THE EFFECTS OF MOBILE PHONES IN SOCIAL AND ECONOMIC DEVELOPMENT: THE CASE OF FEMALE MICROENTREPRENEURS IN CHENNAI, INDIA

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ABSTRACT

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This dissertation participates in the grand debate on whether ideas or technology change social structures that affect the lives of individuals. At its broadest and based on its findings, this dissertation makes the argument that neither ideas nor technology takes precedence. While technology can drive economic and social changes, it cannot do so in the absence of human agency. Insofar as technology drives social change, it does so by amplifying human intent and capacity. Through an examination of mobile phone use by 335 female microentrepreneurs in Chennai, India, this dissertation found that: (1) microentrepreneurs who are highly motivated to grow their businesses experience higher business growth, demonstrating a fairly strong link between attitudes and desired outcomes; (2) business growth is a function of both the use of mobile phones for business processes and the entrepreneurial intent to grow one's business; (3) the economic consequences of mobile phones use may sometimes be over-estimated by the users themselves; and (4) the social use of mobile phones may have a social development outcome in that female microentrepreneurs who use mobile phones for social purposes more frequently also reported a greater sense of self-worth. This dissertation also contributes to the Information and Communication Technology for Development (ICT4D) field by introducing and testing the concept of *mattering*, a construct that measures self-perception of how significant one is to

others. The generalizability of the findings in this dissertation is limited in part by the cross-sectional survey method that was used to collect the data. While claims of causality are made, they should be verified through longitudinal data and can be tested using more powerful statistical procedures. The generalizability of the findings are also limited to historic time and to Chennai, India, home of female microentrepreneurs with their own set of personal and business characteristics. Policy recommendations arising from the findings are also made.

DEDICATION

I dedicate this dissertation to my family, especially…

to Father, Mother and Aunts for supporting this dream;
to my one and only Brother who has always been there for me;
to Mark and Diane for the honor and privilege of being one of their sons;
to Michigan State Men's Volleyball for allowing me to serve and lead.

May all dreams be fulfilled in the love of great family and friends.

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INTRODUCTION

This dissertation participates in a small way in one of the longest running and most highly-contested conversations in the history of ideas. That grand debate centers on how social structures are created, maintained, replaced, and, most importantly for this study, how such social processes affect the lives of individuals. From the classical Greek philosophers, to Durkheim, Weber and Marx in the 19th century, to Giddens in the 20th century, two poles of the argument are visible (Noble, 2000). In broad terms, the argument is about which factors are the principal agents of social maintenance and social change: "ideas" and other cognitive manifestations such as attitudes and common-sense theories; or "atoms", that is, things-material, tools, and technologies.

The idealist position is best exemplified by Weber's study of the Protestant ethic and how that powerful theology "created" capitalists and capitalism (Weber, trans. 1958). In essence, idealists assert that there is nothing so powerful as an idea, an ideology, or even a theology whose time has come. By contrast, the materialist camp contends that both the continuation of the social status quo and its opposite, social change, is fundamentally a matter of control of and access to tangible economic resources. A materialist might ask, for example, how does ownership of telecommunication systems benefit some and exclude others from the social and economic benefits of the network society?

An important stream of thought that builds on materialist assumptions is that of technological determinism. In its least nuanced form or so-called "hard" form, the technologically deterministic position privileges tools and their affordances as the prepotent driver of history (Marx & Smith, 1998). Proponents of hard technological determinism might

claim, for example, that the technologies of online connectivity inexorably lead to massive and negative social change as "real" social bonds are replaced with inauthentic, mediated interactions.

Hard technological determinism is an implicit assumption of communication research. As McQuail (2005) observed, ''the entire study of mass communication is based on the assumption that the media have significant effects'' (p. 456). Moreover, as Chaffee (Rogers & Chaffee, 1983) noted, "the history of communication research has largely been one of response to technological innovation…" (p. 20). If the hard version of technological determinism silently underwrote the institutionalization and growth of the communication research enterprise, it is nevertheless not without its academic critics. Castells, Fernandez-Ardevol, Qiu, and Sey (2007) cautioned, for example, that technology should only be understood as a part of social practices. People use and therefore shape communication devices based on their own motivations, values and goals. A key insight of the soft determinist strategy is that technologies may be created by engineers, but individuals give technologies meaning by choosing how and why to use those technologies. As science fiction novelist William Gibson (1989) observed, "The Street finds its own uses for things – uses the manufacturers never imagined" (p.85).

In short, the lens of soft determinism alerts us to consider that, to the extent that the transformative social changes that are being observed worldwide are the result of communication technologies and processes, researchers should consider technology to be only one of many factors influencing social life. Indeed, only by understanding the interaction of technology with history, culture, gender, laws, etc. can the most complete understanding of contemporary life be achieved.

Mobile Phones, ICT4D, and Social Change

As the most rapidly diffused information and communication technology (ICT) in history, the mobile phone is potentially an especially fruitful research site for exploring the relationship between technology and social change (Castells et al., 2007)[1]. First diffused and studied in the United States and similarly advantaged countries of Europe and Asia, the mobile phone was seen to support the activities of daily life (Katz, 2008; Ling & Donner, 2009). However, the mobile soon diffused in developing countries. Between 2000 and 2004, mobile phone ownership rates in developing countries almost doubled and low-income countries reached the same average level of mobile phone penetration as was observed in high-income countries in 1995 (World Bank, 2008). With this diffusion, scholarly attention was extended to consideration of access to mobiles by the world's poorest persons.

According to the latest projections, there are more than six billion mobile phone subscribers worldwide, with roughly three-quarters of those subscriptions in the developing world (International Telecommunication Union [ITU], 2011). Also, the number of mobile users in developing countries far outstrips the number of people with Internet access. In 2011, the ITU estimated that there were 70 mobile phone users compared to 21 internet users per 100 inhabitants in the developing world. In India, there were 61 mobile phone users per 100 inhabitants and only four in 100 households had internet in 2010. An earlier study estimated that one-fifth of the world's most disadvantaged citizens are mobile subscribers (Heeks, 2008a).

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[1] Throughout this dissertation, I will use the terms "mobile phone" or "mobiles", rather than "cell phone." With the exception of mobile phone subscribers in the United States, users worldwide identify this communication technology as a mobile phone or mobile.

Initially, development practitioners, policymakers, and scholars expressed optimistic, some would say naïve, hopes that information and communication technologies, especially mobile phones, would dramatically facilitate the accomplishment of development goals. For example, the United Nations Millennium Development Goals include Target 8F – [M]ake available benefits of new technologies, especially information and communications (United Nations, 2000). Indeed, the dominant belief in the development community was that access to technology would ameliorate the economic condition of the poorest in the world. In fact, that belief was not completely unfounded. There were well-established and well-known findings that macro-level investments in telecommunication infrastructure (fixed line telephones especially) and the growth of the telecommunication market lead to increased GDP figures in developing countries (Saunders, Warford, & Wellenieus, 1994). With the early diffusion of the mobile phone in countries of Africa, a 10% increase in the availability of mobile phones resulted in a 0.6% increase in per capita GDP (Waverman, Mesci, & Fuss, 2005).

Pioneering research into the growth of access to mobile phones in the developing world was framed early on by communication scholars drawing on the diffusion of innovation paradigm (Rogers, 1986; Singhal & Rogers, 2003; Melkote, 2006) or theories of the digital divide (van Dijk, 2005; Warschauer, 2004). The digital divide refers to gaps in ICT access, and uses between groups (van Dijk, 2005). Early digital divide studies focused on narrowing these gaps and were often framed as efforts at digital inclusion (Warschauer, 2004).With time, communication researchers who studied the role of technology in development coalesced in the specialist field called Information Communication Technology for Development (ICT4D) in

which mobile phones, computers, and public access to those communication technologies are investigated.

Typically, ICT4D research examined those relationships at the level of economic markets. Prominent studies in the ICT4D literature demonstrate that the use of mobile phones can improve market efficiency in such diverse markets as fishing, grain trade and artisan industries (Jensen, 2007; Aker, 2008; Molony, 2006). Although the dynamics of mobile phone use and consequences at the macro- and market-levels are important to understand, small and microenterprises are also important for developing economies since various estimates, both country specific and regional, suggest that women own upward of half of all microenterprises in the developing world (Chen, 2001; Peebles, 2006; Wasihun & Paul, 2010) and a large percentage of the local workforce is employed by those businesses. In India, the National Sample Survey Organization (NSSO, 2000) puts the number of microenterprises with at least one employee at more than four million. More recent surveys estimate the number of workers in the urban, informal sector of the Indian economy to be 74 million, with 16 million of that total being women (Raveendran, 2006).

In the past half-decade or so, enthusiasm for the ICT4D-project has become more restrained, as funders and international organizations now talk of "mainstreaming" mobile-centered research as secondary to the delivery of services such as education, health, or agriculture (Heeks, 2010a). In large part, this growing disregard for the potential value of the mobile phone has come about as a paradox for, despite the explosion of mobile phone ownership; developing countries have not by and large experienced the widespread and transformative economic impacts that ubiquitous access to ICTs was supposed to bring about

(Heeks, Gao, & Ospina, 2010). In response to that paradox, then, this dissertation examines why we see mobile phones everywhere except in the productivity of microenterprises. In fact, the general use of technology may not be related to economic development at all unless that use is directed at economic activity. Intuitively, the adoption of mobile phones by all the workers in a business would not result in increased business productivity especially if the calls placed are non-business related. Thus, when considering the impact of ICT use, just as important and perhaps more important are the intents of the users and the purposes to which the technology is being put to.

For years, the "development" in ICT4D has been synonymous with economic development and researchers have found evidence that ICTs can indeed result in economic growth at various levels of analysis. At the macro level, investments in telecommunication infrastructure and the growth of the telecommunication market benefit the overall economic growth of developing countries. At the market level, prominent studies in ICT4D demonstrate that the use of mobile phones can improve market efficiency in the fishing, grain and artisan industries.

Compared to research at the macro and market level, studies focused on firms or individuals are neither large in number nor cumulative (Donner & Escobari, 2010). Thus, one objective of this dissertation is to address this shortcoming in the ICT4D literature. Moreover, much research about mobiles was for marketing purposes or as atheoretical, after-the-thought evaluations of mobile interventions. As Heeks (2008a) observed, mobile phones are only being incorporated into development projects adventitiously and there has not been crosscutting

initiatives to learn about their transformative possibilities. A second goal of this dissertation then is to bring the social psychological concept of mattering to ICT4D research.

In addition, the current examination of small-scale enterprises may have policy implications, since the majority of the workforce in the developing world is engaged by these microenterprises. Aside from their numbers, microenterprises may be a particularly fruitful site for research into non-economic development goals. Donner (2009), for example, reported that business owners use their mobile phones for both social and business purposes. The different uses of mobile phones would presumably have different types of outcomes that may not always be economic in nature. This dissertation argues that just because some of the outcomes are non-economic in nature does not mean that other developmental goals are not being served. For many international aid agencies, development is more than just economic development; development can also be about social development (ADB, 2003; GSMA, 2011; UNCTAD, 2011). Thus, another objective of this dissertation is to expand the current definition of development beyond that of only economic growth. In the literature review that follows, it is argued that development entails both economic and social development, and the use of mobile phones has an impact on both economic and social developmental outcomes.

By situating this dissertation in the technocentric paradigm of ICT4D research, and by specifically investigating the effect of mobile phones on development goals, this dissertation becomes a vehicle to engage with the "big ideas" of technology, social continuity, and social change. In terms of research goals, this dissertation will: (1) Explore the economic and social consequences of using mobile phones by microentrepreneurs; (2) Examine possible reasons for the mobile phone paradox; and (3) Enrich the ICT4D field with concepts pertaining to economic

and social development. Accordingly, the research outcomes of this dissertation are: (1) Statistical models that explain the mechanisms and consequences of mobile phone use; (2) Boundary conditions for microentrepreneurs to benefit from the use of mobile phones; and (3) Concepts and relationships that explicate the role of mobile phones in both economic and social development. In the broadest sense, the research questions and hypotheses posed here were generated in order to interrogate the mobile phone paradox. In answering these research questions and testing these hypotheses, this dissertation seeks to contribute to the ICT4D field by systematically examining the challenges of delivering development outcomes through mobile phones.

CHAPTER 1

ICTs and Economic Development[2]

The role of ICTs, especially mobile phones as a facilitator of development for the poor has become an axiom of scholarly and public discourse. International organizations (ITU, 2009; United Nations, 2009; World Bank, 2009), governments (e.g., Republic of Rwanda, 2004; Government of India, 2004; Jamaica Ministry of Industry, Technology, Energy, and Commerce, 2007), and even the news media (Agence France-Press, 2009; The Economist, 2009; The New York Times, 2009) now take it as an article of faith that ICTs, especially mobile phones, can be significant enablers of positive change in the developing world.

In a surprisingly communication-centric approach, the Asian Development Bank (ADB) suggests that one cause of poverty and hardship in the developing world is the lack of access to information (ADB, 2003), and it is in this area that mobile phones have the greatest potential to make a difference in the desperate lives of the world's poor (Collier, 2007). In particular, mobile phones have been found to reduce transactional costs, increase income and productivity, and reduce uncertainty and risk (Donner & Escobari, 2010; Esselaar, Stork, Ndiwalana, & Deen-Swarray, 2007; Eurostat, 2008; Heeks, 2008a; 2010b; Indjikian & Segel, 2005; OECD, 2004). Accelerated information diffusion can enhance market efficiency and competition. The same phones could also "extend social and business networks and substitute journeys and

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[2] Throughout this dissertation, the term "ICT" is used for more general discussions of the effects of technological use. The focus of this dissertation is specifically the mobile phone. Mobile phones are, for now, the technology of the moment. With the diffusion of data-enabled phones and even tablets, some of the consequences discussed in this dissertation are likely to evolve as microentrepreneurs find different uses for these devices.

intermediaries" (Duncombe & Heeks, 1999, p.18). Indeed, in countries where mobile phones constitute the primary form of access, increased exchange of information on trade or health services appears to be contributing to development goals (ITU, 2008a).

Despite the general optimism about the promise of ICTs, there is still a paucity of rigorous research on their role for development that would inform practitioners and policy makers. Until recently, evidence linking ICTs to creating new economic activities or changing existing activities has been very weak despite the growing availability of the technology (UNCTAD, 2010, p. xi).

From the perspective of policy makers, the most critical link between ICTs and development is whether the growing availability of ICTs, especially mobile phones, helps achieve development goals. ICT effects have been conceptualized in different ways by different international development organizations. For example, the Asian Development Bank (2003) identified two possible kinds of impacts – vertical and horizontal. Vertical impacts refer to the economic growth that is associated with the ICT industrial sector. ICTs here primarily refer to the goods and services that are being exchanged in this sector. Impact here refers to the increased economic activities that result from investments in the telecommunication sector. The second kind of impact is horizontal and refers to the "means of supporting activities that benefit from prompt and reliable information (p.5)." Horizontal impact is characterized by cost reduction in information searches and transactions as well as the improvement of communication within supply chains. The most valuable contribution of ICTs for enterprises is when "tangible benefits are accrued from greater efficiencies" (UNCTAD, 2010, p. xiv). It is to the second of these two impacts that this dissertation addresses.

Different organizations have termed horizontal and vertical impacts differently. The UNCTAD (2010) refers to direct employment generation in the ICT sector as first order effects and horizontal impact as second order effects. The same study also reported that the greatest business involvement of poor people in the ICT sector was the vending of prepaid cards. However, UNCTAD also conceded that the prepaid card business is fraught with price volatility and low returns, thus raising hard questions about whether such enterprises were likely to be a path out of poverty.

Scholars in the development communication tradition by contrast conceive of ICT effects as the "ultimate dependent variables" (Rogers, 1986, p. 148). Broadly speaking, the study of consequences from that perspective entails examining the changes in an individual's behavior (knowledge, attitudes, or actions) that occur as a result of a communication message (Rogers, 1986, p. 151). Depending on the level of analysis (individual, firm, societal), the consequences of communication technologies can be considered positive (e.g. increased gross domestic product or greater income for very small businesses) or negative as access to online information exacerbates inequality between the information-rich and information-poor.

In the context of this dissertation, desirable outcomes are the functional effects of the mobile phones on the microenterprises owned by individuals and include consequences such as increased productivity and reduced transactional costs. Direct impacts are the changes that occur in immediate response to the mobile phone and indirect impacts are the changes that result from the direct impacts of the mobile phones. If reduced transaction costs are the direct impact, then indirect impacts could be increased business growth or profits. Anticipated impacts are changes caused by the mobile phones that are recognized and intended by the members of the social

system. Unanticipated effects are changes that are neither intended nor recognized. To foreshadow a later section of this dissertation, my dissertation uncovered social development outcomes of mobile phone use that seem to be relatively unrecognized by the ICT4D research community.

Effects across Levels of Analysis

Impact can be measured at different levels of analysis. Some researchers have looked at the impact of ICTs at the macro level while others have looked at the issue from the micro level. If one considers the existing ICT4D literature as well as ICT impact literature in developed countries, one can find much more empirical evidence at the macro level than the micro level of enterprises.

Macro level evidence. Extent economic research in developed countries on the impact of telecommunication investments has yielded fairly convincing evidence of a causal relationship between IT investment and economic growth. Hardy (1980) investigated the impact of telephones per capita on economic growth and concluded that telecommunications was an essential component of the economic infrastructure, fostering productivity and economic growth. Causal relationships between IT equipment investment and rapid economic growth have also been reported (de Long & Summers, 1991; Kathuria, Uppal, & Mamta, 2009). Examining country level data, Cronin, Parker, Collerau, and Gold (1991) confirmed a two-way causal relationship in the U.S. between telecommunications infrastructure investment and economic growth. In their study, the researchers used statistical procedures to confirm the existence of feedback process in which economic activity and growth stimulates demands for telecommunication services. Their explanation for the two-way causal relation was that as the

economy grows, more telecommunications facilities are needed to conduct the increased business transactions. More recently, strong links between mobile phones and economic growth have also been reported in a variety of other geographic contexts (Deloitte, 2007; Lee, Cho, & Jin, 2009; Ovum, 2006; Qiang & Rossotto, 2009).

The economies of developing countries are not excluded from the benefits of ICT investments. In the countries of Africa, a 10% increase in the availability of mobile phones resulted in a 0.6% increase in per capita GDP (Waverman et al., 2005). In fact, this impact may be twice as large in developing countries compared to developed countries. Across the Global South, a 10% increase in broadband penetration was projected to produce a 1.4% increase in per capita GDP (Qiang & Rossoto, 2009). Other macro-level studies also found a direct relationship between ICT growth and economic growth (Forestier, Grace, & Kenny, 2002). Kenny (2006) found that ICT investments can account for 0.4% of additional annual growth in labor productivity.

Micro level evidence. Despite the studies cited above, Donner (2010) argued that there is still a scarcity of ICT4D quantitative research. In his review of ICT4D studies, he found that most existing ICT4D studies are qualitative in nature and even among quantitative ones, there is little agreement in terms of the variables being examined. As such, Donner concluded that a statistical meta-analysis would not be feasible given the lack of commonality in available studies (Light & Pilleman, 1984) and suggested that more research be conducted.

At the micro level, a number of economic outcomes are possible. ICTs can directly eliminate brokers and intermediaries. ICTs can also boost the household incomes of workers who are employed by the ICT sector. Technology can also support the ways that development

projects are implemented in the form of databases and software platforms. These possibilities are wide-ranging but the evidence that demonstrate positive impact has been relatively scarce until recently. The few studies that have been successful in reporting a direct impact have been cited *ad nauseum* by proponents of ICT4D interventions.

In a study of the fishermen of Kerala, India, Jensen (2007) famously found that mobile phones resulted in positive developmental impacts. Working with five-year time series data from three fish markets in coastal India, Jensen found that because the fishermen were able to get mobile phone coverage out at sea, they started to make calls to inquire about pricing and that helped them decide on the best market to take their fish to. This adoption of mobile phones by fishermen and wholesalers was "associated with a reduction in price dispersion. Both consumer and producer welfare increased" (Jensen, 2007, p. 879).

Another often-cited study focused on grain traders in Niger. Aker (2008) found that introduction of cell phone towers in Niger reduced differences in grain prices across markets by 20% and the intra-annual variation of grain prices by 12%. Akers reported that "grain traders in markets with cell phone coverage search over a greater number of markets, have more contacts and sell in more markets. This underscores the fact that the primary mechanism by which cell phones affect market efficiency is a reduction in search costs and hence transaction costs" (p. 4-5). Mobile phones were also found to have augmented communication in existing supply chains in the Nigerian market for traditional handwoven ceremonial cloth (Jagun, Heeks, & Whalley, 2008). In addition, Donner (2006), and de Silva and Ratnadiwakara (2008) also found evidence that mobiles reduce transactional costs and made information more readily available. Other research suggests that the extent to which individual enterprises benefit from enhanced access to

ICT depend on: size, industrial sector, location, workforce skills, availability of relevant content and whether suppliers and customers are also frequent users of ICTs (UNCTAD, 2010, p.64). Taken together, these studies give the ICT4D practitioner some optimism that with better access to information through the use of mobile phones, the economic lot of the poor can be improved.

Nevertheless, the evidence of ICT4D effects at the micro level has not been cumulative, first, because as mentioned above, little energy has been expended on theory building and second, because ICT4D researchers have failed to learn from mistakes made in the past and continue to impose preexisting designs on the poor (Heeks, 2002). Macro level ICT4D findings may apply to small-scaled enterprises but the effects may be very different since the entrepreneurs could have different purposes for ICT acquisition and different entrepreneurial objectives. As such, the dynamics of microenterprise growth require additional evaluation.

Microenterprises and Development

Microenterprises constitute a considerable proportion of the businesses in the developing world. In India alone, there are an estimated 1.5 billion microenterprises (NSSO, 2012), making microenterprises the most common type of business in the country. Just by sheer numbers, microenterprises have the potential to make a difference in the lives of the bottom billion – people whose income is less than one dollar a day (United Nations, 2000). However, this optimistic view of microenterprises needs to be tempered by the fact that only a small minority of enterprise are growth oriented and most remain at the subsistence level, yielding low returns on labor and capital (Duncombe & Heeks, 2002). Furthermore, these smaller enterprises are more likely to remain unproductive relative to the larger ones (ILO, 2009; La Porta & Shleifer,

2008). Besides, the overall contribution to the economy's net growth by microentrepreneurs is still unclear (La Porta & Shleifer, 2008).

But just because microenterprises do not transform a country's economy does not mean that they do not warrant rigorous academic study. Microentrepreneurs have long been of interest to the development community (Mead & Liedholm, 1998; Nichter & Goldmark, 2005) and from a poverty reduction perspective, it is important to focus attention on small-scaled enterprises because they typically have the greatest involvement of the poor and collectively sustain the livelihoods of many of those at the bottom of the pyramid (UNCTAD, 2010). Among the microenterprises, those that are growth oriented typically aim to extend beyond their current market reach (UNCTAD, 2010, p. 66) and are generally better-placed to make use of ICTs. Besides, owning a microenterprise may have social benefits for the business owners in additional to economic ones.

People at the bottom of the pyramid[3] have voted with their wallets for their technology of choice. Even though they number among the world's poorest, this demographic group has demonstrated that they desire access to mobile phones and are willing to pay (Quadir & Mohaiemen, 2009). Mobile phones appear to be the technology of the moment and the increased availability of the devices is "creating opportunities for ICTs in the enterprise sector to contribute to development and reduce poverty" (UNCTAD, 2010, p. xi).

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[3] In the GSMA study, people with a household income of less than US$75 per month were defined as being at the bottom of the pyramid (BOP). The original notion that such persons represent a large, untapped market is the work of Prahalad (2005).

