is designed to gather some basic information on your use of ICTs, and what you feel they are contributing to Ghana. It is for academic research purposes. Some questions are about the internet specifically, and others are more general (phones, computers, newspapers etc). In return for your time, you will receive one cedi. Your answers will be anonymous, and you will not be tracked or contacted about them.

1. – BEFORE BEGINNING THE QUESTIONS – IS THE RESPONDENT:

☐ male ☐ female

2. WHAT IS YOUR AGE?

☐ under 14 ☐ 15-18 ☐ 19-25 ☐ 26-30 ☐ 31-40 ☐ 41-50 ☐ over 50

3. WHAT IS YOUR LEVEL OF EDUCATION?

☐ primary ☐ JSS ☐ Arabic school ☐ SSS ☐ first degree ☐ diploma ☐ masters ☐ phd

4. ARE YOU CURRENTLY A STUDENT?

☐ yes ☐ no

5. DO YOU USE THE INTERNET FOR ANY OF THESE THINGS: (CAN BE MORE THAN ONE ANSWER)

☐ academic research	☐ emailing people you know	☐ asking somebody for money
☐ dating	☐ school/exam registration	☐ learning about ICTs
☐ international news	☐ finding schools/work in Ghana	☐ national news
☐ videos/music	☐ to teach someone about ICTs	☐ finding schools/work abroad
☐ doing business	☐ contacting friends/family abroad	☐ making new friends

6. HOW OFTEN DO YOU USE THE INTERNET?

☐ daily ☐ weekly ☐ monthly ☐ less than once a month

7. WHAT OTHER SERVICES DO YOU EXPECT FROM AN ICT CENTRE?

8. NOT INCLUDING YOUR EMAIL, WHAT OTHER SITES DO YOU VISIT WHEN YOU BROWSE?

9. HOW IMPORTANT IS EACH OF THESE TO YOU?

Mobile phone	☐ very important	☐ quite important	☐ not important
Internet	☐ very important	☐ quite important	☐ not important
Newspapers	☐ very important	☐ quite important	☐ not important
Television	☐ very important	☐ quite important	☐ not important
Radio	☐ very important	☐ quite important	☐ not important

10. ARE ICTS CHANGING THINGS FOR YOU OR THE PEOPLE YOU KNOW?

11. HAVE ICTS CHANGED THE WAY YOU DO YOUR WORK?

☐none of these answers

13. HAVE YOU TRAVELLED OUTSIDE GHANA? (if no, skip to question 17)

☐ yes ☐no

14. DID YOU TRAVEL FOR MORE THAN 6 MONTHS?

☐ yes ☐no

15. WHICH OF THESE DESCRIBE THE PURPOSE OF YOUR TRIP? (CAN BE MORE THAN ONE ANSWER)

☐ business ☐tourism ☐ education ☐family visit

16. WAS YOUR TRIP TO A COUNTRY OUTSIDE AFRICA?

☐ yes ☐no

17. IN GENERAL, DOES USING THE INTERNET MAKE PEOPLE WANT TO TRAVEL?

☐ yes ☐no ☐ don't know

(IF YES, WHY?)

18. DO YOU PLAN TO TRAVEL OUTSIDE GHANA? IF SO, WOULD IT BE FOR: (MAY BE MORE THAN ONE ANSWER)

☐ education ☐ business ☐ tourism ☐ not planning to travel

19. IF YOU DO PLAN TO TRAVEL, WOULD YOU RETURN TO GHANA:

☐ temporarily (keep travelling) ☐ permanently ☐ would not return to Ghana

☐ not planning to travel ☐ don't know

20. IS THE INTERNET BRINGING ANY POSITIVE CHANGES TO GHANA?

21. IS THE INTERNET BRINGING ANY NEGATIVE CHANGES TO GHANA?

22. IS INTERNET ACCESS IMPORTANT FOR GHANA'S FUTURE? (IF YES, WHY?)