There is some attitudinal evidence that microenterprise owners have very positive attitudes toward mobile phones use for business. The GSM Association (2011) reported that 80% of business owners say that they benefit from mobile phone ownership compared to only 63% of non-business owners. Business owners are two and a half times more likely to use mobile phones to earn income than non-business owners. Other researchers describe the key utility of mobile phones as the improved coordination of social and economic activities (Ling & Yittri, 2002). Donner (2010) suggests that it is important to rigorously examine mobile use by entrepreneurs because different uses of the devices may lead to different outcomes. It is particularly important for ICT4D researchers to distinguish different uses and outcomes so as to understand how entrepreneurs can use technology to serve customers more effectively, start a new business, and check market prices or to bypass brokers. Current studies indicate that mobile phones are best at intensifying current relationships compared to changing the fundamental structure of business relationships and this led some researchers to conclude that mobile phones help some businesses, some of the times (Donner, 2005; 2006; Samuel, Shah, & Hadingham, 2005). What would be helpful for ICT4D practitioners are clearer distinctions of which business processes are best augmented by the use of technology and what kinds of comparative advantages are afforded.

A caveat to the optimistic take that mobiles for development is that despite the widespread ownership of mobile phones and their potential, global poverty does not seem to have decreased noticeably. This seems to suggest that access to mobile phones is not the magic bullet to poverty and studies that inform the ICT4D field about why economic growth is limited despite widespread access would be particularly useful. This dissertation is positioned as one such study. In addition, it should be noted that all the effects discussed thus far are economic

ones. It may seem intuitive to only consider economic consequences in the case of microentrepreneurs but research in developing contexts have found that the same mobile devices are used for both business and social purposes. As such, it is plausible that the use of the devices will have both economic and non-economic effects. Accordingly, this study will attempt to identify other non-economic effect of technology use by business owners that have been unrecognized by ICT4D researchers and "unintended" by ICT4D interventionists.

Limitations of Mobile Phones for Effective Development

The ICT4D community is coming to a better understanding of the limitations of mobile phones in enacting effective economic development. The following section discusses four of these limitations. There is limited economic effect because of: (1) Limited economic use; (2) Business attributes; (3) The Matthew effect of technology use; and (4) Social uses of mobile phones far outstrips economic uses.

Limited economic use. The ICT4D literature does not always support the notion that ICTs lead to positive development. Some researchers have not been able to find the same relationship between IT investments and rates of economic growth (Pohjola, 2001). Other micro-level studies also did not find strong evidence of ICT use and increased productivity. Kenny (2006) was unable to find increased productivity resulting from ICT use among SMEs in East Africa and Chowdhury (2006) also noted that the productivity gains in his study were not demonstrably strong. Similarly, in a study of microentrepreneurs in Mumbai, India, Chew, Levy, and Ilavarasan (2011) also found that productivity gains from ICT use were small due to limited use in business practices. The researchers did however find evidence to suggest a causal relationship between ICT use and increased business profits in the case where mobile phones

were used for business practices. This observation of limited impact from limited use is also supported by a study in Rwanda which reported that only one-third of calls made by micro and small enterprise owners (MSEs) were business related (Donner, 2006).

The lesson that can be drawn from these studies is that improving access to ICTs does not always guarantee poverty reduction. The information that is being exchanged in the ICT channels has to be relevant (UNCTAD, 2010). The technology itself does not create the information and neither does it validate the utility of the information. Understanding the information that is exchanged and the utility of that information is still a human endeavor (ADB, 2003). As a development tool, ICTs cannot improve conditions or create jobs on its own. ICTs have to be linked to the efforts and motivations of their users.

Business attributes. Another limitation to the economic effect of mobile phones relates to the nature of the enterprise - whether they are growth or livelihoods enterprises (Duncombe & Heeks, 2005). Growth enterprises show a greater business focus and deliver broader/longer-term benefits of competitiveness, innovation, exports, etc. Livelihood enterprises are typically for the majority of the poor, delivering benefits in terms of livelihood assets. The communicative needs of livelihood enterprises tend to be limited and hence the investments in mobile phones would be unlikely to make a significant impact in the profitability of these businesses (Duncombe & Heeks, 2005). In fact, Schoar (2010, p. 62) noted that there is "a vanishingly small number of individuals who transition from subsistence to transformational entrepreneurs." On the other hand, for growth enterprises that have entrepreneurial goals that are more proximal to large organizations, the increase in business efficiency afforded by technology might be more applicable, although the general consensus in the literature is not at all optimistic in this regard.

Furthermore, a review of mobiles for development studies suggested that mobile devices are mostly used for existing business networks rather than business creation (Donner, 2010). Other studies showed that mobiles are mostly used to keep in touch with customers and suppliers (Esselaar et al., 2007), so perhaps one explanation for the scarce evidence of impact is that the majority of subsistence-based enterprises uses ICTs at best as a communication tool rather than a tool of commerce (UNCTAD, 2010, p.84).

In his literature review of mobile phones for development, Donner and Escobari (2010) observed that mobile phones "amplify existing material and informational flows" (p. 641) rather than change them fundamentally. Indeed, mobiles have generally not been found to be very successful in growing businesses by way of reaching out to new customers (Donner, 2007). Micro and small entrepreneurs were found to prefer face-to-face interaction over mobile phone use especially when they are reaching out to new clients and the phones are mostly seen as a facilitating technology to sustain existing trust-based relationships (Donner, 2006, p.78). Molony (2006) also found that mobiles help intensify and solidify existing relationships but the augmentation of relationships only occur for business networks that already have face-to-face connections. For business relationships in Tanzania, face-to-face interactions and informal relationships are still very important despite the affordances of the mobile (Molony, 2006). As noted by the UNCTAD (2010), the magnitude of ICTs may be more limited in the context of local value chain systems that rely predominantly on "pre-existing, informal and culturally-rooted communication where the exchange of valued information is by means of personal contact" (p. xv). For these enterprises, it may be that combining mobile phones and face-to-face channels will boost the effectiveness of both (GSMA, 2011).

The economic sector that the microenterprise operates in may also influence the effect of mobile phone use on business growth. Different industrial sectors might have different communication needs and thus use mobile phones in different business processes. For instance, microentrepreneurs in the service sector might make more intensive use of mobile phones to communicate with local customers and suppliers. This is evidenced by in South Africa, Egypt and Tanzania which found that mobile phone use increased profits particularly in the service sector (Samuel et al., 2005). In the manufacturing sector, non-exporting manufacturers had highest information needs because they often struggle to survive (Duncombe, & Heeks, 2001). By contrast, manufacturing exporters who are part of the global value chain often seek information for growth through new markets. Microentrepreneurs in the trade sector might use mobile phones to check the market for the best prices and optimize their profits in their business transactions (Jensen, 2007; Aker, 2008).Previous research also found that microenterprises in the trade sector of the informal economy were more likely to experience economic growth from the combination of ICT access and owner motivation to use ICTs for business (Chew, Ilavarasan, & Levy, 2010). Given these findings, economic sectors could be an important consideration in the examination of the effect of mobile phones and form the basis of one of the research questions posed later.

The Matthew effect of mobile phones use. ICT4D research in the past decades suggests one unintended consequence: those who are better placed in society might use technology to accentuate existing power relations and inequalities (UNCTAD, 2010, p. 83). For instance, Abraham (2006) noted that in closing the digital divide, another may open in that the power of trade intermediaries was enhanced because they were better able to maximize the benefits

afforded by technology. This "the-rich-get-richer" effect is sometimes referred to as the Matthew effect (Merton, 1968), thusly named from the biblical verse in which it was proclaimed:

> "For whosoever hath, to him shall be given, and he shall have more abundance; but whosoever hath not, from him shall be taken away even that he hath" (Matthew 13:12, The Holy Bible: King James Version)

The Matthew effect has also been noted in research on the effects of traditional mass media. Past research has shown that mass media tend to widen differences between the information-rich and information-poor among their audiences (Gaziano, 2010; Tichenor, Donohue, & Olien, 1970). The information transmitted by the mass media very often has "greater effect on individuals who are already better informed, better educated and of a higher socio-economic status" (Rogers, 1986, p. 169). In other words, demography determines the differences in the ability to process media information and may in turn affect the extent of the effect of technological use on business growth.

Social uses of mobile phones. Another possible explanation for the lack of studies demonstrating strong effects on economic growth might be that microentrepreneurs do not make extensive use of technology for business purposes. Donner (2004) found that microentrepreneurs in Africa used their mobile phones for both business and social purposes and hence mobile phones support their "livelihoods" as well as their "lives." Souter et al. (2005) also found that mobile phone users in Africa and India used their devices in times of crises and to connect to their social networks in their everyday lives. Few if any used mobile phones solely for economic activity. Despite the recognition that the users of mobile phones may not distinguish between business and social uses, most ICT4D studies have not looked into the social consequence of

mobile use as it relates to developmental goals. Most international aid agencies acknowledge the importance of technology and now understand that the effectiveness of the devices would naturally depend on the content they carry (UNCTAD, 2011). The tendency for mobile phones to be used for social calls begs the question of whether the development outcomes would still be served.

Two research questions and three hypotheses are posed here, with one research question to follow later:

RQ1: What is the relationship between female microentrepreneurs' use of mobile phones and the economic growth of their enterprises?

H1: The more a female microentrepreneur uses mobile phones for business purposes, the more her business will show business growth.

H2: The higher the growth orientation of a female microentrepreneur, the greater the likelihood that her microenterprise will experience economic growth.

H3: Female microentrepreneurs with a higher socioeconomic status will benefit more from the business use of mobile phones than female microentrepreneurs with lower socioeconomic status.

RQ2: What are the differences, if any, in the relationship between use of mobile phones and business growth for microentrepreneurs in different economic sectors?

CHAPTER 2

Unintended and Unrecognized Effects of Mobile Phone Use

The preceding discussion examined the role of mobile phones on economic growth. As was shown, the most popular narrative of ICT4D centered on economic growth, but as prior ICT4D inventions have demonstrated, access to technology does not insure economic growth. There are two issues at hand here, the first being that ICT4D means more than putting technology in the hands of the poor and expecting that their economic well-being will be improved. The second issue is about understanding that there are possibly other effects that have been consigned to the penumbra of economic effect. It may be that social effects of mobile phone use will also help improve the broader well-being of the world's poorest. Understandably, the foremost concern of development should be about alleviating poverty. Collier (2007) argued that we should be focusing on the "bottom billion" because, without external aid, the 58 nations in which the poorest reside will most likely remain static or decline as the rest of the world progresses. However, development is not just about the "accumulation of wealth and the growth of gross national product and other income-related variables" (Sen, 1999, p.14). Economic development will always be important but development is also about other related indicators of development like primary education and being free from diseases. This multi-dimensional view of development is reflected in the different Millennium Development Goals where both economic and non-economic factors are listed. As Hayek (1976, p.35) pointed out, "economic considerations are merely those by which we reconcile and adjust our different purposes, none of which, in the last resort, are economic (excepting those of the miser or the man

for whom making money has become an end in itself).” Economic development is a means to a greater end and should certainly not be seen as the only ends of development.

This philosophical argument that development is not just about economic growth is reflected in how mobile phones are used in everyday lives. While economic activity may be facilitated by the affordances of the mobile in terms of improving response time and information exchange, the technology may also be generating non-economic benefits for the individuals. For instance, fishermen report the peace of mind from increased contact with their families onshore as a benefit of mobile ownership. The mobile phone in the case of SMEs is not just a tool for maximizing profits or improving business efficiency; it serves other social functions that may be tied in with the economic benefits as well.

Indeed, research indicates that people in the developing world tend to use mobiles more for social than business interactions (Castells et al., 2007; Souter et al., 2005). Another noteworthy observation is that the users themselves do not distinguish social and business use and that the line between the two is often blurred (Best, 2010; Donner 2004). ICT4D researchers are the ones who have been examining business uses almost exclusively and perhaps ignoring the fact that individuals may not always been driven to use ICTs in “exclusively instrumental ways” (Duncombe, 2009). If users mostly communicate via mobile phones for social purposes, it is the social networks rather the business networks that may be augmented.

From a broader perspective, international aid agencies such as the UNCTAD (2010) also noted that ICT interventions for subsistence-based enterprises should not be judged solely on their economic effect since “social benefits cannot be readily separated from enhancements to their communication and information systems for enterprise purposes” (p.85). This is also

reflected in the Asian Development Bank's development framework (2003, p.2) which includes strategies that would promote pro-poor sustainable economic growth as well as inclusive social development for the disadvantaged groups in society. In Bangladesh, women now earn money for their family using ICTs and these earnings have elevated their positions in the household (Ahmed, Islam, Hasan, & Rahman, 2006). Their role in decision-making for family affairs is now more important and this increase in respect for women has created a virtuous cycle in society by inspiring other women to push for changes to their own social status. Furthermore, ICTs can provide accessible public spaces for underprivileged women to have their own voice and publicize their experiences and perspectives (Gurumurthy, 2006). Other researchers have found that social uses of mobile phones can reinforce economic uses (Donner, 2009; Burrell, 2008). The implication for researchers is that the use of technology by enterprises should not be studied behind a walled garden of economic effects.

Thus, this dissertation seeks to identify social benefits that are generated by enhanced communication within social networks. These social benefits may be tied in with economic and business outcomes, For instance, when women entrepreneurs remain in touch with family while they are at work, they may feel more at ease that household chores are taken care of. Consequently, they may be better positioned to take care of their businesses. So while the social calls are not generally considered in ICT4D research as important, these calls could possibly generate benefits that are tied in with economic outcomes. In order for mobile phones to benefit the poor, the devices need to address their livelihood concerns as well as other concerns of their daily lives. The separation of business and social effect may be an artifact of research agendas

rather than the actual ways in which the technology is used. At the micro level, the entrepreneurs simply do not separate mobile use for work and for life.

Mobile Phones and Social Development

ICTs can be used as productivity tools and as prestige objects (Unwin, 2009; Castells et al., 2007). Mobiles can also serve as symbols or vehicles of globalization. Accordingly, while entrepreneurs might use mobile phones for instrumental economic purposes such as information seeking or connecting with their business networks, they can also be using mobile phones for intrinsic uses that are "social or emotionally related" (Ling & Donner, 2009, p.189). This point might be illustrated in a study of mobile advertisements in India. Kavoori and Chanda (2006) found that mobile phones are depicted as capitalist, masculine and corporate, and serve as symbols of modernity and globalization for many users. In their study, the scholars found that a sizeable number of advertisements focused on the esteem-enhancing aspect of mobile phones rather than the possibilities of increased economic efficiency.

At a broader level, scholars are gradually recognizing that development is not strictly economic. As noted by Sridhar and Sridhar (2006), mobile phones have the potential to improve broader social well-being as well and scholars should also examine the role of mobile phones in other non-economic aspects of life such as health, education and governance (Horst & Miller, 2006). In another study on the capacities to use and actual uses of technology, Alampay (2006) noted that the primary use of mobile phones is social in nature. He observed that the use of mobile phones can intensify social ties and improve connections with clients but this use of the devices does not necessarily translate to more business or more income for microentrepreneurs.

In this last instance, the investment in mobile phones is having a social outcome as opposed to the economic outcome for which it was intended.

Thus, the social consequences of mobile phone use might be just as important, if not more important than economic ones. Smith, Spence, and Rashid (2011) report that mobile phones maintain family and social relations, allow users to act in an emergency and increased the efficiency of everyday living. For business owners, mobile phones increase profits particularly in the service sector (Samuel et al., 2005) and they also contribute to the overall well-being of the entrepreneurs. Beyond the potential of generating increased revenues, there are other benefits. For instance, connection to their social networks can give the tradespeople a peace of mind while they conduct their business. Abraham (2007) reported that while mobile phone use improved the market efficiency of fishermen in India, what has been overlooked is that the devices also allow them to feel safer and less isolated while they are out at sea. The use of mobile phones for family interactions can also reduce family transaction costs such that the fishermen can deal with quotidian activities while they are out at sea or in the harbor.

Other major international organizations such as the UNCTAD also acknowledge the role of ICTs in augmenting social and human capital assets in addition to physical capital. ICTs have the potential to increase the self-confidence of their users and can facilitate the participation of women in the economy (UNCTAD, 2011). For women in low and middle income countries, research has found that the benefits of mobile phone ownership are more social than economic. Women in these countries reported that they felt safer, more connected and more independent as a result of their mobile phones (GSMA, 2011). Their income or professional opportunities also increased. The respondents reported that communication with family and friends was a core

activity of daily life. Another case study also provided some evidence that woman entrepreneurs benefit socially from ICT usage (Guihuan, 2005). Other studies about women and ICTs also suggest that ICTs may have an empowering function for women users, improving their sense of agency and control, increasing self-esteem and self-confidence, and improving power relationships (Garrido & Roman, 2006; Huyer, 2005; Maier & Nair-Reichert, 2007; Slater & Tacchi, 2005). The Grameen Village Phone Project did not just create business opportunities for women in rural villages; Bayes, von Braun, & Akhter (1999) found that there were also social development outcomes. The village phone ladies reported higher self-confidence, improved mobility, knowledge and a greater sense of empowerment in making decisions that matter to them.

The social consequences are not limited to perceptions of empowerment and security. ICT4D scholars have also examined the use of mobile phones to improve education (Rashid & Elder, 2009; Traxler & Leach, 2006; Stone, Lynch, & Poole, 2003), and to provide mobile healthcare applications (Chib, 2010; Idowu, Ogunbodede, & Idewo, 2003). In his study of midwives working in rural communities, Chib (2010) reported that midwives used mobile phones to transmit health statistics to a central database, contact coordinators and peers for health advice and information, and communicate with doctors and patients. In their study of Nigerian doctors, Idowu et al. (2003) described how the doctors used mobiles to communicate with one other within a large hospital, and to respond to emergencies when offsite. In both studies, the mobile phone infrastructure facilitated the delivery of basic healthcare efficiently while overcoming the challenges of constrained access and delayed interventions.

As the uptake of mobile mobiles increases globally, researchers have also observed that mobile phones can create rural-urban and international linkages that could add to the social capital of marginalized populations (Heeks, 2008b). In these cases, better flow of information through social ties that are maintained by mobile phones can help the poor make the best of opportunities that they might not have been aware of.

Applying the Senian Approach Using the Concept, Mattering

In *Development as Freedom*, Amartya Sen (1999) argued that indicators of development are both economic and non-economic in nature. Sen's freedoms approach contends that development is about freedom from the vicissitudes of poverty as well as from other societal features that constrain the ability of the poor to make choices that will better their lives. The Senian approach takes into account that development is so much more than economics. Mobile phone use may make a difference for economic growth but its effects may be enhanced when the social milieu supports the development efforts. Defining development as more than economic development is important because community norms and values can determine developmental outcomes. Sen highlighted how "values and social mores affect the presence or absence of corruption and the role of trust in economic or social or political relationships" (p. 9). Consistent with the Senian view of development, the Asian Development Bank (2003) also believes that development goes beyond alleviating poverty and the provision of basic services. When access to information is increased, the poor can gain access to a wider range of life options and therefore play a greater role in determining their future. Equally important are other intangibles such as the freedom to participate in the wider society and feelings of empowerment.

The Senian approach focuses on development as the expansion of a freedom of choice not just in the economic domain but other domains such as healthcare, education and political participation. In fact, the Senian approach seems to be more closely aligned with the Millennium Development Goals which encompass development in different domains of daily life. Smith et al. (2011) made the case for the potential of mobile phones in extending human capabilities in a paper that applies Sen's capability approach. The authors argued that mobile phones increased access to timely and relevant information, and expanded possibilities for increase connectedness between people. Beyond this recent study, empirical research that applies the Senian approach to ICT4D is scarce, presumably because Sen himself has not suggested any methods of operationalizing his largely normative insights.

Mattering as a social effect. Related in a sense to several of Sen's "substantive freedoms" (e.g. freedom of thought, of emotions, and of affiliation) is a concept from the field of social psychology, "mattering." Mattering is defined as the perception that people have of how significant they are to others (Rosenberg & McCullough, 1981). Mattering has been said to be integral to people's self-concept and their sense of where they fit in their social networks and mattering is profoundly important for both self and society. For individuals, the perception that who they are and what they do are relevant to others can keep feelings of alienation at bay. For society, mattering is an essential element of feelings of social bonding in the social networks and structures.

Empirical verification of the construct of mattering in social psychology has thus far uncovered three dimensions – awareness, importance and reliance. Awareness refers to the "merest of senses if others realize that we exist" (Elliot, Kao, & Grant, 2004, p. 340). Importance

refers to the extent to which people are the object of others' interest and concern. Reliance refers to the extent to which others depend on us. In an empirical validation the concept of mattering, Elliot et al. (2004, p. 353) established the discriminant validity of three components of mattering and concurred with Rosenberg and McCullogh (1981) that mattering is one of the primary motivators in the self-concept and expected that the concept would be relevant to a wide range of social phenomena.

In previous examinations of female microentrepreneurs in India, the construct of perceived empowerment was found to be related to mobile phone use (Ilavarasan & Levy, 2010; Chew, Ilavarasan, & Levy, 2010; Chew, Levy, & Ilavarasan, 2011). The construct comprised items such as "because of my business, I am feeling more confident", "because of my business, I have gained respect among my friends and in my neighborhood", and "because of my business, my parents-in-law are proud of me." These items share conceptual similarities with particularly the important and awareness components of the mattering construct. If measures of reliance had been deployed in the Mumbai study and if the Mumbai data were then re-analyzed, it is possible that what was conceptualized as perceived empowerment is actually mattering.

The conceptual clarification of perceived empowerment and mattering might be of interest to the ICT4D field in two ways. First, it will introduce a social psychological construct that has already been empirically validated and it will clarify the somewhat vague concept of perceived empowerment. This endeavor will improve the parsimony of the social psychological construct. Second, by using the term mattering, we can focus on the empirical examination of a self-construct without getting into the ideologically-tainted rhetoric that sometimes surrounds discussions of the enfranchisement of women (Kabeer, 1999; Rowlands, 1997).

Thus, inspired by the Senian capabilities framework, this dissertation will examine the relevance of the construct of mattering in ICT4D research. At the framework level, this endeavor will be an attempt to bridge the economic goals of development to the other goals that address the broader well-being of the poor. At the theoretical level, the dissertation will examine one key social consequence of mobile phone use for microentrepreneurs in the form of mattering. As such, the following research question is posed:

RQ3: What is the relationship between mobile phone use and mattering?

CHAPTER 3

Women Entrepreneurs in India

India holds great promise as a site for research about the mobile phone productivity paradox for three reasons. First, the country currently has an overall mobile teledensity of 79% (TRAI, 2012). Average price per minute of mobile phone use in India is one cent (in USD) and is among the lowest in the world (UNCTAD, 2011). In urban areas, the total number of mobile subscribers is 596 million and the mobile teledensity is 163%. With the number of mobile phones exceeding the number of people in Indian cities, claiming that mobile phones are "everywhere" in this context would not be an exaggeration, at least not by far.

Second, Indian cities are home to a great number of microenterprises that provide employment for impoverished workers. According to the NSSO (2000), the greatest number of "establishments" (in practice, microenterprises) – some 4.2 million – are found in the cities of India, a figure that is three times that of the number located in India's vast rural areas. This informal sector is also estimated to account for two-thirds of total employment (Srivastava, 2005). Currently, the vast majority of new connections to mobiles worldwide occur amongst the urban poor, a trend that is only projected to continue. Therefore, the frontier of socio-economic exclusion and inclusion in emerging networked societies is in urban spaces (Qiu, 2009). A study in this research context will thus shed light on how mobile phones are used by urban microentrepreneurs and perhaps start to unravel the mobile phone paradox.

Third, despite widespread access to mobile telephony and multitudes of microenterprises, India still has one of the largest income gaps in the world (GSMA, 2011). This mismatch between mobile access and income makes India an archetypal context of the mobile phone

paradox. Indeed, in the urban areas of India, we seem to be seeing mobile phones everywhere but in poverty alleviation. Also, the case of India is particularly relevant to this dissertation because the country has one of the most profound gender gaps in South Asia. There are 137 million fewer women than men, and women are 31% less likely than men to own a mobile phone (GSMA, 2011). The presence of this gender gap makes India an ideal site for examining the role of mobile phones in achieving social development outcomes.

Returning to the three research goals of this dissertation, urban India is a suitable context because: (1) There is a large number of microentrepreneurs; (2) It is an archetype of the mobile phone paradox with its huge income gap despite the widespread access to mobile phones; and (3) There is both an income gap and a gender gap that would allow this dissertation to examine the role of mobile phones in achieving economic and social development outcomes.

RESEARCH METHOD

Sample Design

One survey comprising three samples were conducted in Chennai, India: one, a general survey of women who own microenterprises, one of women who own microenterprises who had received microloans, and one of women who own microenterprises in three specific industrial sectors (leather, plastics, and engineering). The "industrial sectors" survey involved microenterprises in the manufacturing sector (MOSPI, 2008) as we wanted to investigate if the use of mobile phones differed among industrial sectors. In our previous study in Mumbai, India, the manufacturing sector was omitted from the analysis because the number of microenterprises in this sector was too small. The inclusion of manufacturing firms in these industrial sectors was to ensure that there would be a sufficient number of them to run the sector level analyses.

The surveys were administered by trained interviewers from a local marketing firm, selected through the competitive bidding policies of the Indian Institute of Technology-Delhi. The surveys were in the field from March to May, 2011. Permission to use data from the three surveys was granted by Dr. P. Vigneswara Ilavarasan, principal investigator, Indian Institute of Technology, Delhi. The data-gathering was supported by a research grant from the International Development Research Centre (IDRC), a Crown corporation in Ottawa, Canada.

For data-gathering purposes, a microenterprise[4] was defined as a business that has between one and ten hired workers. Data for the general survey was gathered using a multi-stage

[4] There is no consensus among researchers about the definition of a "microenterprise" and reports often conflate micro-, small-, and even medium-sized businesses. Some researchers cap microenterprises at five or fewer workers or, invoking International Labor Organization, United

random sampling technique, coupled with a random walk procedure. The first stage was composed of 31 "investigative units" (IV) of the Indian government's National Sample Survey Office (NSSO), selected by simple random sampling from the 305 IV units in Chennai City. Two reserve IV units were selected at the same time. The IV is a geographic area typically made up of 15-20 "blocks," where a block has a population of 600 to 800 persons and has clear cut identifiable boundaries and landmarks. Nine interviews were conducted in each of the 31 IVs, a clustering method that is generally consistent with common survey practice.

All the blocks in a given IV were numbered. As the second stage in the sampling frame, one block in each IV unit was selected by simple random sampling. A number was assigned to each corner of each block selected, going clockwise around the block starting in the uppermost left-hand corner. One of the corners was then chosen by simple random sampling. That corner became the final stage in the multi-stage cluster sample and was the starting point for the interviews.

Interviewers were instructed to follow a predetermined, random walk from the starting point. As a part of providing instructions to the survey interviewers, four possible directions (left, right, forward, back) were listed and all possible ways of walking in any Indian road/street. A direction was chosen by simple random sampling and the interviewer proceeded in that direction along the flow of traffic until the first interview is completed. For each subsequent interview, a new direction (left, right, forward, back) was again selected by simple random sampling and the

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Nations, or British government criteria, set the limit at ten employees. In India, the site for this dissertation, the National Survey Sample Organization (NSSO, 2000 and 2012) categorizes very small businesses by the number of workers, while the Indian Ministry of Micro, Small, & Medium Enterprises bases its definition on the value of physical plant and machinery.

interviewer continued walking within the selected IV until all interviews have been completed. In order to ensure adequate representation of various size microenterprises, the following quotas within each IV unit were established: three enterprises with 1–5 hired workers and six with 6–9 hired workers. These quotas approximate the distribution of microenterprises by number of hired employees as reported by the NSSO.

The final sample size for the general survey, which was based on the multi-stage random sample described above, was 298 respondents and the response rate was about 80% based on the field reports from the interviewers and the survey agency. This rate was slightly higher than the 67% reported in previous research using the same sampling design (Ilavarasan & Levy, 2010).

For the microloans survey, the list of respondents was generated from three sources – the City Commissioner, the Working Women's Forum, and the Sornammal Educational Trust. This list generated 150 microentrepreneurs who received microloans and the response rate was about 79%. For the "industrial sectors" survey, there was no existing list of microenterprises in each of these sectors and it was more efficient to use a snowball sampling method. Seventy enterprises were first selected from each of the three industrial sectors (leather, plastics, and engineering). With the assistance of local informants, geographically contiguous neighborhoods in which a substantial number of microenterprises can be clearly identified as being in one of the three industrial sectors were sought out. In developed countries, industrial business sectors located in the same geographic area have been found to improve business performance by endowing certain localities with resource advantages while simultaneously sparking innovation through competition among geographically proximate members (Breschi & Malerba 2001; Porter, 2000; Pratt, 2000). As this phase is an exploratory one, the size of the sample (n = 150) was fixed by

limitations of time and resources. Taken together, the general survey, the microloan survey, and the industrial sector survey produced an initial *N* of 598 that included both mobile phone owners and non-owners.

Questionnaire Construction

The questionnaire drew heavily on a questionnaire developed for a previous study of microenterprises in Mumbai, India (Ilavarasan & Levy, 2010). For this dissertation, items that were inserted included better indicators of overall mobile phone use: "how often do you receive calls from your business suppliers?" and "how often do you receive calls on your mobile from your customers?" Two new measures of perceived benefits mobile phones – relationship maintenance and productivity – were also conceptualized. Items for these measures included: "my mobile phone has improved my relationships with my business suppliers" and "because of my mobile phone, I do not travel much for business purposes". According to the manager of the survey field staff, each interview in Chennai ran for no more than 45 minutes. To reduce respondent burden and interviewer fatigue, three short breaks of a few minutes were built into the survey.

With initial approval from the Michigan State Institutional Review Board, a draft questionnaire was pilot tested in Chennai by Dr. Ilavarasan with a convenience sample of 10 women who own microenterprises. Modifications were subsequently made to the questionnaire and the final version was approved by the MSU IRB on January 6, 2011. On December 21, 2011, the MSU IRB issued a closure of the protocol. The final version of the questionnaire was translated into Tamil, the predominant language of Chennai. To ensure that a linguistically and culturally Tamil text had been created, the Tamil version of the questionnaire was then back-

translated into English by a local translation service in Chennai. Interviewers carried both a Tamil and an English version of the questionnaire and respondents were given the opportunity to indicate from which version they preferred to be interviewed.

Data Handling and Analysis

Completed interviews were returned to P.I. Ilavarasan once a week. The physical questionnaires are kept in a locked office at the Indian Institute of Technology, Delhi. Respondents were contacted by Dr. Ilavarasan and a research assistant to verify that the interview had taken place. Once the interview had been verified, the signed consent form on page one of the survey which contained identifying information was removed from the remaining pages and keep in a locked file cabinet. A computer data file was then created from the questionnaire. Since the signed consent form had been separated from the body of the questionnaire, the data file did not contain any information linking individual respondents to their responses.

Operational Measures

The following section describes the operationalization of the three dependent variables and the 13 independent variables. Appendix 2 lists eight of these independent variables and the respective items that comprise these variables using the exact wording from the questionnaire. The operationalization of the other five single-item independent variables is detailed below. Where appropriate, the most common measure of reliability, Cronbach's alpha (Cronbach, 1951), is listed.

The rationale for choosing the three dependent variables was twofold. On their own, the analysis of the individual dependent variables addresses the research questions and hypotheses in

this dissertation. As a set, the three dependent variables collectively will offer a narrative of the overall effect of mobile phones which includes both economic and social effect. This broader narrative calls to attention of ICT4D researchers and policymakers that the effect of mobile phones will vary considerably depending on how effect is defined, measured and analyzed.

Dependent variables. The first dependent variable, business growth, is operationally measured the year-over-year increase in revenue reported by the microentrepreneur. For this sample, the mean business growth was 6.26, *SD* = 12.92, range = -50 – 80. About seven percent of the microentrepreneurs reported negative growth of one percent to fifty percent. About two in five (38.2%) of the microentrepreneurs reported no growth. Another two in five (38.2%) reported growth of between one to ten percent. Another 11.3% reported growth between ten and 20%. The rest (2.7%) reported growth between 20 to 80%.

The use of the year-over-year change in revenue in this dissertation is consistent with previous work in another research site (Chew, Ilavarasan, & Levy, 2010; Chew, Levy, & Ilavarasan, 2011). From these studies, we found that the majority of microenterprises do not keep financial records, making the data collection of revenue reliant on recall. This use of the year-over-year change in revenue originated from the pilot study in 2008. In that pilot study, the survey interviewers found that entrepreneurs were reluctant to disclose the amount of business income in real money terms. Presumably, they are concerned about the information being used for tax purposes (de Mel, McKenzie, & Woodruff, 2009). Attempts to ask indirect questions such as “how much money would it take to start a business like this now?” were also unsuccessful in gaining compliance. The respondents were more willing to comply when the question of business income was measured in terms of percentage change. This measure of business growth

has been used consistently in the published research. In previous research (Chew et al., 2010; Chew et al., 2011), the logarithmic transformation of the measure of business growth was calculated to correct for skewness in the dataset. In the current dataset, the distribution of business growth is close to normal (skewness[5] = .76) and the measure of business growth was retained in its original form (year-over-year percentage change in income).

Two attempts were made to improve the reliability of the measure of business growth for this dissertation. In the first, self-reports of the year-over-year change in the number of hired workers was explored as another possible indicator of business growth. However, the change in number of hired workers was not significantly correlated with business growth and produced a low correlation coefficient, $r(335) = -.016$, *n.s.* Indeed, the correlation between change in hired workers and business growth was negative. One possible explanation might be for this seeming contradiction is that the increase in the number of hired workers entailed higher labor costs and thus decreases annual income (LaPorta & Schliefer, 2008).

In the second attempt to increase the reliability of the indicator of business growth, six additional items based on the assumption that year-over-year profits had increased were considered: the use of increased revenue to buy more supplies, to start a new branch, to hire more workers, to save money to reinvest later in business, to buy things for the family, and to save money for health emergencies. This exploratory index of business growth was a count variable (1 = yes, 0 = no; $M = 2.60$, $SD = 1.14$, range = 0 – 6). This variable was moderately correlated with the percentage change in annual income, $r(335) = .27$, $p < .001$. However, the

[5] One statistical rule of thumb is that distributions with skewness values between -1 and 1 are close to normal.

composite measure of growth indicators and business growth had very low reliability (α = .241) even when both were standardized and scaled. One possible explanation for the low reliability may be that in scaling to prevent over-weighting of either variable, each growth indicator (e.g. relocation to a larger premise) is invariably equated to a percentage change in business growth. This matching may not be valid as increased profitability is often the pre-requisite for the other business growth indicators. In statistical terms, the two variables are not measuring the same latent variable of business growth (Hays, 1981). In the interest of maintaining statistical validity, neither the change in number of hired workers nor growth indicators were added to the measure of business growth.

The second dependent variable is economic growth linked to mobile phones. This dependent variable is the perception of increased business growth that the entrepreneurs specifically attribute to mobile phones. Growth linked to mobile phones was based on a four-item index comprising: "my mobile is an important tool to help my business grow", "after I bought my mobile phone, my profits increased", "using your mobile for business helped improve the way you do business", "using my mobile phone is helping my business make a bigger profit right now" (α = .71, *M* = 3.02, *SD* = 1.08).This variable was constructed by summing and averaging the component items. Missing data were replaced with mean values but only when fewer than 10% of the cases were missing for a component item and only for cases in which no more than a third of the items in an index would be replaced.

The third dependent variable is mattering. The current examination of mattering is based on the premise that the use of mobile phones may yield social development outcomes in addition to economic ones. Indeed, the literature reviewed above about women and mobile phones use

suggested that mobile phones may have an empowering function for women users by improving their sense of agency and control, increasing self-esteem and self-confidence, and improving power relationships (Garrido & Roman, 2006; Huyer, 2005; Maier & Nair-Reichert, 2007; Slater & Tacchi, 2005). However, the use of the umbrella term of empowerment may pose problems of conceptual obscurity as can be seen in the multiple ways that empowerment is operationalized in the current literature. One purpose of this dissertation is to maintain conceptual clarity and precision in the measurement of the social development consequence of mobile phone use. To this end, mattering is used for the reason that it has been empirically validated and examined in health and interpersonal communication over the past three decades.

To create indices of mattering that were appropriate to the research context, the three factors that comprise mattering – importance, awareness and reliance, were first adapted from Elliot et al. (2004). To recap, importance refers to the extent to which people are the object of others' interest and concern. In the research context, survey items that were selected for the factor analysis probed the significance of entrepreneurs' business activities to their family and social networks. Awareness refers to the merest of senses if others realize that we exist. In the research context, survey items that were selected for the factor analysis probed the social acceptance of the women's business activities by males in their social networks. Reliance refers to the extent to which others depend on us. In the research context, survey items that were selected for the factor analysis probed the financial independence of the women as a proxy to the extent to which their family can depend on their business success.

Although all the survey items were selected based on their conceptual similarities to the three factors of mattering, they were not assigned *a priori* into the respective subscales. Instead,

a principal axis factor analysis with varimax rotation was conducted to assess the underlying structure for the 14 items measuring the concept of mattering. (The assumption of independent sampling was met. The assumptions of normality, linear relationships between pairs of variables, and the variables being correlated at a moderate level were checked). Three factors were requested, based on the fact that the items were designed for the three constructs: importance, awareness, and reliance. After rotation, the first factor accounted for 26.8% of the variance, the second factor accounted for 19.9%, and the third factor accounted for 15.4%. Table 1 displays the items and factor loadings for the rotated factors, with loadings less than .40 omitted to improve clarity. The first factor, which seems to index importance, had strong loadings on items 5-10. Item 4 had a cross-loading on both the first and third factors and was dropped from the sub-scales construction. The second factor, which seemed to index others' awareness of the women's business activities, had high loadings on items 11-14. The third factor, which seemed to index the microentrepreneurs' financial independence, had high loadings on the first three items.

The first factor of mattering, importance, comprised six items on the first factor ($\alpha = .84$, $M = 4.30$, $SD = 0.45$). The second factor of mattering, awareness, comprised three items on the second factor ($\alpha = .84$, $M = 3.88$, $SD = 0.89$). The third factor of financial independence, comprised three items on the first factor ($\alpha = .63$, $M = 3.72$, $SD = 0.75$). The three factors of mattering had medium to high reliability for the respective subscales.

Table 1

Factor Loadings for the Rotated Factors of Mattering

Item	Factor Loading			Communality
	1	2	3	
1. My business generates some additional income for my family, but it is not the only source of money we have			.75	.59
2. I'm hoping my business will make me financially independent			.67	.46
3. I started my business because I didn't want to be idle at home			.71	.63
4. Because of my business, I am feeling more confident about my life in general.	.51		.51	.59
5. Because of my business, I have gained respect among my friends and in my neighborhood	.77			.63
6. Because of my business, my parents feel proud of me.	.81			.65
7. Because of my business, my parents-in-law are proud of me.	.77			.61
8. Because of my business, my husband shows me more respect.	.68			.55
9. Because of my business, my opinions are considered to be important in family decisions.	.63			.49
10. I am confident that I can run a successful business.	.64			.55
11. Male customers think that a woman can run a successful business		.67		.49
12. Male suppliers think that a woman can run a successful business.		.85		.76
13. I think the men in my family approve of my dealing with male customers and suppliers in my business		.86		.80
14. My neighbors approve of my dealing with male customers and suppliers in my business		.86		.82
Eigenvalues	4.90	2.31	1.41	
% of variance	26.58	20.07	14.90	

Note. Loadings < .04 are omitted

The awareness and importance sub-scales had reliability coefficients comparable with those found in existing studies (see Table 2 below). The reliance sub-scale had a lower reliability

coefficient than the ones found in existing studies. Table 2 provides a conceptual mapping of the sub-scales from interpersonal communication to the research context. Indeed, the third factor in the factor analysis seems to index the financial independence of the women entrepreneurs rather than the reliance of others on them. However, it should be mentioned that the focus of the other sub-scales are the businesses in that the first indexed the importance the women entrepreneurs feel as a result of their business and the second indexed the others' awareness of their business activities. Likewise, the financial independence of female microentrepreneurs can be considered a proxy for the extent to which their families will benefit from the success of the business. In a patriarchal culture where women are often perceived as a liability on the family's finances, financial independence makes them less of a liability on the family's finances and more of an asset to the family. Thus, reliance in this context does not index the extent to which others are dependent on the business but rather the extent to which the women entrepreneurs are not a financial liability. The reliability coefficient of .63 is less than desired values of greater than .70 but given the exploratory nature of mattering in ICT4D, this sub-scale in the concept is deemed acceptable (Cronbach, 1951) and can be refined in future studies.

Table 2

Conceptual Mapping of Interpersonal Mattering to Mattering in Current Research Context

Interpersonal mattering	Mattering in research context
Awareness (α = .82 to .87)	Awareness (α = .82)
▪ Most people do not seem to notice when I come or in a social gathering, ▪ Sometimes when I am with others, I feel almost as if no one recognizes me ▪ People are usually aware of my presence ▪ For whatever reason, it is hard for me to get other people's attention ▪ Whatever else may happen, people do not ignore me ▪ For better or worse, people generally know when I am around ▪ People tend not to remember my name	▪ Male customers think that a woman can run a successful business ▪ Male suppliers think that a woman can run a successful business. ▪ I think the men in my family approve of my dealing with male customers and suppliers in my business ▪ My neighbors approve of my dealing with male customers and suppliers in my business
Importance (α = .79 to .86)	Importance (α = .85)
▪ People do not care what happens to me ▪ There are people in my life who react to what happens to me in the same way they would if it had happened to them ▪ My successes are a source of pride to people in my life ▪ I have noticed that people will sometimes inconvenience themselves to help me ▪ When I have a problem, people usually don't want to hear about it ▪ Much of the time, other people are indifferent to my needs ▪ There are people in my life who care enough about me to criticize me when I need it ▪ There is no one who really takes pride in my accomplishments	▪ Because of my business, I have gained respect among my friends and in my neighborhood ▪ Because of my business, my parents feel proud of me. ▪ Because of my business, my parents-in-law are proud of me. ▪ Because of my business, my husband shows me more respect. ▪ Because of my business, my opinions are considered to be important in family decisions. ▪ I am confident that I can run a successful business.

Table 2 (cont'd)

- No one would notice if one day I disappeared
- If the truth be known, no one really needs me

Reliance (α = .83 to .87)	Financial independence (α = .65)
▪ Quite a few people look to me for advice on issues of importance ▪ I am not someone people turn to when they need something ▪ People tend to rely on me for support ▪ When people need help, they come to me ▪ People count on me to be there in times of need ▪ Often people trust me with things that are important to them	▪ My business generates some additional income for my family, but it is not the only source of money we have ▪ I'm hoping my business will make me financially independent ▪ I started my business because I didn't want to be idle at home

A confirmatory factor analysis indicated that the three-factor concept of mattering in this dissertation was an adequate fit, $\chi^2 = 242.59$, $df = 63$, $p < .001$, RMSEA[6] = .069, CFI = 0.940 (see Appendix 1). Modification indices suggested that dropping item 11 from the sub-scale of awareness would improve the model fit slightly, $\chi^2 = 188.03$, $df = 52$, $p < .001$, RMSEA = .066, CFI = 0.951. As this examination of mattering is an exploratory one, item 11 was retained given the very slight increase in model fit. The inclusion or omission of the item in the awareness sub-scale should be re-assessed when the concept of mattering is replicated in future studies.

[6] RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index. Three measures of goodness-of-fit were used: the overall chi-square test of fit; as Byrne (1989) cited; RMSEA as Browne and Cudeck (1993) cited, and CFI as Hu and Bentler (1999) cited.

Furthermore, in the interest of having fewer predictors in the regression models later, a grand 14-item mattering measure was constructed ($\alpha = .84$, $M = 4.10$, $SD = 0.45$).

By conceptualizing mattering as being a function of mobile phone use, this dissertation does not rule out the possibility of the reverse causal relationship in which increased perceptions of mattering lead to greater mobile phone use. This question of endogeneity has been posed in our previous work on business growth. In subsequent analyses, we were able to assess the statistical support for the plausibility of a recursive relationship (Chew et al., 2011). Since this dissertation is primarily concerned with examining the effect of mobile phone use, the causal effect of mobile phone use on mattering serves as the logical start point of the analysis. The reverse causal relationship or a recursive relationship will be the subject of subsequent research on the concept.

Independent variables: Respondent attitudes and behaviors. Based on previous research, several other variables predict business growth. These variables are grouped into characteristics of the entrepreneurs, characteristics of the business, and the demographics of the entrepreneurs.

Characteristics of the entrepreneurs include the growth orientation of the businesswomen. This variable measured the attitudes of the entrepreneurs towards their future growth in terms of anticipated workforce expansion and anticipated profits. In recent studies of entrepreneurial characteristics, growth orientation might also relate to risk-taking behavior (Acharya, Rajan, & Shoar, 2007; de Mel et al., 2009). While this dissertation did not assess risk-taking per se, the current measurement of anticipated growth follows an approach similar to a recent study by Verheul, Thurik, Grilo, and van der Zwan (2012) who referred to these attitudes as “wanting it”

(business growth). To assess growth orientation, seven items measuring the anticipated growth by the entrepreneurs were identified and a principal axis factor analysis with varimax rotation was conducted to assess the underlying structure of the items. After rotation, the first factor accounted for 43.3% of the variance and the second factor accounted for 20.4%. Table 3 displays the items and factor loadings for the rotated factors, with loadings less than .40 omitted to improve clarity.

Table 3

Factor Loadings for the Rotated Factors of Growth Orientation

Item	Factor Loading		
	1	2	Communality
1. There is substantial demand for our product/services.		.72	.52
2. I won't think of myself as a successful businessperson unless my profits grow every year.		.59	.39
3. I won't think of myself as a successful businessperson unless I can hire some new workers every year.	.89		.82
4. One year from now, I expect to be making more money in my business.		.80	.65
5. One year from now, I expect to have more hired workers in my business.	.89		.81
6. Five years from now, I expect to be making more money in my business.		.73	.56
7. I will have more employees in next 5 years	.82		.72
Eigenvalues	3.03	1.43	
% of variance	43.3	20.4	

Note. Loadings < .040 are omitted

The first factor, which seems to index anticipated workforce expansion, had strong loadings on items 3, 5 and 7. The second factor, which seemed to index anticipated increased profits, had high loadings on items 1, 4 and 6. Item 2 had loading below .6 and was dropped from the sub-scales construction. Growth orientation in terms of anticipated workforce expansion

comprised three items on the first factor (α = .85, *M* = 3.08, *SD* = 1.13). The second factor of anticipated increased profits, comprised three items on the second factor (α = .71, *M* = 4.14, *SD* = 0.53).

As with mattering, a grand growth orientation index was calculated in order to reduce the number of factors in the subsequent regression models. The index of growth orientation comprised all six items in the two subscales (α = .80, *M* = 3.61, *SD* = 0.69). About 14.3% (81 of 335) of the entrepreneurs had growth orientation that was above one standard deviation of the mean. For the purposes of subsequent analyses, this group is considered as entrepreneurs with high growth orientation. About 18.5% (62 of 335) of the entrepreneurs had growth orientation that was below one standard deviation of the mean. For the purposes of subsequent analyses, this group is considered as entrepreneurs with low growth orientation.

The business use of mobile phones is a key independent variable in the analysis. The questionnaire in the Mumbai study asked only about the frequency with which respondents used mobiles to *call* customers, suppliers, etc. (Ilavarasan & Levy, 2010). As a methodological improvement, the Chennai questionnaire included three additional items that indexed both the frequency with which respondents used mobiles to call their customers, employees, and business suppliers; and the frequency with which the female microenterprises owners received calls *from* their customers, employees and business suppliers, α = .82, *M* = 1.64, *SD* = 0.72. This expanded composite measure not only increased the reliability of the previous measure, it also allowed for a more fine-grained examination of the actual business processes. This detailed examination may shed light on the exact business processes that are associated with entrepreneurs with higher business growth.

The social use of mobile phones was a two-item measure that indexed the frequency that the business owners call their family and friends to talk about non-business related things and how often they receive calls from family and friends to talk about non-business related things, $r(335) = .556$, $M = 3.53$, $SD = 0.82$. The inclusion of the social use of mobile phones is based on existing literature that suggests that even non-business related calls can have a business effect. For instance, Jensen (2007) found that fishermen in Kerala, India reported better "peace of mind" while they are working at sea because they can use mobile phones to call home to make sure that the family is all right.

An index of the perceived benefits of mobile phones was created using two multi-item measures. First, the perceived benefit of relationship maintenance comprised three items: "having a mobile phone makes it easier for me to deal with male customers," "having a mobile phone makes it easier for me to deal with male suppliers," and "my mobile phone has improved my relationships with my business suppliers" ($\alpha = .80$, $M = 2.50$, $SD = 1.22$). The perceived benefit of increased business productivity was indexed by seven items: "having a mobile phone makes it easier for me to balance my business life and my home life," "I get more work done because I own a mobile phone," "because of my mobile phone, I do not travel much for business purposes," "because of my mobile phone, I receive business calls at any time," "because I own a mobile phone, I feel more confident in running my business," "because of my mobile phone, I feel more self reliant," and "because of my phone, I am able to do business with strangers without much hesitation" ($\alpha = .97$, $M = 3.62$, $SD = 1.21$).

Independent variables: Microenterprise characteristics. The second category of independent variables comprised different characteristics of the businesses. These included the

customer reach of the microenterprise, the number of hired workers, and the formality of business operations. The customer reach of the business was a single item measure that was indicated by the geographical locations of the customers. The business owners were asked to indicate if customers came primarily from the neighborhood (coded as 1), other parts of Chennai, outside Chennai or outside India (coded as 4). There are two ways that customer reach may be related to the other variables in the analysis. First, businesses with a higher customer reach may be associated with higher business growth since they could be servicing more clients in a larger geographical area. Second, a higher customer reach may require the business owners to use their mobile phones more extensively in order to stay connected to their clients. In these instances, the mobile phones are reducing the transactional costs between businesses and their customers by eliminating the need to travel or allowing business-owners to market their services to more potential customers.

Another characteristic of the businesses, the number of hired workers, was operationalized as the number of hired, full-time employees in the businesses who were not immediate family members. The number of hired workers may be associated with business growth in conflicting ways. Businesses with higher growth might hire more workers but the more hired workers a business has, the higher the labor costs. Thus, the net effect of hired workers may be enterprise-specific and bears further exploration in this dissertation.

Business formality was a count variable (yes coded as 1, no coded as 0) comprising five items: “is your business registered with the government?”, “is your business registered with an association?”, “does your business have a PAN (unique taxpayer I.D) number?”, “does your business have a bank account to use just for business purposes?” and whether financial records

are kept for business transactions. The mean for business formality was 0.52, *SD* = .73. This low mean is consistent with the findings from existing studies that the majority of microentrepreneurs are located in the informal sector of the economy.

Independent variables: Microentrepreneur characteristics. The third category of independent variables comprised the demographics of the women entrepreneurs. These included the education, caste, class, age, and the availability of domestic help. Education was indicated by how much formal education the women entrepreneurs had. This varied between "never been to school" to "master's degree or higher." Caste was indicated by whether the respondents self-identified as being members of a lower, middle or upper caste. Respondents also classified themselves as being poor, middle or upper class. Caste and class are relevant to the analysis because they are related to the economic sector the respondents tend to operate in. As Sridharan (2004) noted, the middle class tends to be "intermediate income groups in non-manual occupations, situated between a tiny, rich upper class and a majority of low income and manual occupation groups" (p. 411). Vissa (2011) also found that Indian entrepreneurs have a preference to work with those from their own caste group when forming a business because they share a common language. Age was measured by how old the women entrepreneurs were in years. The availability of domestic help was a count variable of whether the women entrepreneurs had part-time or full time domestic help and whether other members of the family (mother, in-laws and husband) share the domestic chores. Availability of domestic help was included in the analysis because of its relevance to the research context. Indeed, given the patriarchal nature of Indian society, women are typically prescribed home-based roles. Women who own and run a microenterprise are still not free from domestic work and their business activities must

understood in the context of dual home-work challenges (Sulandjari, 1998; Maier & Nair-Reichert, 2007).

Sample Characteristics

Taking the microenterprise as the unit of analysis, the mean number of full time hired workers (excluding members of the immediate family) was 1.12, *SD* = 1.85, range = 0 – 10. More than half (56.7%) of the microenterprises did not have any hired workers other than their immediate family members. About one-third of the microenterprises (37.1%) had between one and five hired workers, 6.2% had between six and ten workers. Compared to the national sample based on the most recent data (2009 – 2010) from the NSSO (2012), the businesses in the Chennai sample appear to have smaller operations. In the latest national survey, 66% of urban establishment had employees between one and five workers (including the owner), and 24% have between six and ten workers on their payrolls (NSSO, 2012). The daily wage rate for an urban worker was Rs. 125 (2.38 USD) for a male and Rs. 71 (1.35 USD) for a female.

Of the 598 microenterprises surveyed, only 6.4% had a landline phone in the workplace; while slightly more than half (56.0%) of women who owned those businesses had at least one mobile phone. Mobile phone ownership by Chennai female microentrepreneurs was twice as high as the national average of 28% for all Indian women (GSMA, 2011). The use of landline phones was excluded from the analysis in this dissertation given that less than one in ten microenterprises had them in the workplace. Also, our previous research also found that they are being used to meet business communication needs in an extremely limited manner (Chew et al., 2010). Indeed, many microenterprises maintained their landlines primarily because of the historically long waiting period to acquire a landline. Also, there is a belief that businesses need

to have a landline in order to maintain the business' presence in the business space, however infrequently these landlines are used (Ilavarasan & Levy, 2010).

A majority of female-owned microenterprises (47.3%) were in the service sector. Examples of services offered by respondents included beauty parlors, academic tutoring, laundry, and equipment rental. Some 29.4% of the microenterprises were trade sector businesses. As reported by respondents, typical businesses in trade included sellers of clothing, groceries, small electronics, dress materials, or jewelry. Some 23.3% of the microenterprises were in the manufacturing sector, including tailoring, dressmaking, toy making, tobacco products and bamboo furniture. Table 4 shows the breakouts of these business characteristics by mobile phone owners and non-owners. The average microenterprise had been in business for a decade (mode = 5 years, range = 3 months – 50 years), and only 7.4% had been started within a year of the survey. Nearly all (86.8%) of the microenterprise customers came from the "neighborhood," one in ten came from other parts of Chennai and 3.3% were from outside Chennai.

Table 4

Number of Hired Workers and Economic Sector by Owners and non-Owners of Mobile Phones

Number of hired workers	Mobile phone owners		Mobile phone non-owners		Overall	
0	155	(46.3%)	184	(70.0%)	339	(56.7%)
1 – 5	148	(44.2%)	74	(28.1%)	222	(37.1%)
6 – 10	32	(9.6%)	5	(1.9%)	37	(6.2%)
	335	(100.0%)	263	(100.0%)	598	(100.0%)
Economic sector						
Service	140	(41.9%)	142	(54.2%)	282	(47.3%)
Trade	124	(37.1%)	51	(19.5%)	175	(29.4%)
Manufacturing	70	(21.0%)	69	(26.3%)	139	(23.3%)
	334	(100.0%)	262	(100.0%)	596	(100.0%)

Of the 598 female microentrepreneurs sampled, 80.3% were married and had an average of two children (mode = 2.0, range = 0 – 7). The mean age was 38.9, *SD* = 9.97. Only 3.8% had full-time or part-time domestic help although 37.8% said their husband shared in the work of maintaining the home. About four out of ten (38.3%) businesswomen had a personal bank account from which they could make withdrawals or payments on their own. One in ten of the women entrepreneurs had never been to school, 68.3% had a high school or higher secondary school education and only 6.3% earned a diploma, bachelor's degree or higher.

All of the respondents said they speak Tamil and 73.4% can write the language. Less than two in ten (17.7%) spoke English, 23.2% could read English, and 19.4% could write it. In terms of numeracy, only two in five (18.1%) of respondents said they could calculate taxes or interest, another 59.7% said they could do simple arithmetic, while only 3.7% said they could recognize or write numbers but could not do calculations.

In terms of caste, 36.3% identified themselves with the lower caste, 57.4% with the middle caste and only 6.4% with the upper caste. In terms of social class, 15.7% identified themselves as the poor class, 29.9% as lower class, 21.6% as the lower middle class, 25.4% as the middle middle class, 7.2% as the upper middle class and only 0.2% as the upper class.

Owners and non-owners of mobile phones

Since a principal objective of this dissertation is to investigate the dynamics of mobile phone use, much of the analysis that follows draws only on the 335 female microentrepreneurs who were also mobile phone owners. In addition, to provide baseline comparisons between owners of mobiles and non-owner, independent samples t-tests were conducted for the key variables and presented in Table 5 below.

Table 5

Comparison between Owners and non-Owners of Mobile Phones

	Mobile phone ownership	*n*	*M*	*SD*	*t*	*df*	sig. (2-tailed)
Domestic help	No	263	0.99	0.25	-0.81	596	.421
	Yes	335	1.01	0.27			
Caste	No	263	1.53	0.56	-6.50	596	.000
	Yes	335	1.83	0.56			
Class	No	263	2.32	1.03	-8.95	596	.000
	Yes	335	3.16	1.20			
Age of business owner	No	263	40.54	10.98	3.61	596	.000
	Yes	335	37.60	8.90			
Education	No	263	2.33	1.05	-6.74	596	.000
	Yes	335	2.98	1.26			
Number of full-time hired workers	No	263	0.65	1.29	-5.71	596	.000
	Yes	335	1.50	2.12			
Age of business	No	263	12.05	11.09	3.40	592	.001
	Yes	331	9.29	8.73			
Formality	No	263	0.25	0.44	-5.37	596	.000
	Yes	335	0.52	0.73			
Customer reach	No	263	1.10	0.32	-3.06	596	.002
	Yes	335	1.21	0.53			
Growth orientation	No	263	3.46	0.67	-4.55	596	.000
	Yes	335	3.72	0.69			
Business growth	No	263	6.62	15.50	-0.31	596	.754
	Yes	335	6.26	12.92			

It appears that owners and non-owners of mobile phones divide along economic lines. Mobile phone owners are of a higher caste and class. Owners of mobile phones are also younger and more educated. In terms of business characteristics, owners of mobile phones have more hired workers; newer businesses; more formal operations and customers from a larger geographical locale. They also report a stronger desire to grow their businesses.

Curiously however, female microentrepreneurs without mobile phones scored higher in terms of raw numbers on the index of business growth, although this difference was not statistically significant. This observation runs counter to the dissertation's premise that mobile phones have a positive effect on business growth. Possible explanations for this finding include, first, the costs of maintaining a mobile phone may offset any increase in business growth. Indeed, Heeks (2008b) noted that there are concerns that the poor could be spending high proportions of their disposable income on airtime, to the detriment of a family's financial well-being. Second, owners of mobile phones may not always be using the phones for business purposes. Time spent on the phone chatting is time that could be spent earning money. Also, if the mobile phones are used primarily for non-business calls, then we would not expect a consequent growth in business.

To examine the possible effect of mobile phone ownership and growth orientation on business growth, business growth scores were subjected to a two-way analysis of variance (see Table 6) having two levels of mobile phones ownership (owners, non-owners) and three levels of growth orientation (low, average, high). Only the main effect of growth orientation was statistically significant at the .05 significance level. The main effect of growth orientation yielded an F-ratio of $F(2, 592) = 12.141$, $p < .001$, indicating that the mean growth orientation score was significantly greater for high growth orientation ($M = 4.78$, $SD = 1.99$) compared to average growth orientation and low growth orientation. The main effect of mobile phone ownership, $F(1, 592) = 1.296$, and the interaction effect of the two variables, $F(2, 592) = 0.06$, were not significant. Table 7 shows the descriptives for the two-way analysis of variance and Figure 1 shows the plot of the estimated marginal means.

Table 6

Two-Way Analysis of Variance for Business Growth as a Function of Mobile Phone Ownership and Growth Orientation

Variable and source	*df*	*MS*	*F*	*p*
Mobile phone ownership	1	248.83	1.29	.256
Growth orientation	2	2336.90	12.14	< .001
Mobile phone ownership*growth orientation	2	11.66	0.06	.941
Error	592	192.49		

Table 7

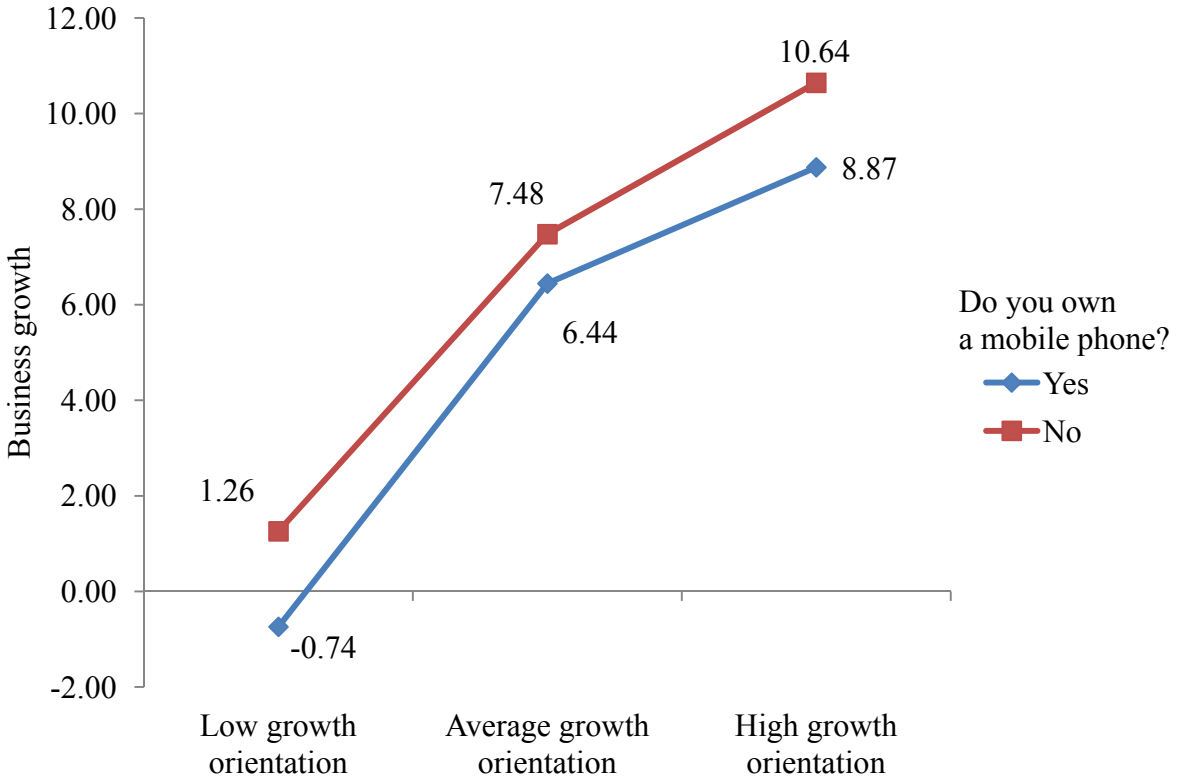
Means, Standard Deviations, and n's for Business Growth as a Function of Mobile Phone Ownership and Growth Orientation

	Mobile phone owners			Non-owners			Total	
Growth orientation	*n*	*M*	*SD*	*n*	*M*	*SD*	*M*	*SD*
Low	36	-0.74	10.73	57	1.26	14.57	0.48	13.19
Average	218	6.44	12.04	165	7.48	13.63	6.89	12.74
High	81	8.88	14.99	41	10.64	21.30	9.47	17.30
Total	335	6.26	12.92	263	6.62	15.50	6.42	14.10

Figure 1

Plot of the Estimated Marginal Means of Business Growth as a Function of Mobile Phone Ownership and Growth Orientation

For interpretation of the references to color in this and all other figures, the reader is referred to the electronic version of this dissertation.



The results of the two-way factorial analysis of variance are consistent with what decades of ICT4D interventions have eventually found – mere access to technology does not improve the well-being of the poor. In the analysis above, neither the main effect of mobile ownership nor the interaction effects of mobile ownership with growth orientation on business growth were statistically significant.

However, in order to continue endeavors in narrowing the digital divide, funding agencies need to be convinced that there will be positive effect for the poor. What existing

research and the preceding analysis have found is that the assumption that access facilitates development does not seem to be supported by empirical data. Certainly in the case of mobile phones, the near ubiquity of access to these devices did not create transformative improvements in the lives of poor. Since the primary interest of this dissertation is to understand the effect of mobile phones, the following analyses and results were conducted in service to this research problem. To foreshadow these analyses, the results will identify the boundary conditions for when mobile phones will make an impact on the economic and social development of the poor.

RESULTS

To begin to address the research questions and hypotheses, Pearson product-moment correlations were calculated using SPSS (2011) version 19.0. Table 8 shows the Pearson product-moment correlations among the dependent and independent variables. The results reported from this point forth are for the 335 microentrepreneurs who own mobile phones. Also, recall that the entire sample comprised three sub-samples: one general, one of microentrepreneurs who had microloans and one of microentrepreneurs in the manufacturing sector. To ensure that the three samples used were comparable in terms of their business growth, an *F*-test was conducted for the respondents who had microloans and those who did not. The groups were not statistically different, $F(1, 334) = 1.10$, *n.s.* An *a apriori* check for the industrial sector was not done since industrial sector is an independent variable listed in one of the research questions.

For the dependent variable, business growth, the correlation matrix indicated that microenterprise growth was correlated with perceived growth linked to mobile phones, the growth orientation of the business women, the business use of mobile phones, the perceived affordances of mobiles for relationship maintenance, and increased productivity. Business growth was also positively correlated with the number of hired workers, formality, the education level of the business women, and the amount of domestic help available.

The second dependent variable, perceived growth linked to mobile phones, was positively correlated with mattering, the growth orientation of the entrepreneurs, customer reach, number of hired workers, formality, education, and caste. This dependent variable was also highly correlated to the business use of mobile phones, the perceived affordances of mobiles for

relationship maintenance, and increased productivity. There was a negative correlation between age and perceived growth linked to mobile phones.

The third dependent variable, mattering, was positively correlated with the growth orientation of the business women, the social use of mobile phones, perceived benefit of mobile phones for relationship maintenance, number of hired workers, formality, and the availability of domestic help.

Hypothesis 1 posited that microentrepreneurs who use mobile phones for business purposes more will experience better business growth. This was consistent with the data and the zero-order correlation indicated in the matrix. There was a positive correlation between business use of mobile phones and business growth, $r(335) = .16$, $p < .001$.

To answer the other research questions and hypotheses, hierarchical multiple regressions were conducted to determine the best linear combinations of the independent variables and the three dependent variables. Four independent variables had non-normal distributions and the Box-Cox power transformation (Box & Cox, 1964; Osbourne, 2010) was performed using SPSS to render the distributions more nearly normal. The four independent variables were: number of hired workers, customer research, availability of domestic help, and formality. After the Box-Cox transformations, the assumptions of linearity, normally distributed errors, and uncorrelated errors were checked in each model and met.

To examine the relationship between microentrepreneurs' use of mobile phones and economic growth in the businesses they own (RQ1), the first hierarchical multiple regression was conducted with business growth as the dependent variable. When the number of hired workers, education, formality and the availability of domestic help, were entered, they significantly

predicted business growth, $F(4, 330) = 4.58$, $p = .001$, with two variables significantly contributing to the prediction. When the other variables were added, the prediction was improved: R^2 change = .05, $F(4,326) = 4.09$, $p < .01$. The entire group of variables significantly predicted business growth, $F(8, 326) = 4.42$, $p < .001$, adjusted $R^2 = .08$, however the predicted effect was small (Cohen, 1988).

The beta weights and significant values, presented in Table 9, indicate which variables contributed most to business growth. With this combination of predictors, the only significant predictor was the growth orientation of the entrepreneurs, $\beta = .14$.

Table 8

Pearson Product-moment Correlations among the Dependent and Independent Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Business growth	1															
2. Growth linked to mobiles	.24**	1														
3. Mattering	.03	.14 *	1													
4. Growth orientation	.22**	.30 **	.48**	1												
5. Business use of mobile phones	.16**	.55**	.06	.12*	1											
6. Social use of mobile phones	.080	-.091	.224**	.087	.021	1										
7. Relationship maintenance	.16**	.51**	.14**	.13*	.43**	-.21**	1									
8. Productivity	.23**	.81**	.10	.29**	.50**	-.24**	.54**	1								
9. Customer reach	.08	.19**	.05	-.01	.37**	-.13*	.28**	.17**	1							
10. Hired workers	.12*	.24**	.13*	.19**	.40**	.03	.20**	.25**	.31**	1						
11. Formality	.17**	.28**	.21**	.39**	.17**	.13*	.03	.26**	.15**	.20**	1					
12. Education	.12*	.28**	.07	.17**	.32**	.07	.03	.23**	.04	.10	.36**	1				
13. Caste	.09	.15**	.03	.12*	.14*	.14*	.02	.10	.15**	.17**	.24**	.26**	1			

Table 8 (cont'd)

14. Class	.05	.10	.09	.20**	.23**	.25**	-.01 <	.04	.03	.18**	.24**	.35**	.47**	1	
15. Age	-.08	-.13**	-.06	-.10	-.17**	.02	-.03	-.15**	.12*	.02	-.06	-.26**	.02	-.10	1
16. Domestic help	.121*	.09	.11*	.05	.09	.07	.03	.03	.03	-.07	.08	.10	.01 <	.06	.01 < 1

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

Variable	*M*	*SD*
1. Business growth	6.25	12.92
2. Growth linked to mobiles	3.03	1.08
3. Mattering	4.20	0.45
4. Growth orientation	3.72	0.69
5. Business use of mobile phones	1.64	0.72
6. Social use of mobile phones	3.53	0.82
7. Relationship maintenance	2.50	1.22
8. Productivity	3.52	1.21
9. Customer reach	1.21	0.53
10. Hired workers	1.50	2.12
11. Formality	0.52	0.73
12. Education	2.98	1.26
13. Caste	1.83	0.56
14. Class	3.16	1.20
15. Age	37.60	8.90
16. Domestic help	1.01	0.27

Table 9

Hierarchical Multiple Regression Analysis Summary Predicting Business Growth

		B	*t*	Sig
Model 1	(Constant)		-0.95	.341
	Hired workers	.10	1.77	.078
	Formality	.12	2.08	.038
	Education	.06	0.96	.340
	Domestic help	.11	2.10	.037
Model 2	(Constant)		-3.41	.001
	Hired workers	.04	0.69	.492
	Formality	.06	0.89	.376
	Education	.03	0.50	.617
	Domestic help	.10	1.95	.053
	Growth orientation	.14	2.40	.017
	Business use of mobiles	.02	0.21	.832
	Relationship maintenance	.06	0.85	.395
	Productivity	.11	1.60	.111

Dependent variable: Business growth

$F(8, 326) = 4.42$, $p < 0.001$; *Adjusted* R^2 for Model 2 = .08; ΔR^2 for additional variables = .05

From the regression analysis, the use of mobile phones and the perceived benefits of the mobile phones appear to have no effect on business growth. However, using mobiles for business communication might be working with other variables to generate business growth or suppressed by other underlying explanatory variables. As the correlation matrix in Table 8 indicated, the business use of mobile phones was positively correlated with business growth, $r(335) = .16$, $p<.001$. To investigate the possibility of an interaction effect, the interaction term of mobile phone use and growth orientation was included in the third step of the previous regression analysis (see Table 10).

Table 10

Hierarchical Multiple Regression Analysis Summary Predicting Business Growth with the Addition of the Interaction between Growth Orientation and Business of Mobile Phones

		B	*t*	sig
Model 3	(Constant)		-3.86	.000
	Hired workers	.03	0.47	.639
	Formality	.04	0.57	.571
	Education	.02	0.35	.726
	Domestic help	.12	2.16	.032
	Growth orientation	.17	2.78	.006
	Business use of mobiles	.02	0.30	.763
	Relationship maintenance	.05	0.75	.454
	Productivity	.13	1.86	.064
	Interaction of growth orientation and business use of mobiles	.13	2.34	.020

Dependent variable: Business growth

$F(9, 325) = 4.59$, $p < 0.001$; *Adjusted* R^2 for Model 3 = .09; ΔR^2 for interaction term = .02

In this model, the interaction term of growth orientation and business use of mobile phones was statistically significant, $\beta = .13$, $p < .05$. The overall R^2 of the model was .09. With the addition of the interaction term, the availability of domestic help was also a significant predictor. To investigate the nature of the interaction effect between growth orientation and business use of mobile phones, an interaction analysis was conducted (see Table 11 and Figure 2).

Table 11 provides the means for the predicted values of business growth orientation by business use of mobile phones and Figure 2 graphically represents the interaction effects between growth orientation and business use of mobile phones on business growth. The figure

suggests that entrepreneurs with a low growth orientation do not seem to benefit from the business use of mobile phones while those with a high growth orientation benefited the most from the business use of mobile phones in terms of their business growth.

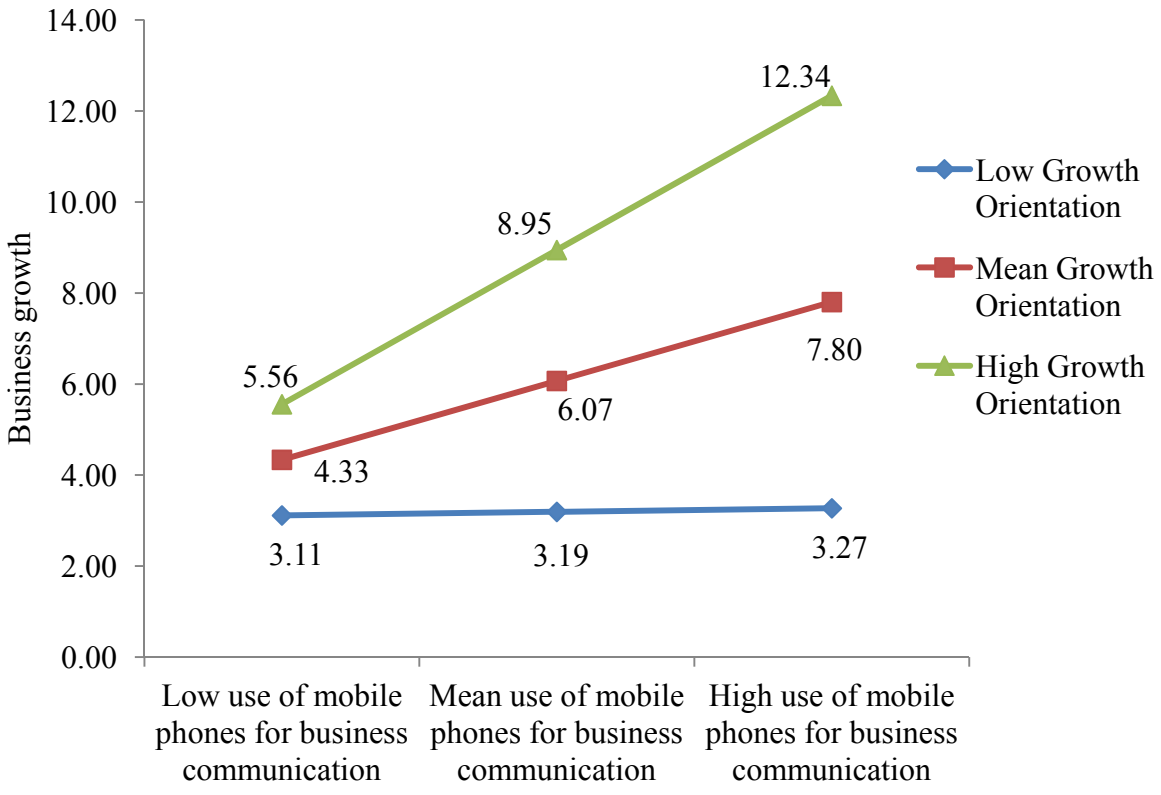
Table 11

Predicted Values of Business Growth by Growth Orientation and Business Use of Mobile Phones

		Growth Orientation		
		Low (-1 *SD*)	Mean	High (+1 *SD*)
Business use of mobile phones	Low	3.11	4.34	5.56
	Mean	3.19	6.07	8.95
	High	3.27	7.80	12.34

Figure 2

Plot of Interaction Effects of Growth Orientation and Business Use of Mobile Phones



Hypothesis 2 posited that, compared to livelihood microentrepreneurs, growth-oriented microentrepreneurs will benefit more from business use of mobile phones. The results of the interaction analysis above were consistent with hypothesis 2. In the analysis, growth-oriented microentrepreneurs are operationalized as those who are one standard deviation above the mean growth orientation of the sample. Livelihood microentrepreneurs are those who are one standard deviation below the mean growth orientation of the sample. This trifurcation is an analytical convention for interaction analysis in regression models (Aiken & West, 1991). The results from the regression and the subsequent simple slopes analysis suggested that growth-oriented microentrepreneurs benefitted more from business use of mobile phones compared to livelihood microentrepreneurs.

To address RQ2 which asked whether the economic sector in which the microenterprise was located made a difference to the relationships between mobile phones and business growth, a fourth step was added to the regression model. Here, the economic sectors of manufacturing, trade, and services were included as predictors of business growth. Each economic sector was dummy-coded as one or zero before it was added to the model (see Table 12).

None of the beta coefficients of the economic sector dummy variables were statistically significant. This suggests that, controlling for other variables, the average business growth of microentrepreneurs in the three economic sectors did not differ by sector. This is not to say that the economic sector is not important. The null findings for the economic sector may be due to the regression procedure; that is, the other variables in the model were accounting for most of the variance and when they were controlled, economic sector did not account for any more variance that were statistically significant.

Table 12

Hierarchical Multiple Regression Analysis Summary Predicting Business Growth with the Addition of Economic Sector Dummy Variables

		B	*t*	sig
Model 4	(Constant)	-	2.45	.015
	Hired workers	.02	0.27	.788
	Formality	.04	0.59	.558
	Education	.02	0.27	.790
	Domestic help	.11	2.10	.037
	Growth orientation	.16	2.68	.008
	Business use of mobiles	.02	0.31	.760
	Relationship maintenance	.05	0.81	.417
	Productivity	.13	1.86	.064
	Interaction of growth orientation and business use of mobiles	.12	2.23	.027
	Manufacturing sector	.06	0.31	.753
	Trade sector	.06	0.26	.804
	Service sector	.02	0.07	.947

Dependent variable: Business growth

$F(12, 322) = 3.50$, $p < 0.001$; *Adjusted* R^2 for Model 4 = .12; ΔR^2 for economic sector variables = .003

Hypothesis 3 inquires whether female microentrepreneurs with a higher social economic status would benefit more from the business use of mobile phones. To address this hypothesis, interaction terms of the social economic variables (education, caste, class and age) with business growth were added in the model. When the interaction terms of the socio-economic variables were added, they improved the prediction, R^2 change = .034, $F(4.321) = 3.16$, $p < .05$. The entire group of variables significantly predicted business growth, $F(13, 321) = 4.234$, $p < .001$, adjusted $R^2 = .11$. This is a small to medium effect (Cohen, 1988). The beta weights and significant values, presented in Table 13, indicate which variables contribute most to business growth. With this combination of predictors, the interaction terms of the socio-economic variables show

significant predictors to be education, β = -14 and age, β = -.12. This suggests that business use of mobile phones was different for women of different levels of education and age groups. To investigate the nature of these two interaction effects, two interaction analyses were conducted.

Table 13

Hierarchical Multiple Regression Analysis Summary Predicting Business Growth with the Addition of Interaction Terms of Social Economic Variables

		B	*t*	sig
Model 5	(Constant)		-4.42	.000
	Hired workers	.02	0.39	.694
	Formality	.05	0.73	.464
	Education	.06	0.90	.367
	Domestic help	.13	2.36	.019
	Growth orientation	.17	2.87	.004
	Business use of mobiles	.10	1.32	.189
	Relationship maintenance	.04	0.64	.523
	Productivity	.12	1.64	.102
	Interaction of growth orientation and business use of mobiles	.16	2.85	.005
	Interaction of education and business use of mobiles	-.14	-2.30	.022
	Interaction of caste and business use of mobiles	-.04	-0.69	.491
	Interaction of class and business use of mobiles	-.08	-1.21	.228
	Interaction of age and business use of mobiles	-.12	-2.08	.039

Dependent Variable: Business growth

$F(13, 321) = 4.23$, $p < 0.001$; *Adjusted* R^2 for Model 5 = .11; ΔR^2 for interaction terms = .03

Table 14 provides the means for the predicted values of education by business use of mobile phones and Figure 3 graphically represents the interaction effects between education and business use of mobile phones on business growth. The figure suggests that entrepreneurs who are more educated benefit less from the business use of mobile phones, while those with less educated are able to experience comparable business growth if they use their mobile phones for business purposes more intensively. Referring to Table 14, for women entrepreneurs who were

less educated, business use of mobile phones could make a difference of as much as 7.3% growth in their business. For the more educated group, the business use of mobile phones only made a difference of less than one percent in business growth.

Table 14

Predicted Values of Business Growth by Education and Business Use of Mobile Phones

		Education		
		Low (-1 *SD*)	Mean	High (+1 *SD*)
Business use of mobile phones	Low	1.57	4.72	7.87
	Mean	5.20	6.76	8.33
	High	8.83	8.81	8.78

Table 15 provides the means for the predicted values of the age of the female microenterprise owner by business use of mobile phones and Figure 4 graphically represents the interaction effects between microentrepreneur age and business use of mobile phones on business growth. The figure suggests that, compared to microenterprises owned by older women, the microenterprises owned by younger women benefit more if the owner uses her mobile phones for business purposes. In this analysis, younger entrepreneurs are between 18 to about 29 years old.

Figure 3

Plot of Interaction Effects of Education and Business Use of Mobile Phones

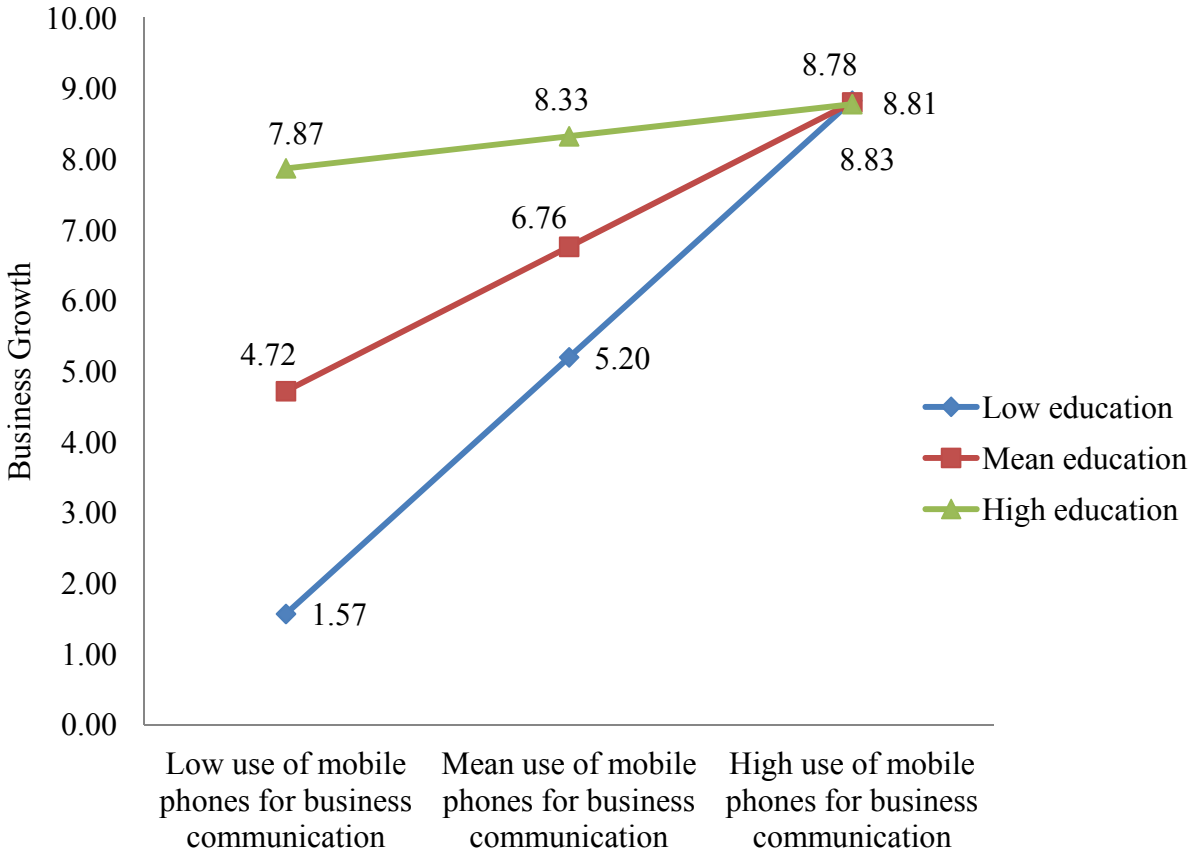


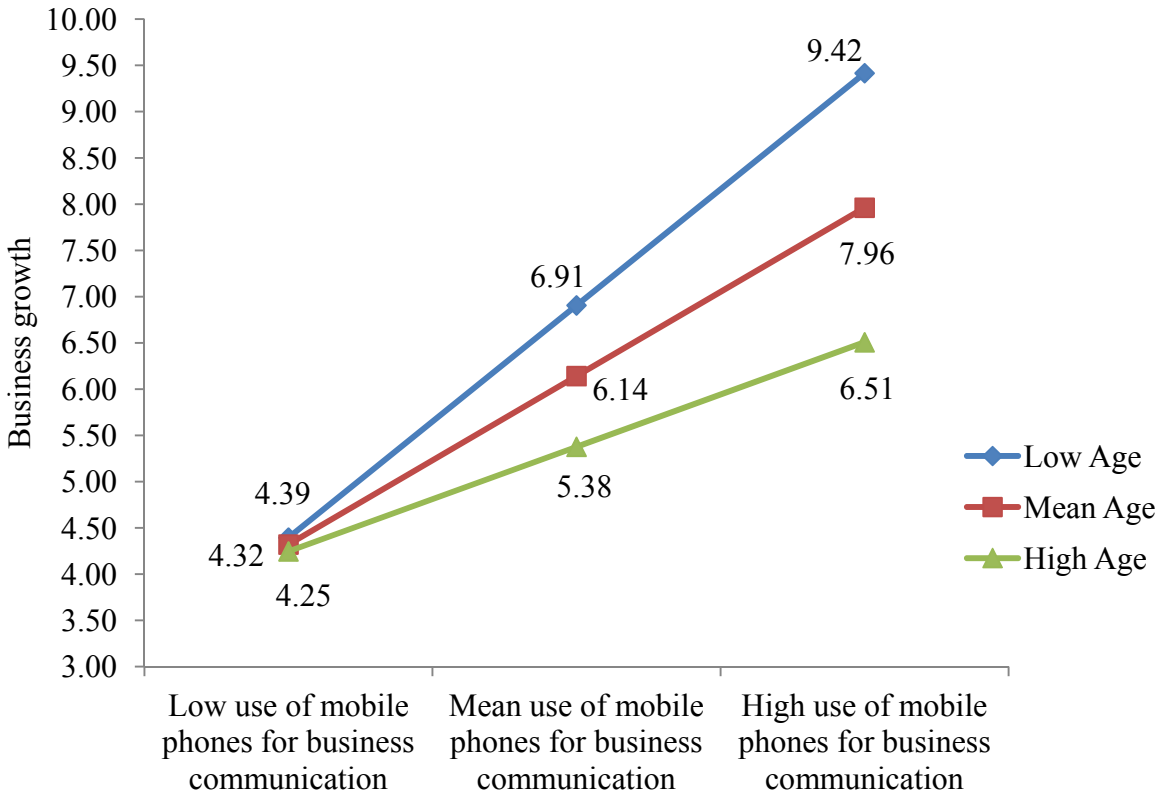
Table 15

Predicted Values of Business Growth by Age and Business Use of Mobile Phones

		Age		
		Low (-1 *SD*)	Mean	High (+1 *SD*)
Business use of mobile phones	Low	4.39	4.32	4.25
	Mean	6.91	6.14	5.38
	High	9.42	7.96	6.51

Figure 4

Plot of Interaction Effects of Age and Business Use of Mobile Phones



Hypothesis 3 posited that microentrepreneurs with a higher social economic status will benefit more from the business use of mobile phones. The findings from the preceding regressions and interaction analyses do not support that hypothesis. The microenterprises owned by women who belong to a higher caste or higher social class do not benefit more from the business use of mobile phones. In terms of education, a Matthew effect was not evident in the group who are more educated, i.e., those who are more educated do not report higher business growth even when they use their mobile phones for business purposes more intensively. On the contrary, the plot of the interaction effect in Figure 3 suggests that microenterprises owned by

women who are less educated but use their mobile phones for business purposes more intensively will experience business growth that is comparable with the more educated group, controlling for all other variables. In terms of age, the interaction effect of age and business use of mobile phones is consistent with the well-documented phenomenon that the younger generation worldwide are early adopters of new communication technologies and use them more intensively (ITU, 2008b; Locksley, 2009). The simple slopes in Figure 4 suggest that business growth is highest when younger women entrepreneurs use mobile phones for business purposes more frequently.

To address RQ1 from an alternative perspective, a second hierarchical multiple regression was conducted in which an alternative measure of business growth was tested. In this set of analyses, perceived business growth linked to mobile phones was considered the dependent variable and mobile phone use was the independent variable (see Table 16). The key difference between this dependent variable and the previously used business growth is that it indexes the retrospective attribution of the effect of mobile phone use on the microentrepreneurs' business growth. This dependent variable is constructed from questions that probed the microentrepreneurs' perceptions and recall of how much their business growth has benefited from the use of mobile phones.

Table 16

Hierarchical Multiple Regression Analysis Summary Predicting Growth Linked to Mobile Phones

		B	*t*	sig
Model 1	(Constant)		7.31	.000
	Hired workers	.15	2.73	.007
	Customer reach	.13	2.38	.018
	Formality	.16	2.82	.005
	Education	.16	2.84	.005
	Caste	.03	0.53	.596
	Age	-.12	-2.20	.029
Model 2	(Constant)		-0.84	.404
	Hired workers	-.04	-1.25	.213
	Customer reach	-.01	-0.32	.746
	Formality	.04	1.04	.297
	Education	.04	1.16	.247
	Caste	.04	1.20	.247
	Age	.01	0.16	.871
	Growth orientation	.06	1.83	.068
	Business use of mobiles	.18	4.48	.000
	Relationship maintenance	.09	2.22	.027
	Productivity	.65	15.85	.000

Dependent variable: Growth linked to mobile phones

$F(10, 324) = 76.48$, $p < 0.001$; *Adjusted* R^2 for Model 2 = .693; ΔR^2 for additional variables = .533

When the number of hired workers, customer reach, formality, education, caste and age were entered into the model, five of the six independent variables were significant predictors of business growth linked to mobile phones, $F(6, 328) = 11.12$, $p < .001$. Only caste did not predict business growth linked to mobile phones. With the inclusion of the five variables, the prediction was improved substantially: R^2 change = .53, $F(4,324) = 145.18$, $p < .001$. The entire group of

variables significantly predicted business growth, $F(10, 324) = 76.48$, $p < .001$, adjusted $R^2 = .69$. This is a large effect according to Cohen (1988). The beta weights and significant values, presented in Table 16, indicate which variables contribute most to business growth. With this combination of predictors, there are three significant predictors of growth linked to mobile phones: business use of mobile phones, $\beta = .18$, perceived benefit of mobile phones for relationship maintenance, $\beta = .09$ and the perceived benefit of mobile phones for increased productivity, $\beta = .65$.

To address RQ3 which focused on the antecedents of mattering, a third hierarchical multiple regression was conducted for the dependent variable of mattering (see Table 17). In contrast to the two earlier regression analyses which examined economic effect, the current analysis focuses on the social development consequence of mattering.

Table 17

Hierarchical Multiple Regression Analysis Summary Predicting Mattering

		B	*t*	sig
Model 1	(Constant)		39.66	.000
	Hired workers	.10	1.85	.065
	Formality	.18	3.34	.001
	Domestic help	.10	1.92	.056
Model 2	(Constant)		14.15	.000
	Hired workers	.02	0.44	.659
	Formality	.01	0.04	.971
	Domestic help	.07	1.52	.129
	Growth orientation	.43	8.41	.000
	Social use of mobiles	.21	4.21	.000
	Relationship maintenance	.12	2.46	.014

Dependent variable: Mattering

$F(6, 328) = 21.37$, $p < 0.001$; *Adjusted* R^2 for Model 2 = .27; ΔR^2 for additional variables = .22

When the number of hired workers, formality, and the availability of domestic help were entered, a significant linkage between business growth and mobile phones use was found, $F(3, 331) = 7.37$, $p < .001$, with formality significantly contributing to the prediction. When growth orientation, social use of mobiles, and the perceived benefit of relationship maintenance were added, they improved the prediction, $\Delta R^2 = .22$, $F(3,328) = 33.22$, $p < .001$. The entire group of variables significantly predicted business growth, $F(6, 328) = 21.37$, $p < .001$, adjusted $R^2 = .268$, a medium effect (Cohen, 1988).

The beta weights and significant values, presented in Table 17, indicate which variables contribute most to mattering. With this combination of predictors, there are three significant predictors of growth linked to mobile phones: growth orientation, $\beta = .43$, social use of mobile phones, $\beta = .21$ and the perceived benefit of mobile phones for relationship maintenance, $\beta = .12$. Conceptually, business growth could be a predictor of mattering in that greater business success would be associated a greater sense of self worth. However, business growth was not included in this regression model because it was uncorrelated with mattering, $r(335) = .03$, *n.s.* (see Table 8).

DISCUSSION

The preceding analyses and findings can best be understood as a series of smaller narratives that collectively tell a broader story about the effects of mobile phones on the female microentrepreneurs of Chennai and their businesses. These smaller narratives are derived largely from the three sets of multiple regressions. Collectively, these findings identify boundary conditions for the type and extent of mobile phone effects on the economic and social development of female microentrepreneurs in Chennai.

The first set of regression models examined the antecedents of business growth. Controlling for all the other variables, business growth was significantly predicted by: the index of growth orientation of the women entrepreneurs, perceived benefit of mobile phones for increased productivity, the availability of domestic help, and the interaction effects of the business use of mobile phones with growth orientation, education, and age.

The growth orientation of the women entrepreneurs featured prominently in the regression models. Insofar as the women entrepreneurs had a strong desire to garner greater profits, hire more workers or expand their operations in the future, their businesses also tended to do better economically. In the dataset, 14.3% of the microentrepreneurs were highly growth oriented. This is one of the two most significant finding reported in my dissertation. The literature reviewed earlier suggested that microenterprises generally do not grow. However, this finding suggests that microentrepreneurs who were highly motivated to grow their businesses did experience higher business growth, demonstrating a fairly strong link between attitudes and desired outcomes.

Another set of attitudes, female microentrepreneurs' perceptions of the benefits of mobile phones for increased productivity, also predicted business growth. Although the verification of a causal chain between this set of attitudes and greater microenterprise revenues, etc. was beyond the scope of this dissertation, it is possible that the perceived benefit of increased productivity might have driven mobile phone use and higher mobile phone use for business-related activities in turn increased business growth.

The findings also indicated that greater availability of domestic help predicted higher business growth. It is possible that when women entrepreneurs had a lighter domestic burden, their businesses might perform better economically. Time that the women entrepreneurs did not spend doing household chores was time that could potentially be spent on growing their enterprises. This finding supported a long-held feminist belief that for women to succeed professionally, "involvement and support from immediate family were also valuable, especially where the women had children and other household responsibilities" (Maier & Nair-Reichert, 2007, p.52).

The second of the two most important findings in my dissertation was the interaction effect between growth orientation and the business use of mobile phones. While business use of mobile phone on its own was not a significant predictor of business growth, the interaction of this variable with growth orientation was. What this interaction analysis showed was that the use of mobile phones in business activities had the greatest effect on business growth when it was coupled with a strong entrepreneurial spirit. For women entrepreneurs who, for whatever the reasons, did not or could not grow their businesses, the use of mobile phones did not have a strong effect on their business growth. On the other hand, for women entrepreneurs with a strong

desire to grow their businesses, the use of mobile phones had a relatively stronger positive effect on their business growth. Thus, business growth was strongest at the confluence of a microentrepreneur's strong desire to grow her business and her active use of mobile phones to support one's business activities. Earlier, the findings suggested that "wanting it" (business growth, Verheul et al., 2012) predicted business growth; that effect appeared to be amplified when microentrepreneurs use mobile phones for business purposes.

In short, the overall conclusion based on the first set of regressions is that there are two boundary conditions that need to be present for mobile phones to have a substantial effect on business growth: women who own microenterprises must be both motivated to grow their businesses and they must be using the mobile phones for business purposes. This conclusion lends perspective to the failures of earlier ICT4D interventions which operated on the assumption that access and use of technology would alleviate poverty. In the absence of a strong motivation to better one's life and aided by the appropriate use of communication technology developmental outcomes would not be achieved. As Toyama (2011; 2012) puts it, technology is really only 10% of the solution and "technology projects in global development are most successful when they amplify already successful development efforts or positively inclined intent" (p.75).

One important and often neglected issue in ICT4D research centers on possible negative consequences that might occur when a new communication technology is introduced (Agre, 2002; Warshauer, 2004). The relevant question here is, given existing patterns of social, economic, or political discrimination, does the communication technology in question help perpetuate the marginalizing status quo, does it strengthen the power of the already powerful

and thereby enhance inequality, or does it facilitate steps toward greater economic, social, or political inclusion? The interrogation of a possible rich-get-richer effect in this dissertation instead demonstrated an outcome that can be seen in a positive light. While great education disparities exist in India (Desai & Kulkarni, 2008), the interaction analysis of education and business use of mobile phones on business growth demonstrated that greater use of mobile phones for business activities had an enabling effect for those who are less educated. Controlling for the other variables, the microenterprises owned by less educated women benefitted more from business use of mobile phones than female microentrepreneurs with higher levels of education. Thus, far from supporting a Matthew effect for which we would expect that more educated entrepreneurs would benefit more from business use of mobile phones, this finding suggested that less educated entrepreneurs narrowed income discrepancies due to the literacy gap and enjoyed comparable business growth as those who were more educated.

Returning to the data analysis, the second multiple regression tested the antecedents for the dependent variable of perceived business growth linked to mobile phones. On the whole, the findings supported the earlier narrative that the business use of mobile phones and the perceived benefits of mobile phones contributed to overall business success. However, the insights that the second regression offered go beyond reinforcing the earlier finding. The results of the second regression pointed to a very important methodological consideration: the variance explained and the effect sizes of the two regression models were vastly different because of the different operationalization of business growth. In the first regression model, business growth was the year-over-year increase in income and the variance explained by the predictor variables of mobile phone use was small (R^2 = .11). This was consistent with our previous work which found

that the effect of mobile phones was modest. In the second regression model, business growth was the perceived growth attributed to the use of mobile phones. The variance explained by the predictors related to mobile phones was large (R^2 = .69). To recap, this dependent variable consisted of self-reported items such as "my mobile is an important tool to help my business grow," "after I bought my mobile phone, my profits increased," and "using your mobile for business helped improve the way you do business". In terms of the magnitude of effect, the two regression models told very different stories about what mobile phones can do for business growth. Our previous research suggests that the first regression model may be presenting a more accurate picture.

The discrepancy in effect sizes offers a cautionary note to researchers seeking to measure the effects of mobile phones by using self-reported retrospection of technological effect. In the latest multi-country survey on the effect of mobile phones conducted by the GSMA (2011), four in ten women across low and middle-income countries reported increased economic or professional opportunities due to their ownership of a mobile phone (p.22). Eighty percent of women business owners reported that they benefited from mobile phone ownership compared to only 63% of non-business owners (p.23). These findings corroborated with the findings of the second regression in that, based on self-reported benefits of mobile phones on business growth, technology had a huge effect.

The juxtaposition of the findings from the first and second regression models produces the second narrative that points to one possible pitfall in ICT4D research. The huge effect size suggests that respondents may have over-estimated the positive effect of mobile phones (and other technologies) on their businesses. If the findings of the second set of regressions are used

to inform policy in the absence of earlier findings, policy makers may anticipate effect that are overly optimistic and this could lead to overly ambitious technological interventions. For ICT4D researchers, one methodological implication from this finding is that survey questions that require respondents to report the effect of technology on business growth may be particularly susceptible to the cooperative subject bias and marketing hype about the benefits of technology. The combined findings from the two regressions highlight the need to examine both perceived effect and other indicators of effect that are less prone to survey biases.

The third regression with mattering as the dependent variable shed light on one social development consequence of mobile phone use that is often consigned to the penumbra of ICT4D effects studies. In this analysis, the entrepreneurs' growth orientation, the use of mobile phones for social purposes, and their perception that mobile phones facilitate relationship maintenance all predicted a greater sense of mattering. One key insight from this set of analyses is that the use of mobile phones can have a social development impact. When women entrepreneurs used mobile phones to make social calls to their family and friends, they also reported a heightened sense that their business activities mattered to these significant others. These results are consistent with observations that mobile phones are not merely used for economic purposes but also as symbols of prestige and status. Interestingly, even though the women entrepreneurs use mobile phones to make non-business related calls to family and friends, the respondents in this study also reported that they felt a greater sense of importance, awareness, and reliance of their social position as a businesswoman. In other words, their social calls to family and friends heightened awareness of their status as businesswomen and

contributed to a more positive self-image that their business activities "mattered" to their significant others.

At most, there are only a handful of large-sample studies in the literature that report mobile phones being used as enhancers of status for female microentrepreneurs (Bhavnani, Chiu, Janakiram, & Silarszky, 2008). In the latest GSMA study (2011), the majority of the women surveyed – between eight and nine in ten, depending on location – reported that mobile phones allowed them to lead more secure, connected and independent lives. In a similar vein, the findings on mattering provided empirical and quantitative support for the notion that mobile phones can have a social development consequence by increasing feelings of mattering.

The question for other ICT4D researchers is whether mattering matters. This dissertation contends that it does. The social development consequence of mattering has promise for the ICT4D field and perhaps future research could explore the relationship between mattering, social networks, and the generation of social capital. For researchers trying to address the third Millennium Development Goal of promoting gender equality and empowering women, the concept of mattering is a viable option. Thus, the methodological contribution of this dissertation is that it offers a possibly more precise conceptualization and operationalization of "empowerment" – a vague and often politicized concept (Rowlands, 1997; Williams, 2005). The validity and reliability of the concept of mattering has been verified for the past three decades in the field of psychological health. The confirmatory factor analysis in this dissertation indicated that items that were adapted for this research context from the original mattering scales were reliable and are viable for use in future research.

To sum up, the common thread that ran through the findings of this dissertation is that all provided some additional understanding of the mobile phone paradox. This dissertation did not find that mobile phones were a change agent that transformed the lives of massive numbers of women who own microenterprises. It did however identify important boundary conditions that determined the effects of mobile phones. While those effects were not large, they specified the conditions under which mobile phones can make the greatest difference for women operating very small businesses in developing countries. To achieve such an effect, female microentrepreneurs must use mobile phones for business purposes and that use must be accompanied by a strong motivation to better one's economic condition. In terms of social development, the use of mobile phones can also potentially increase the psychological well-being of the users. When female microentrepreneurs used the mobiles for social calls, they also reported a greater sense that their business activities are of consequence to their significant others.

Limitations

Like all scientific investigations, this dissertation has its limitations. First, although the dissertation examined effects, the findings come from a cross-sectional survey and not from a longitudinal data-gathering design. Without data collected over time, it is not possible to definitively address questions about which independent variables are linked to the main dependent variable, microenterprise growth. However, the claims to effects in this dissertation are substantiated by statistical modeling of causal relationships and such statistical modeling is thought to generate plausible statements about causality (Pearl, 2000). For future research, this lack of more certain proof of causality can be overcome either through panel studies of

microentrepreneurs over multiple years or by field experiments where key variables can be isolated and manipulated.

Second, questions of endogeneity and recursivity may not have been fully addressed in this dissertation and are the subject of future work. It may be that the dependent variables examined in the dissertation also have an impact on the independent variables that were examined. In the case of mattering, even though it has been conceptualized as an effect of mobile phone use, it may be that a heightened sense of self-concept would also encourage greater mobile phone use. In the case of business growth, it may be that greater business growth would allow the microentrepreneurs to afford domestic help. Nevertheless, the question of bi-directional causality for business growth and business use of mobile phones was addressed using more powerful statistical tools of structural equation modeling and path analysis in previous research (Chew et al., 2011). In further research, the verification of the plausibility of the causal relationships would be replicated for this data set for all three dependent variables. For now, due to the significant interaction relationships found in the dataset, AMOS (version 19) could not be used to verify the statements of causality. AMOS is not capable of modeling interactions among latent variables, since interactions among continuous latent variables require nonlinear constraints among the parameters (Joreskog & Yang, 1996). Nonetheless, the overall conceptualization of business growth and mattering as effects in this dissertation aligns my research with a central theme in recent ICT4D research which focuses on impact assessment of technology (Heeks, 2010c).

Third, the generalizability of the findings in this study are limited to historic time and place – roughly a decade into the 21st century, a time when India's long-running economic

growth was beginning to slow (India Today, 2012) and to Chennai, India, home of female microentrepreneurs with their own set of personal and business characteristics. Whether the macro-level decline in India's growth influenced the business growth of microenterprises owned by women is well beyond the scope of this dissertation and was not investigated.

As to a comparison of the women and the microenterprises they own in Chennai, an earlier study from Mumbai, India, (Ilavarasan & Levy, 2010) also found results that are broadly similar to those that have been discussed in this dissertation. In both studies, ICT use was limited to the mobile phone and business use of mobile phones had a minimal impact on the income of the microentrepreneurs. For now, the findings and discussion points of this dissertation should be considered as arising from the limited geographic context of urban India and from a study of mobile phone use by a specific type of female business owners. These findings might apply to urban microenterprises in other developing countries. However, cultural differences (e.g., preference for face-to-face interactions or bargaining, Effah, 2012), or differences in economic freedom (compare, for example, the role of the government in economies of Hong Kong, Vietnam, or Indonesia) might require revisions to these findings. Also, this dissertation focused on mobile phones and the voice interactions enabled by these devices. Although this form of mobile phones is the technology of the moment, data-enabled mobiles or even tablet personal computers might be worth studying in the near future. For microenterprises tied to global value chains, data-enabled mobile devices might offer benefits or facilitate cost-effective participation in the global economy.

On a related note, even though the comparison in this study of business growth between owners and non-owners of mobile phones showed that their scores were not significantly different; this dissertation does not claim that access to mobile phones is unimportant. For other populations such as rural and coastal communities who have poorer access to telecommunication networks, access and use remains an important item on the development agenda.

Finally, the findings of this dissertation are derived from self-reports of survey respondents. Like all data about behaviors that occur over time, some responses to survey items in this study (e.g., cumulative estimates of mobile phone use for specific business tasks) should be interpreted cautiously, since the survey item might exceed the cognitive capacity of certain respondents to accurately recall communication behavior (Wei, 2007). Moreover, in some cases, responses to might even be deliberately deceptive, as certain female microentrepreneurs were reluctant to disclose true business revenues or other sensitive items. Obtaining valid indicators of business income and growth remains difficult of course, even for the rigorous models so highly valued by development economists (de Mel et al., 2009). Although the year-over-year percentage change in income was used as a proxy for business growth, we do not know what the dollar value of these percentages is and whether any increases in income is sufficient to lift people out of poverty. Without the actual Rupee value of the percentages, the question to whether the increases would make the difference in the lives of the women and their families remains partly unanswered and should be examined in future research.

Policy Recommendations

The findings of this dissertation offer several policy recommendations that are germane to the space of female microentrepreneurs. Subject to the limitations discussed above, the

research can be used to inform policy debates around Millennium Development Goal One: Eradicate extreme poverty and Millennium Development Goal Three: Promote Gender Equality and Empower Women (United Nations, 2011). By providing a tool (the index of growth orientation) and with new evidence about the effects of mobiles in the informal sector, governments and NGOs will be better able to channel resources to those female microentrepreneurs who wish to transform their businesses beyond the subsistence level.

This dissertation identified one of those traits, an above average business growth orientation; and in terms of age, younger female microentrepreneurs, say 18 to 29, seemed best positioned to make the most of mobile phone use for business communication. This dissertation is not suggesting that programs targeting subsistence microenterprises should be discontinued, for it is always possible that such efforts might have some positive consequence. But, when policy makers are faced with competing demands on limited budgets, the analysis, and subsequent replications in other developing countries, may help guide them in setting budget priorities.

Another potentially contentious recommendation that follows from this dissertation is that a revision might be necessary to the long-standing development goal that increasing access for young girls and women to formal education is necessary to remediate the lives of young women (Summers, 1994) and that continues to be on the policy agenda as Millennium Goal Two. Findings from the research reported here suggests that limited educational attainment may be less of a handicap than generally thought and that women with comparatively low levels of formal schooling need not be excluded from ICT4D interventions. The finding that supports this recommendation is that the income gap associated with differences in literacy can be narrowed

by the purposive use of mobile phones for business activities. In fact, while higher levels of mobile use for business purposes did result in microenterprise growth for businesses owned by poorly educated women, the amount of mobile phone use for business purposes did not significantly affect the income of the more educated group.

One additional recommendation pertains to increasing the efficacy of the microentrepreneurs in using mobile phones in their business activities. Several of the findings highlighted the role that business use of mobile phones played in increasing business growth. To encourage greater business use of mobile phones, policy makers could offer entrepreneurial training for motivated business owners. The foci of the training might include how to use the mobile phones to make more money and reduce costs. The training might also seek to increase the entrepreneurs' awareness of the benefits of mobile phones such as increased productivity or enabling relationship maintenance. This heightened awareness of the benefits of mobile phones was associated with higher business use of mobile phones and might reinforce the other pathways to greater business growth identified in this dissertation.

While the discussion of this dissertation focused on the effects of mobile phone use, this is not to say that access is not an important condition for mobile phones to improve the lives of the poor. For parts of the world that are still too isolated or too sparsely populated for telecommunication companies to want to serve them, access continues to be a question. Policymakers and other practitioners should continue to work at narrowing the digital divide in access for these marginalized groups.

My final recommendation is about the use of the concept, mattering, in future ICT4D research and practice. While this dissertation only carried out an initial exploration of mattering,

the analysis showed that concept was a robust measure for the social development goal of promoting gender equality. As a substitute or possibly just an adjunct to the concept of empowerment, the term mattering would allow practitioners and researchers to measure the social development outcomes of ICT4D interventions more consistently from project to project. This push for the social development of the poor has its supporters in popular press. The Free Exchange blog in The Economist (2012), citing a speech by the noted development economist Esther Duflo, noted that the infusion of hope among poor people can help break them out of the poverty cycle.

CONCLUSION

At the beginning of this dissertation, a promise was made to examine the role of technology in driving economic and social changes. Embedded in this examination was an assumption that the change agents under scrutiny – mobile phones – can enact a change. Indeed, many theories of social change, especially those with a materialist perspective, assume that change driven by technology is inevitable. Others, arising from an idealist point of view, are much less certain that technologically-driven social change will always occur.

Broadly speaking, this dissertation did not find definitive evidence that supported one view over the other. Rather, the statement that dissertation makes is that technology can drive economic and social changes; but not in the absence of human agency. Transformative social changes do not occur because of technology alone; they occur because communication processes are modified by the interplay between social structure, human intent, values, and the new communication technologies (Castells et al., 2007). Mobile phones are not a panacea that lifts people out of poverty, but they certainly have the potential to bring about important change by improving the lot of the poor. Like all technologies throughout time, mobile phones are tools that can improve or worsen the human condition. The findings from this dissertation resonates with the social shaping of technology approach and its core observations that human enact technologies and that technologies amplify human intent and capacity (Lievrouw & Livingston, 2002).

The inter-relationships between technology and human networks are complex and it is important that considerations of human factors are not overlooked in the excitement to pin our hopes on technology to alleviate poverty. In his book *The Shock of the Old*, Edgerton (2006)

observed that we have been enamored of technology as innovations and have overlooked technology-in-use. When we are obsessed with what the technology is and what it can do, we ignore the fact that technology on its own cannot overcome inequalities that are embedded in social structures. On the other hand, when we only romanticize grand ideas such as eradicating global poverty, we ignore the fact that ideas need agents and tools to bring them to fruition. In the endeavor to better the condition of the poor, both ideas and tools are needed.

Another parallel commentary that this dissertation makes is just because technology has the potential to amplify human capacity and intent in beneficial ways does not mean that the users would choose to make use of these opportunities. While the development community would like to see the poor make use of the devices to lift themselves out of poverty, there is no certainty that this will happen. As White (1978) notes, "a new device merely opens a door; it does not compel one to enter" (p. 28). This dissertation takes this one step further and suggests that there might be other doors that we have been blindered to. While some see technologically-driven change exclusively in economic terms, the effects of mobile phone use may not always be economic in nature. The assumption that mobile phones would be dedicated to economic betterment by the poor reflects certain hubris on the part of some in the development community. Just like the people living in developed countries, poor people living in developing countries use their phones for the betterment of both their economic and social conditions. From their perspective, one use may be just as important as the other. The seemingly frivolous social calls may contribute to the achievement of a social development outcome in that when social calls are made, the social well-being of women entrepreneurs may be improved because they feel that what they do *matter*.

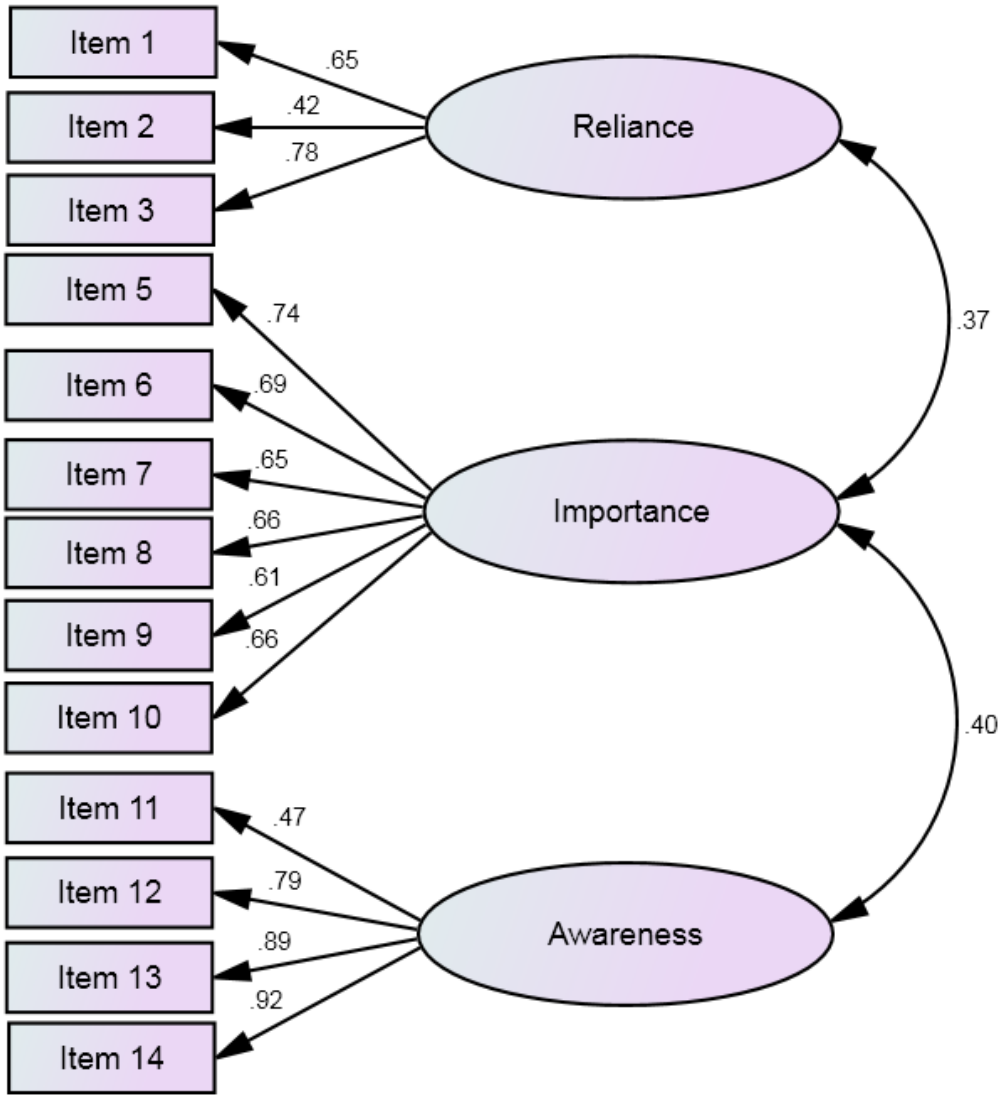
Insofar as technology was found to drive some measure of economic and social change; the questions that naturally follow are what the magnitudes of the changes are and whether these changes make a difference. Strictly from a statistical standpoint, the changes solely attributable to technology are modest. However, for women microentrepreneurs who are striving to improve their own and their families' lives, even the modest changes would help them take a positive step towards their aspirations. We stand at the crossroads of technological history where mobile phones are now firmly in the hands of the poor. For those deemed poor and destitute, perhaps the real difference that these devices make is not just improving income or increasing a sense of self-worth; perhaps the real difference is giving hope. However minute the changes may be, the devices are also giving hope that the poverty cycle may be overcome. Like the proverbial raindrops that collect to form an ocean, perhaps hope too can coalesce into a wellspring of entrepreneurial spirit that would help these businesswomen transcend poverty and marginality.

APPENDICES

Appendix 1

Figure 5

Confirmatory Factor Analysis of Operational Measures of Mattering



$\chi^2 = 242.59$, $df = 63$, $p < .001$, RMSEA = .069, CFI = 0.940

Items 1 – 14 correspond to the respective items listed in Table 1.

Appendix 2

Independent Variables and their Reliability

Growth Orientation (α = .80) 1 = strongly disagree, 5 = strongly agree

1. I won't think of myself as a successful businessperson unless I can hire some new workers every year.
2. One year from now, I expect to have more hired workers in my business.
3. I will have more employees in next 5 years
4. There is substantial demand for our product/services.
5. One year from now, I expect to be making more money in my business.
6. Five years from now, I expect to be making more money in my business.

Business Use of Mobiles (α = .83) 1 = never, 5 = very often

1. How often do you use your mobile to call your customers?
2. How often do you receive calls on your mobile from your customers?
3. How often do you use your mobile to call the employees of your business?
4. How often do you receive calls on your mobile from your business employees?
5. How often do you use your mobile to call your business suppliers?
6. How often do you receive calls from your business suppliers?

Social Use of Mobiles (*r*[335] = .56) 1 = never, 5 = very often

1. How often do you use your mobile to call your family and friends to talk about things not connected to your business?
2. How often do your family and friends call you on your mobile to talk about things not connected to your business?

Perceived Benefit of Relationship Maintenance (α = .80) 1 = strongly disagree, 5 = strongly agree

1. Having a mobile phone makes it easier for me to deal with male customers
2. Having a mobile phone makes it easier for me to deal with male suppliers

3. My mobile phone has improved my relationships with my business suppliers

Perceived Benefit of Productivity (α = .97) 1 = strongly disagree, 5 = strongly agree

1. Having a mobile phone makes it easier for me to balance my business life and my home life
2. I get more work done because I own a mobile phone
3. Because of my mobile phone, I do not travel much for business purposes
4. Because of my mobile phone, I receive business calls at any time.
5. Because I own a mobile phone, I feel more confident in running my business
6. Because of my mobile phone, I feel more self reliant
7. Because of my phone, I am able to do business with strangers without much hesitation

Customer Reach

1 = Customers are people who walk in

2 = Customers are from other parts of Chennai

3 = Customers are from outside Chennai

4 = Customers are from outside India

Business Formality (1 = yes, 0 = no)

1. Is your business registered with the government?
2. Is your business registered with an association?
3. Does your business have a PAN (unique taxpayer I.D) number?
4. Does your business have a bank account to use just for business purposes?
5. Are financial records are kept for business transactions?

Domestic Help (1 = yes, 0 = no)

1. I have part-time domestic help.
2. I have full-time domestic help.
3. My mother and /or my in-laws share the work at home
4. My husband shares the work at home

Appendix 3

Questionnaire

Study on Women Microentrepreneurs and ICTs in Chennai
Indian Institute of Technology Delhi

IV No. Block No. Interview No. Que ID.
Dataset : _____
Date of Interview ___/____/2010 Time of Interview: Start: _____ End:
Interviewer sign & date: _____ Reviewer sign & date:

You are being asked to participate in a research study about businesses owned by women in Chennai. You have been scientifically selected as a possible participant in this study because you own a small business.

1. The goal of this research is to understand more about the factors that impact on businesses like yours. You will be asked questions about your business. The interview will take approximately half an hour.
2. There are no obvious physical, legal, or economic risks associated with participating in this study because your answers will be kept strictly confidential. The Michigan State University Institutional Review Board will have access to the data in the event of an audit. However, your confidentiality will be protected to the maximum extent of the law Participation in this study does not benefit you personally.
3. By participating, you will help us understand the needs and wants of small businesswomen in general. You must be at least 18 years old but no older than 70 to participate. Your participation is voluntary. You will receive a gift worth 500 rupees if you chose to participate. You are free to discontinue your participation at any time or refuse to answer any question without consequences. There will be no way to link you personally to your answers.
4. If you have concerns or questions about this study, such as scientific issues, how to do any part of it, or to report an injury, please contact Prof. Mark Levy, Department of Telecommunication, Information Studies & Media, Michigan State University, East Lansing, MI 48824 USA, Email: mlevy@msu.edu, Tel: 00 1 517 432 6747.
5. If you have any questions or concerns about your role and rights as a research participant, or would like to register a complaint about this study, you may contact (anonymously if you wish), MSU Human Research Protection Program at Tel: 00 1 517 355 -2180, Fax: 00 1 517 432 4503, or e-mail irb@msu.edu or regular mail at 207 Olds Hall, MSU, East Lansing, MI 48824 USA

You indicate your voluntary agreement to participate in this research and have your answers included in the data set by providing your signature below.

Signature with date Name & mobile number, if any

Please attach proof of gift receipt (Letterhead / Visiting Card / Rubber Stamp), signed

This consent form was approved by the Social Science/Behavioral/Education Institutional Review Board (SIRB) at Michigan State University. Approved 1/6/11 – valid through 1/5/12. This version supersedes all previous versions. IRB # 10-1151.

Part A

A1. Thank you once again for agreeing to participate in this survey. To start with, purely for classification purposes, please tell me how many full-time hired workers does your business have, not counting members of your immediate family? _____

Note: Hired workers are full-time employees who are working on a regular basis. Husband, wife, parents, own siblings, sons, and daughters should NOT be counted as hired workers. More distant relatives who work in the business and who are paid should be included in this count.]

A2. Not counting members of your family, how many part-time workers does your business have? _____

[Note: Part time workers are either getting paid on piece-meal basis or come for only limited hours in a day.]

A3. Out of the total hired workers in your business, how many are women? _____

A4. Are there any women managers or supervisors?

a. Yes	☐
b. No	☐

A5. [Ask only if hired worker(s) is (are) present] How much do you agree or disagree with this statement: My hired workers have specialized skills that are often hard to replace. [Use SHOW CARD 1] _____

SECTION 1
ENTERPRISE/BUSINESS DETAILS

A6. How many years ago was your business started? _____ years ago.

A7. Please complete this sentence. "Money to start my business came from_____." [Check all that apply]

a. My own personal savings	☐
b. My husband gave me money	☐
c. I mortgaged my jewelry	☐
d. My parents gave me money	☐
e. My brother(s) gave me money	☐
f. A private organization (NGO) loaned me money	☐
g. A microfinance organization loaned me money	☐
h. A private money lender loaned me money	☐
i. A government organization gave me money	☐
j. I do not remember	☐
k. Others_____	☐

A8. Over the years, have you taken any loans to help your business?

a. Yes	☐
b. No	☐

[If Yes, ask QA9; else go to QA13]

A9. Tell me about your loans. Thinking about your most recent business loan:

a. From whom did you receive the loan?
b. When did you receive the loan?
c. For what purpose was the money used?
d. How much was the loan for?
e. What is the interest rate for this loan?
f. Was this interest rate:

a. Much higher than the market rate	☐
b. Same as the market rate	☐
c. Lower than the market rate	☐

g. Did you provide any collateral security for this loan?

a. Yes	☐
b. No	☐

A10. Now please tell me about the loan before your most recent loan. [If none, SKIP to QA11]

a. From whom did you receive the loan?
b. When did you receive the loan?
c. For what purpose was the money used?
d. How much was the loan for?

A11. Do you think you will borrow money again for your business?

a. Yes	☐
b. No	☐

A12. Why do you say that? _____

A13. Which of the following categories best describes your business?

a. Manufacturing	☐
b. Services	☐
c. Trade	☐
d. Other: _____	☐

A14. Please describe your product/services/trade. [Use product, service, trade, depending on answer to A13]

a. _____
b. _____
c. _____

A15. In your business, what are the top three top revenue generators?

a._____
b._____
c._____

A16. How do you describe customers of your business? [Check all that apply]

a. Customers are people who walk in.	☐
b. Customers are from other parts of Chennai	☐
c. Customers are from outside Chennai	☐
d. Customers are from outside India.	☐
e. Customers come through my sales representatives.	☐
f. Customers come through the mobile phone.	☐
g. Customers come through e-mail.	☐
h. Customers are through the retail vendors.	☐
i. Other: _____	☐

A17. Do you have any paid employee who is responsible for running the business in your absence?

a. Yes	☐
b. No	☐

A18. Is this the only business you own?

a. Yes	☐
b. No	☐

[If No ask QA19 and QA20; else go to QA21]

A19. What are your other businesses? [Probe for type of business]

a. _____

b. _____

A20. To manage your other businesses, do you:

a. Make regular visits in person	☐ Yes	☐ No
b. Use a mobile phone	☐ Yes	☐ No
c. Use e-mail	☐ Yes	☐ No
d. Use Internet online chatting	☐ Yes	☐ No
e. Other: _____	☐ Yes	☐ No

A21. Please tell me how much you agree or disagree with each of the following statements: [Use Show Card 1]

a. My business generates some additional income for my family, but it is not the only source of money we have.
b. I'm hoping my business will make me financially independent.
c. I started my business because I didn't want to be idle at home.

A22. Do you have landline phones at your business?

a. Yes	☐
b. No	☐

[If Yes askQA23, else go to QA29]

A23. How many landline phones do you have in your workplace? _____

A24. How often do you use your business landline to *call* your customers? [Use SHOW CARD 2]

A25. Why do / don't you use your business landline to call your customers?

a. _____

b. _____

A26. [Ask only if use business landline to call customers] How many days in the past week did you use your business landline *to call* your customers? [Use SHOW CARD 3]

A27. How often do you *receive calls* from your customers on your business landline? [Use SHOW CARD 2]

A28. How many days in the past week did you *receive calls* from your customers on your business landline? [Use SHOW CARD 3]

A29. Do you ever use your friends'/other people's *landline* phones to receive calls for your business?

a. Yes	☐
a. No	☐

[If Yes ask QA30, else go to QA31]

A30. Why do you use friends'/others' landlines to receive business calls?

a. _____

b. _____

A31. Do you ever use external PCOs/STD booths to make phone calls for your business?

a. Yes	☐
b. No	☐

[If Yes ask QA32, else go to QA33]

A32. Why do you use PCOs/STD booths?

a. _____

b. _____

A33. Do you ever use your friends'/other people's *mobile* phones to make or receive calls for your business?

a. Yes	☐
b. No	☐

[If Yes ask QA34 else go to QA35]

A34. Why do you use friends'/others' mobile phones to make or receive business calls?

a. _____

b. _____

A35. Have you ever given mobile phones to your employees to use for business purposes?

a. Yes	☐
b. No	☐

A36. Please tell me the main reasons for providing or not providing mobile phones to your employees to use for business purposes.

a. _____

b. _____

A37. In general, do most of your employees have personal mobile phones?

a. Yes	☐
b. No	☐

[If Yes, ask QA38 and QA39, else go to SECTION 2

A38. Do they ever use their personal mobile phones for business purposes?

a. Yes	☐
b. No	☐

A39. Do you pay the phone bills for your employees when they use their own mobiles for business purposes?

a. Yes	☐
b. No	☐

SECTION 2
OPINION ON BUSINESS

A40. On a normal working/business day, how many hours do you spend on:

a. Business-related activities	_____ hours
b. Home-related activities	_____ hours

A41. Would you say that… [Check only one]

a. Almost all of your customers are men.	☐
b. Some of your customers are men and some of your customers are women.	☐
c. Almost all of your customers are women	☐

A42. Would you say that… [Check only one]

a. Almost all of your suppliers are men.	☐
b. Some of your suppliers are men and some of your suppliers are women.	☐
c. Almost all of your suppliers are women.	☐

A43. Would you say that… [Check only one]

a. Almost all of your friends who are in business are men.	☐
b. Some of your friends who are in business are men and some of your friends in business are women.	☐
c. Almost all of your friends who are in business are women.	☐

A44. How much do you agree or disagree with the following statements? [Use Show Card 1]

a. I feel more comfortable doing business with women customers.	☐
b. I feel more comfortable doing business with women suppliers.	☐
c. In the future, I would like to have more men as customers.	☐
d. In the future, I would like to have more men as suppliers.	☐

A45. As a business person, have you ever received any support or extra benefits from the government because you are a woman?

a. Yes	☐
b. No	☐

[If Yes ask QA46 and QA47, else go to QA49; if response to QA46 is more than 1, ask QA48]

A46. How many times? _____

A47. Please tell me why you received special support or extra benefits [the first time].

a. _____

b. _____

A48. Please tell me about the most recent special support or benefits you received because you are a woman.

a. _____

b. _____

A49. Have you had any kind of training related to your business?

a. Yes	☐
b. No	☐

[If yes ask QA50, else go to SECTION 3]

A50. Please tell me about the training.

What was the training about?	Who gave the training?	For how many days was the training?
a.		
b.		
c.		

SECTION 3
ACCESS TO AND OPINIONS ABOUT MOBILES

A51. Do you own a mobile phone?

a. Yes	☐
b. No	☐

[If Yes ask QA52; else go to SECTION 4]

A52. How many mobiles phones do you own? _____

A53. [Ask only if number of mobile phone is more than one] Do you use [any of] the mobile phone(s) only for business?

a. Yes	☐
b. No	☐

[If Yes, ask QA54; else go to QA55]

A54. Why do you use certain mobile phones only for business?

a._____

b._____

A55. Whether you use your mobile(s) only for business or not, please tell me about the mobile phone you use most often for business:

a. What is the brand name?	_____	
b. How many years have you been using this phone?	_____	
c. How much did the phone cost?		
d. Is it a prepaid / recharge connection?	☐Yes	☐No
e. Who is the service provider	SIM 1: _____ SIM 2: _____ (if applicable):	
f. Did you buy it "second-hand"?	☐Yes	☐No

[For each of the following items, first ask whether the mobile used most for business has the function and then how comfortable or uncomfortable respondent is with each function, using SHOW CARD 5]

			Comfort Level Use Show Card 5
g. Can it play MP3 songs or other audio?	☐ Yes	☐ No	
h. Does it have a video recorder?	☐ Yes	☐ No	
i. Is it Internet enabled?	☐ Yes	☐ No	
j. Does it have a dual SIM?	☐ Yes	☐ No	
k. Does it have Bluetooth?	☐ Yes	☐ No	
l. Does it have a camera?	☐ Yes	☐ No	
m. Does it have MMS, picture messaging facility?	☐ Yes	☐ No	

A56. Beside talking on your mobile, which functions, if any, do you use on this mobile phone?[Probe]

a._____

b._____

c._____

A57. Do you ever get unsolicited SMS text messages from some external person or agency? [If Yes, ask Q A58; else skip to QA59]

a. Yes	☐
b. No	☐

A58. What was the SMS about?

a._____

b._____

A59. As a business woman, do you get any special discounts from your mobile company?

a. Yes	☐
b. No	☐

A60. What mobile service provider do your customers use? [Ask all]

a. Do most of your customers use the same mobile service provider that you do?	☐ Yes	☐ No	☐ Don't Know
b. Do most of your customers use a different mobile service provider than you do?	☐ Yes	☐ No	☐ Don't Know
c. Do some of your customers use the same mobile service provider and some use a different one than you do?	☐ Yes	☐ No	☐ Don't Know

A61. Some people say that it is cheaper to call within the same mobile service provider network. In your experience is that correct or not correct?

a. Yes it is correct	☐
b. No, it is not correct	☐
c. DON'T KNOW	☐

A62. How much do you agree or disagree with the following statements?
[Use SHOW CARD 1]

a. Having a mobile phone makes it easier for me to deal with male customers.	
b. Having a mobile phone makes it easier for me to deal with male suppliers.	
c. Having a mobile phone makes it easier for me to balance my business life and my home life.	
d. I get more work done because I own a mobile phone	
e. Because of my mobile phone, I do not travel much for business purposes.	
f. Because of my mobile phone, I receive business calls at any time.	
g. My mobile phone has improved my relationships with my customers.	
h. My mobile phone has improved my relationships with my business suppliers.	
i. My mobile is an important tool to help my business grow.	
j. My mobile phone helps me to relax by playing games or listening to music.	
k. Because I own a mobile phone, I feel more confident in running my business.	
l. Because of my mobile phone, I feel more self-reliant.	
m. Because of my mobile phone, I am able to do business with strangers without much hesitation.	
n. After I bought my mobile phone, my profits increased.	

A63. Sometimes it takes a while for people to figure out how to best use their mobile phones for business. Do you think that using your mobile for business helped improve the way you do business [Read all. Check only one]

a. Almost immediately	☐
b. Within a month or two	☐
c. In six months to one year	☐
d. In one to two years	☐
e. Even longer than two years	☐
f. It hasn't improved the way I do business	☐

SECTION 4
MOBILE USE

[Ask only if the respondent has a mobile phone, else go to Section 5]

A64. How often do you use your mobile *to call* your customers? [Use SHOW CARD 2] [If NEVER, go to QA66; else go to QA65]

A65. How many days in the past week did you use your mobile *to call* your customers? [Use SHOW CARD 3]

A66. Why do / don't you use your mobile *to call customers*?

a. _____

b. _____

A67. How often do you *receive calls* on your mobile from your customers? [Use SHOW CARD 2] [If NEVER, go to QA69; else go to QA68]

A68. How many days in the past week did you *receive calls* on your mobile from your customers? Use SHOW CARD 3] _____

A69. How often do you use your mobile *to call* the employees of your business? [Use SHOW CARD 2] _____

A70. Why do / don't you use your mobile to call business employees?

a. _____

b._____

A71. How often do you *receive calls* on your mobile from your business employees? [Use SHOW CARD 2] _____

A72. How often do you use your mobile *to call* your business suppliers? [Use SHOW CARD 2] [If NEVER, go to QA74; else go to QA73]

A73. How many days in the past week did you use your mobile *to call* your business suppliers? [Use SHOW CARD 3]

A74. Why do / don't you use your mobile to call business suppliers?

a. _____

b. _____

A75. How often do you *receive calls* on your mobile from your business suppliers? [Use SHOW CARD 2] [If NEVER, go to QA77; else go to QA76]

A76. How many days in the past week did you *receive calls* on your mobile from your business suppliers? [Use SHOW CARD 3]

A77. How often do you use your mobile *to call* business-people in other parts of Chennai? [Use SHOW CARD 2] [If NEVER, go to QA80, else go to QA78]

A78. How many days in the past week did you use your mobile *to call* your business-people in other parts of Chennai? [Use SHOW CARD 3]

A79. Why do / don't you use your mobile *to call* business-people in other parts of Chennai?

a. _____

b. _____

A80. How often do you *receive calls* on your mobile from business-people in other parts of Chennai? [Use SHOW CARD 2] [If NEVER, go to QA82; else go to QA81]

A81. How many days in the past week did you *receive calls* on your mobile from business-people in other parts of Chennai? [Use SHOW CARD 3]

A82. How often do you use your mobile *to call* business-people in other parts of India? [Use SHOW CARD 2] [If NEVER, go to QA84; else go to QA83]

A83. How many days in the past week did you use your mobile *to call* business-people in other parts of India? [Use SHOW CARD 3]

A84. Why do / don't you use your mobile *to call* business-people in other parts of India?

a._____

b._____

A85. How often do you *receive calls* on your mobile from business-people in other parts of India? [Use SHOW CARD 2] [If NEVER, go to QA87; else go to QA86]

A86. How many days in the past week did you *receive calls* on your mobile from business-people in other parts of India? Use SHOW CARD 3]

A87. How often do you use your mobile *to call* business-people outside India? [Use SHOW CARD 2] [If NEVER, go to QA89; else go to QA88]

A88. How many days in the past week did you use your mobile *to call* business-people outside India? [Use SHOW CARD 3]

A89. Why do / don't you use your mobile *to call* business-people outside India?

a._____

b._____

A90. How often do you *receive calls* on your mobile from business-people outside India? [Use SHOW CARD 2] [If NEVER, go to QA92; else go to QA91]

A91. How many days in the past week did you *receive calls* on your mobile from your business-people outside India? Use SHOW CARD 3]

A92. How often do you use your mobile *to call* your family and friends to talk about things not connected to your business? [Use SHOW CARD 2]

A93. Why do / don't you use your mobile *to call* family and friends to talk about things not connected to your business?

a._____

b._____

A94. How often *do your family and friends call* you on your mobile to talk about things not connected to your business? [Use SHOW CARD 2]

A95. How often do you use your mobile to *send SMS text messages* to your family and friends about things not connected to your business? [Use SHOW CARD 2]

A96. Why do / don't you use your mobile *to send SMS text messages* to your family and friends about things not connected with your business?

a. _____

b. _____

A97. How often do your *family and friends send you* SMS text messages on your mobile phone that are not connected with your business? [Use SHOW CARD 2]

A98. How often do you use your mobile to take pictures of your family and friends? [Use SHOW CARD 2]

A99. Why do / don't you use your mobile to take pictures of your family and friends?

a._____

b._____

A100. How often do you use your mobile to *send email* to your family and friends about things not connected to your business? [Use SHOW CARD 2]

A101. Why do / don't you use your mobile *to send email* to your family and friends?

a._____

b._____

A102. How often do you *receive email on your mobile* from your family and friends about things not connected to your business? [Use SHOW CARD 2]

A103. How often do you use your mobile *to send SMS text messages* to your customers? [Use SHOW CARD 2] [If NEVER, go to QA105; else go to QA104]

A104. How many days in the past week did you use your mobile *to send SMS text messages* to your customers? [Use SHOW CARD 3]

A105. Why do / don't you use your mobile *to send SMS text messages* to your customers?

a._____

b._____

A106. How often do you *receive SMS text messages* on your mobile from your customers? [Use SHOW CARD 2] [If NEVER go to QA108, else go to QA107]

A107. How many days in the past week did you receive *SMS text messages* on your mobile from your customers? [Use SHOW CARD 3]

A108. How often do you use your mobile *to send SMS text messages* to your business employees? [Use SHOW CARD 2] [If NEVER, go to QA110; else go to QA109]

A109. How many days in the past week did you use your mobile *to send SMS text messages* to your business employees? [Use SHOW CARD 3]

A110. Why do / don't you use your mobile *to send SMS text messages* to your business employees?

a._____

b._____

A111. How often do you *receive SMS text messages* on your mobile from your business employees? [Use SHOW CARD 2] [If NEVER, go to QA113; else go to QA112]

A112. How many days in the past week did you *receive SMS text messages* on your mobile from your business employees? [Use SHOW CARD 3]

A113. How often do you use your mobile *to send SMS text messages* to your business suppliers? [Use SHOW CARD 2] [If NEVER, go to QA115; else go to QA114]

A114. How many days in the past week did you use your mobile *to send SMS text messages* to your business suppliers? [Use SHOW CARD 3]

A115. Why do / don't you use your mobile *to send SMS text messages* to your business suppliers?

a._____

b._____

A116. How often do you *receive SMS text messages* on your mobile from your business suppliers? [Use SHOW CARD 2] [If NEVER, go to QA118; else go to QA117]

A117. How many days in the past week did you *receive SMS text messages* on your mobile from your business suppliers? [Use SHOW CARD 3]

A118. How often do you use your mobile *to send SMS text messages* to business-people in other parts of Chennai? [Use SHOW CARD 2] [If NEVER, go to QA120; else go to QA119]

A119. How many days in the past week did you use your mobile *to send SMS text messages* to business-people in other parts of Chennai? [Use SHOW CARD 3]

A120. Why do / don't you use your mobile *to send SMS text messages* to business-people in other parts of Chennai?

a._____

b._____

A121. How often do you *receive SMS text messages* on your mobile from business-people in other parts of Chennai? [Use SHOW CARD 2] [If NEVER, go to QA123; else go to QA122]

A122. How many days in the past week did you *receive SMS text* messages from business-people in other parts of Chennai on your mobile? [Use SHOW CARD 3]

A123. How often do you use your mobile *to send SMS text messages* to business-people in other parts of India? [Use SHOW CARD 2]

A124. Why do / don't you use your mobile *to send SMS text messages* to business-people in other parts of India?

a._____

b._____

A125. How often do you *receive SMS text messages* on your mobile from business-people in other parts of India? [Use SHOW CARD 2] [If NEVER, go to QA127; else go to QA126]

A126. How many days in the past week did you *receive SMS text messages* from business-people in other parts of India on your mobile? Use SHOW CARD 3]

A127. How often do you *send SMS text messages* on your mobile to business-people in other parts of India? [Use SHOW CARD 2] [If NEVER, go to QA129; else go to QA128]

A128. How many days in the past week did you use your mobile *to send SMS text messages* to business-people in other parts of India?
[Use SHOW CARD 3]

A129. How often do you use your mobile *to send SMS text messages* to business-people outside of India? [Use SHOW CARD 2]

A130. Why do / don't you use your mobile *to send SMS text messages* to business-people outside of India?

a._____

b._____

A131. How often do you *receive SMS text messages* from business-people outside of India on your mobile? [Use SHOW CARD 2]

A132. How often do you use your mobile to take pictures for your business?
[Use SHOW CARD 2]

A133. Why do / don't you use your mobile to take pictures for your business?

a. _____

b. _____

A134. How often do you use your mobile to *send email* to your customers?
[Use SHOW CARD 2]

A135. Why do / don't you use your mobile to send email to your customers?

a. _____

b. _____

A136. How often do your customers send you email on your mobile phone?
[Use SHOW CARD 2]

A137. How often do you use your mobile to browse the Internet for information about prices and other business news? [Use SHOW CARD 2]

A138. How often do you download new programs or apps for your mobile to use in your business?[Use SHOW CARD 2]

A139. How often do you use computer programs or apps on your mobile to keep track of business inventory? [Use SHOW CARD 2]

A140. How often do you use computer programs or apps on your mobile, things like address book or contact list, to keep track of your customers?
[Use SHOW CARD 2] [If NEVER, go to QA142; else go to QA141]

A141. About how many days in the past week did you use computer programs or apps on your mobile to keep track of your customers? [Use SHOW CARD 3]

A142. Why do / don't you use computer programs or apps on your mobile to keep track of your customers?

a. _____

b. _____

A143. [Ask only if use computer programs or apps on mobile to keep track of customers] Compared to a year ago, would you say you are using computer programs or apps on your mobile more or less or about the same amount to keep track of customers?
[Use SHOW CARD 4]

A144. How often do you use computer programs or apps on your mobile to keep track of money in your business? [Use SHOW CARD 2]

A145. Why do / don't you use computer programs or apps on your mobile to keep track of money in your business?

a. _____

b. _____

A146. [Ask only if use computer programs or apps on mobile to keep track of money] Compared to a year ago, would you say you are using computer programs or apps on your mobile more or less or about the same amount to keep track of money in your business? [Use SHOW CARD 4]

A147. How often do you use computer programs or apps on your mobile to keep records about your business employees? [Use SHOW CARD 2]

A148. Why do / don't you use computer programs or apps on your mobile to keep records about your business employees?

a. _____

b. _____

A149. [Ask only if use computer programs or apps on mobile to keep track of business employees] Compared to a year ago, would you say you are using computer programs or apps on your mobile more or less or about the same amount to keep records about your business employees? [Use SHOW CARD 4]

A150. How often do you *use your mobile* to…[Use SHOW CARD 2] [Ask all]

a. send money to your family and friends?	
b. send money to suppliers to pay bills?	
c. send money to your business employees?	
d. send or receive money from your customers?	
e. send or receive money from business-people in other parts of Chennai?	
f. send or receive money from business-people in other parts of India?	
g. send or receive money from business-people outside India?	
h. deposit or withdraw money from your business into a banking account?	

A151. In general, what language do you use for…

	a. Texting	b. Email	c. Looking at websites	d. storing contacts
Tamil	☐	☐	☐	☐
English	☐	☐	☐	☐
Combination of Tamil and English	☐	☐	☐	☐
Some other language	☐	☐	☐	☐

SECTION 5
COMPUTERS AT HOME
[If there are no computers at home, please go to SECTION 9]

Now we would like to talk about computers at home.

A152. Please tell me whether you have any of the following at home:

a. Desktop computer at home	☐ Yes	☐ No
b. Laptop computer at home	☐ Yes	☐ No

[If No to both a and b, go to SECTION 9

A153. How many years ago did you get first get a: [Ask only applicable questions]

a. Desktop computer at home	_____
b. Laptop computer at home	_____

A154. How often do you use your computer at home to play video games?
[Use SHOW CARD 2] [If NEVER, go to QA156; else go to QA155]

A155. About how many days in the past week did you use your computer at home to play video games? [Use SHOW CARD 3]

A156. [If Yes to QA152b] Do you ever bring your laptop to work for business purposes?

a. Yes	☐
b. No	☐

A157. What specific things do you do with your computer at home" [Probe: Anything else?]

a._____

b._____

A158. Do you use your computer at home for business purposes?

a. Yes	☐
b. No	☐

[If No, please go to SECTION 7]

SECTION 6
USE OF HOME COMPUTER FOR BUSINESS

A159. How often do you use your computer at home to keep track of business supplies? [Use SHOW CARD 2] [If NEVER, go to QA161; else go to QA160]

A160. About how many days in the past week did you use your computer at home to keep track of business supplies?[Use SHOW CARD 3]

A161. Why do / don't you use your computer at home to keep track of business supplies?

a. _____

b. _____

A162. [Ask only if use home computer to keep track of business supplies] Compared to a year ago, would you say you are using your computer at home more or less or about the same amount to keep track of business supplies?[Use SHOW CARD 4]

A163. How often do you use your computer at home to keep track of your business inventory? [Use SHOW CARD 2] [If NEVER, go to QA165; else go to QA164]

A164. About how many days in the past week did you use your computer at home to keep track of your business inventory? [Use SHOW CARD 3]

A165. Why do / don't you use your computer at home to keep track of your business inventory?

a. _____

b. _____

A166. [Ask only if use home computer to keep track of business inventory] Compared to a year ago, would you say you are using your computer at home more or less or about the same amount to keep track of your business inventory? [Use SHOW CARD 4]

A167. How often do you use your computer at home to keep track of money in your business? [Use SHOW CARD 2] [If NEVER, go to QA169; else go to QA168]

A168. About how many days in the past week did you use your computer at home to keep track of money in your business? [Use SHOW CARD 3]

A169. Why do / don't you use your computer at home to keep track of money in your business?

a. _____

b. _____

A170. [Ask only if use home computer to keep track of money in business] Compared to a year ago, would you say you are using your computer at home more or less or about the same amount to keep track of money in your business?[Use SHOW CARD 4]

A171. How often do you use your computer at home to keep records about your business employees? [Use SHOW CARD 2] [If NEVER, go to QA173; else go to QA172]

A172. About how many days in the past week did you use your computer at home to keep records about your business employees? [Use SHOW CARD 3]

A173. Why do / don't you use your computer at home to keep records about your business employees?

a. _____

b. _____

A174. [Ask only if use home computer to keep records about business employees] Compared to a year ago, would you say you are using your computer at home more or less or about the same amount to keep records about your business employees? [Use SHOW CARD 4]

A175. How often do you use your computer at home to keep track of your customers? [Use SHOW CARD 2] [If NEVER, go to QA177; else go to QA176]

A176. About how many days in the past week did you use your computer at home to keep track of your customers? [Use SHOW card 4]

A177. Why do / don't you use your computer at home to keep track of your customers?

a._____

b._____

A178. [Ask only if use home computer to keep track of your customers] Compared to a year ago, would you say you are using your computer at home more or less or about the same amount to keep track of your customers? [Use SHOW CARD 4]

SECTION 7
INTERNET USE AT HOME

A179. Do you have an Internet connection at home? [If No, go to PART B Section 9]

a. Yes	☐
b. No	☐

A180. [If yes] What specific things do you do with the Internet connection at home"
[Probe: Anything else?]

a._____

b. _____

A181. How often do you use your computer at home to send email to your family and friends about things not connected to your business?
[Use SHOW CARD 2] _____

A182. Why do / don't you use your computer at home to send email to your family and friends about things not connected to your business?

a. _____

b. _____

A183. How often do you receive email on your computer at home from your family and friends about things not connected to your business? [Use SHOW CARD 2]

A184. How often do you use your computer at home to look at online web sites for news, sports, or stories about famous people?
[Use SHOW CARD 2] [If NEVER, go to QA186; else go to QA185]

A185. About how many days in the past week did you use your computer at home to look at web sites for news, sports, or stories about famous people? [Use SHOW CARD 3]

A186. Why do / don't you use your computer at home to look at to online web sites for news, sports, or stories about famous people?

a. _____

b. _____

A187. How often do you use your computer at home to chat online with your family and friends about things not connected to your business? [Use SHOW CARD 2][If NEVER, go to QA189; else go to QA188]

A188. About how many days in the past week did you use your computer at home to chat online with your family and friends about things not connected to your business? [Use SHOW CARD 3]_____

A189. Why do / don't you use your computer at home to chat online with your family and friends about things not connected to your business?

a. _____

b. _____

A190. How often do you use your computer at home to buy something online for your personal use? [Use SHOW CARD 2] [If NEVER, go to QA192; else go to QA191]

A191. About how many days in the past week did you use your computer at home to buy something online for your personal use? [Use SHOW CARD 3]

A192. Why do / don't you use your computer at home to buy something online for your personal use?

a. _____

b. _____

A193. How often do you use your computer at home to buy something online for your family and friends? [Use SHOW CARD 2] [If NEVER, go to QA195; else go to QA194]

A194. About how many days in the past week did you use your computer at home to buy something online for your family and friends? [Use SHOW CARD 3]

A195. Why do / don't you use your computer at home to buy something online for your family and friends?

a. _____

b. _____

A196. How often do you use your computer at home to download music? [Use SHOW CARD 2] [If NEVER, go to QA198; else go to QA197]

A197. About how many days in the past week did you use your computer at home to download music? [Use SHOW CARD 3]

A198. Why do / don't you use your computer at home to download music?

SECTION 8
INTERNET USE AT HOME FOR BUSINESS

A199. Do you ever connect to the Internet on your computer at home to do business? [If No, go to PART B SECTION 9]

a. Yes	☐
b. No	☐

A200. How often do you use your computer at home *to send* email to your customers? [Use SHOW CARD 2] [If NEVER, go to QA202; else go to QA201]

A201. How many days in the past week did you use your computer at home *to send* email to your customers [Use SHOW CARD 3]

A202. Why do / don't you use your computer at home *to send* email to your customers?

a. _____

b. _____

A203. How often do you *get email* on your home computer from your customers? [Use SHOW CARD 2] [If NEVER, go to QA205; else go to QA204]

A204. How many days in the past week did you *get email* on your home computer from your customers [Use SHOW CARD 3] _____

A205. How often do you use your computer at home *to send* email to your business employees? [Use SHOW CARD 2] [If NEVER, go to QA207; else go to QA206]

A206. How many days in the past week did you use your computer at home *to send* email to your business employees? [Use SHOW CARD 3]

A207. Why do / don't you use your computer at home *to send* email to your business employees?

a. _____

b. _____

A208. How often do you *get email* on your home computer from your business employees? [Use SHOW CARD 2] [If NEVER, go to QA210; else go to QA209]

A209. How many days in the past week did you *get email* on your home computer from your business employees? [Use SHOW CARD 3]

A210. How often do you use your computer at home *to send* email to your business suppliers? [Use SHOW CARD 2] [If NEVER, go to QA212; else go to QA211]

A211. How many days in the past week did you use your computer at home *to send* email to your business suppliers? [Use SHOW CARD 3]

A212. Why do / don't you use your computer at home *to send* email to your business suppliers?

a. _____

b. _____

A213. How often do you *get email* on your home computer from your business suppliers? [Use SHOW CARD 2] [If NEVER, go to QA215; else go to QA214]

A214. How many days in the past week did you *get email* on your home computer from your business suppliers? [Use SHOW CARD 3]

A215. How often do you use your computer at home *to send* email to business-people in other parts of Chennai? [Use SHOW CARD 2] [If NEVER go to QA217; else go to QA216]

A216. How many days in the past week did you use your computer at home *to send* email to business-people in other parts of Chennai? [Use SHOW CARD 3]

A217. Why do / don't you use your computer at home *to send* email to business-people in other parts of Chennai?

a. _____

b. _____

A218. How often do you *get email* on your home computer from business-people in other parts of Chennai? [Use SHOW CARD 2] [If NEVER, go to QA220; else go to QA219]

A219. How many days in the past week did you *get email* on your home computer from business-people in other parts of Chennai? [Use SHOW CARD 3]

A220. How often do you use your computer at home *to send* email to business-people in other parts of India? [Use SHOW CARD 2]n[If NEVER, go to QA222; else go to QA221]

A221. How many days in the past week did you use your computer at home *to send* email to business-people in other parts of India? [Use SHOW CARD 3]

A222. Why do / don't you use your computer at home *to send* email to business-people in other parts of India?

a. _____

b. _____

A223. How often do you *get email* on your home computer from business-people in other parts of India? [Use SHOW CARD 2] [If NEVER, go to QA225; else go to QA224]

A224. How many days in the past week did you *get email* on your home computer from business-people in other parts of India? [Use SHOW CARD 3]

A225. How often do you use your computer at home *to send* email to business-people outside India? [Use SHOW CARD 2] [If NEVER go to QA227; else go to QA226]

A226. How many days in the past week did you use your computer at home *to send* email to business-people outside India? [Use SHOW CARD 3]

A227. Why do / don't you use your computer at home *to send* email to business-people outside India?

a. _____

b. _____

A228. How often do you *get email* on your home computer from business-people outside India? [Use SHOW CARD 2] [If NEVER, go to QA230; else go to QA229]

A229. How many days in the past week did you *get email* on your home computer from business-people outside India? [Use SHOW CARD 3]

A230. How often do you use your computer at home to browse the Internet for information about prices and other business news? [Use SHOW CARD 2] [If NEVER, go to QA232; else go to QA231]

A231. About how many days in the past week did you use your computer at home to browse the Internet for information about prices and other business news? [Use SHOW CARD 3]

A232. Why do / don't you use your computer at home to browse the Internet for information about prices and other business news?

a. _____

b. _____

A233. [Ask only if use home computer to browse for information about prices and other business news] Compared to a year ago, would you say you are using your computer at home more or less or about the same amount to browse the Internet for information about prices and other business news? [Use SHOW CARD 4]

A234. How often do you use your computer at home to search the Internet for information about ways to do things better in your business? [Use SHOW CARD 2] [If NEVER, go to QA236; else go to QA235]

A235. About how many days in the past week did you use your computer at home to search the Internet for information about ways to do things better in your business? [Use SHOW CARD 3]

A236. Why do / don't you use your computer at home to search the Internet for information about ways to do things better in your business?

a. _____

b. _____

A237. [Ask only if use home computer to search for information about ways to do things better in your business] Compared to a year ago, would you say you are using your computer at home more or less or about the same amount to search the Internet for information about ways to do things better in your business? [Use SHOW CARD 4]

A238. How often do you use your computer at home to download new computer programs to use in your business? [Use SHOW CARD 2]

A239. Why do / don't you use your computer at home to download new computer programs to use in your business?

a. _____

b. _____

A240. [Ask only if use home computer to download new computer programs to use in business] Compared to a year ago, would you say you are using your computer at home more or less or about the same amount to download new computer programs to use in your business? [Use SHOW CARD 4]

A241. How often do you use your computer at home to chat online with business suppliers? [Use SHOW CARD 2] [If NEVER, go to QA243; else go to QA242]

A242. About how many days in the past week did you use your computer at home to chat online with your business suppliers? [Use SHOW CARD 3]

A243. Why do / don't you use your computer at home to chat online with your business suppliers?

a. _____

b. _____

A244. [Ask only if use home computer to chat with business suppliers] Compared to a year ago, would you say you are using your computer at home more or less or about the same amount to chat online with your business suppliers?
[Use SHOW CARD 4]

A245. How often do you use your computer at home to chat online with customers?
[Use SHOW CARD 2] [If NEVER, go to QA247; else go to QA246]

A246. About how many days in the past week did you use your computer at home to chat online with customers? [Use SHOW CARD 3]

A247. Why do / don't you use your computer at home to chat online with customers?

a. _____

b. _____

A248. [Ask only if use home computer to chat online with customers] Compared to a year ago, would you say you are using your computer at home more or less or about the same amount to chat online with customers? [Use SHOW CARD 4]

A249. How often do you use your computer at home to chat online with employees?
[Use SHOW CARD 2] [If NEVER, ask A251; else go to QA250]

A250. About how many days in the past week did you use your computer at home to chat online with employees? [Use SHOW CARD 3]

A251. Why do / don't you use your computer at home to chat online with employees?

a. _____

b. _____

A252. [Ask only if use home computer to chat online with employees] Compared to a year ago, would you say you are using your computer at home more or less or about the same amount to chat online with employees? [Use SHOW CARD 4]

A253. How often do you use your computer at home to chat online with business-people in other parts of Chennai? [Use SHOW CARD 2] [If NEVER, ask QA255; else go to QA254]

A254. About how many days in the past week did you use your computer at home to chat online with business-people in other parts of Chennai? [Use SHOW CARD 3]

A255. Why do / don't you use your computer at home to chat online with business-people in other parts of Chennai?

a. _____

b. _____

A256. [Ask only if use home computer to chat online with business people in other parts of Chennai] Compared to a year ago, would you say you are using your computer at home more or less or about the same amount to chat online with business-people in other parts of Chennai? [Use SHOW CARD 4]

A257. How often do you use your computer at home to chat online with business-people in other parts of India?
[Use SHOW CARD 2] [If NEVER, ask QA259; else go to QA258]

A258. About how many days in the past week did you use your computer at home to chat online with business-people in other parts of India? [Use SHOW CARD 3]

A259. Why do / don't you use your computer at home to chat online with business-people in other parts of India?

a. _____

b. _____

A260. [Ask only if use home computer to chat online with business people in other parts of India] Compared to a year ago, would you say you are using your computer at home more or less or about the same amount to chat online with business-people in other parts of India? [Use SHOW CARD 4]

A261. How often do you use your computer at home to chat online with business-people outside India? [Use SHOW CARD 2] [If NEVER, ask QA263; else go to QA262]

A262. About how many days in the past week did you use your computer at home to chat online with business-people outside India? [Use SHOW CARD 3]

A263. Why do / don't you use your computer at home to chat online with business-people outside India?

a. _____

b. _____

A264. [Ask only if use home computer to chat online with business people outside of India] Compared to a year ago, would you say you are using your computer at home more or less or about the same amount to chat online with business-people outside India? [Use SHOW CARD 4]

A265. How often do you use your computer at home to buy something online for your business? [Use SHOW CARD 2] [If NEVER, go to Q A267; else go to QA266]

A266. About how many days in the past week did you use your computer at home to buy something online for your business? [Use SHOW C ARD 4]

A267. Why do / don't you use your computer at home to buy something online for your business?

a. _____

b. _____

A268. [Ask only if use home computer to buy something online for business] Compared to a year ago, would you say you are using your computer at home more or less or about the same amount to buy something online for your business? [Use SHOW CARD 4]

Please go to Part B

Part B

SECTION 9
COMPUTERS IN THE BUSINESS WORKPLACE

Now I'd like to talk about computers in the business workplace.

B1. Does your business have computers in the workplace?

a. Yes	☐
b. No	☐

[If No, go to SECTION 12]

B2. How many computers does your business have now? _____

B3. Please tell me the details about your computer(s). How many years ago was the (first) computer bought for your business? _____

B4. Why was the (first) computer bought? [Probe: Any other reasons?]

a. _____

b. _____

B5. Why do you use computers at work? [Probe: Any other reason?]

a. _____

b. _____

B6. Who uses the business computer(s)? [Ask all]

a. You as owner	☐ Yes	☐ No
b. Managers / supervisors	☐ Yes	☐ No
c. Workers	☐ Yes	☐ No

[If Yes for QB6b or c, ask QB7; else skip to Q B8]

B7. [Ask only if response to QB6 b or c is Yes] Please tell me the main reasons for providing computers for your employees.

a. _____

b. _____

B8. [Only ask if the business is an Internet café or desktop publishing] If your computers are used by your customers, for what purpose(s) are they used?

a. _____

b. _____

B9. Please answer the following questions about the computer at work that is used most.

a. Cost of the computer		
b. Is it branded?	☐ Yes	☐ No
c. Did you buy it "second-hand"?	☐ Yes	☐ No
d. Did you buy it in installments?	☐ Yes	☐ No

[For the following items, ask how comfortable or uncomfortable respondent is with each function. Use SHOW CARD 5]

			Comfort Level
a. Does the most used computer at work have CD/ DVD ROM facility?	☐ Yes	☐ No	
b. Does it have USB port (to connect pen/ external drive)?	☐ Yes	☐ No	
c. Does it have the Microsoft office software (Word, Excel)?	☐ Yes	☐ No	
d. Does it have other software like Tally, CAD, ERP, Inventory, Adobe or Photoshop?	☐ Yes	☐ No	
e. Does it have Internet calling facility? (SKYPE, GOOGLE VOICE, MAGIC BOX)	☐ Yes	☐ No	

B10. Is your workplace computer [Read all. Check only one]:

a. Always switched on during the day	☐
b. Only switched on when it is needed	☐

B11. How often do you use the computer at work to keep track of business supplies? [Use SHOW CARD 2][If NEVER, go to QB13; else go to QB12]

B12. About how many days in the past week did you use the computer at work to keep track of business supplies? [Use SHOW CARD 3] _____

B13. Why don't / do you use the computer at work to keep track of business supplies?

a. _____

b. _____

B14. [Ask only if use computer to keep track of business supplies; else skip to B15]Compared to a year ago, would you say you are using the computer at work more or less or about the same amount to keep track of business supplies?[Use SHOW CARD 4]

B15. How often do you use the computer at work to keep track of inventory? [Use SHOW CARD 2] [If NEVER, go to QB17; else go to QB16]

B16. About how many days in the past week did you use the computer at work to keep track of business inventory? [Use SHOW CARD 3] _____

B17. Why don't / do you use the computer at work to keep track of business inventory?

a. _____

b. _____

B18. [Ask only if use computer to keep track of inventory; else skip to B19] Compared to a year ago, would you say you are using the computer at work more or less or about the same amount to keep track of business inventory? [Use SHOW CARD 4]_____

B19. How often do you use the computer at work to keep track of money in your business? [Use SHOW CARD 2] [If NEVER, go to QB21; else go to QB20]

B20. About how many days in the past week did you use the computer at work to keep track of money in your business? [Use SHOW CARD 3] _____

B21. Why do / don't you use the computer at work to keep track of money in your business?

a. _____

b. _____

B22. [Ask only if use computer to track money; else skip to B23] Compared to a year ago, would you say you are using the computer at work more or less or about the same amount to keep track of money in your business? [Use SHOW CARD 4]

B23. How often do you use the computer at work to record information about employees? [Use SHOW CARD 2] [If NEVER, go to QB25; else go to QB24]

B24. About how many days in the past week did you use the computer at work to keep records about employees? [Use SHOW CARD 3] _____

B25. Why do / don't you use the computer at work to keep records about employees?

a. _____

b. _____

B26. [Ask only if use computer to keep records about employees; else skip to B27] Compared to a year ago, would you say you are using the computer at work more or less or about the same amount to keep records about employees? [Use SHOW CARD 4]

B27. How often do you use the computer at work to keep track of customers? [Use SHOW CARD 2] [If NEVER, go to QB29; else go to QB28]

B28. About how many days in the past week did you use the computer at work to keep track of customers? [Use SHOW CARD 3] _____

B29. Why do / don't you use the computer at work to keep track of customers?

a. _____

b. _____

B30. [Ask only if use computer to keep track of customers; else skip to B31] Compared to a year ago, would you say you are using the computer at work more or less or about the same amount to keep track of customers? [Use SHOW CARD 4] _____

B31. How often do you use the computer at work to play video games? [Use SHOW CARD 2]

SECTION 10
INTERNET USE AT WORK PLACE

B32. Does your business have an Internet connection?

a. Yes	☐
b. No	☐

[If Yes ask QB33; if No go to SECTION 11]

B33. How many years ago did your business first get an Internet connection? _____ years

B34. Why did your business first get an Internet connection?

a. _____

b. _____

B35. Is your workplace computer:

a. Always connected to the Internet during the day	☐
b. Only connected to the Internet when it is needed	☐

B36. Does your business have wireless Internet capability?

a. Yes	☐
b. No	☐

B37. Who uses the Internet at work? [Ask all]

a. You as owner	☐ Yes	☐ No
b. Managers / supervisors	☐ Yes	☐ No
c. Workers	☐ Yes	☐ No

B38. What are the main reasons you use the Internet at work? [Probe: Any other reasons?]

a. _____

b. _____

B39. Does your business have an e-mail address?

a. Yes	☐
b. No	☐

[If Yes ask QB40 and QB41; else go to QB42]

B40. For how many years has your business had an e-mail address? _____ years

B41. Why did you set up an e-mail address for your business?

a. _____

b. _____

B42. Do you have a personal email address?

Yes	☐
No	☐

B42a. [If Yes], Do you use it for your business?

Yes	☐
No	☐

B43. How often do you use the computer at work *to send* email to your family and friends about things not connected with your business? [Use SHOW CARD 2] _____

B44. Why do / don't you use the computer at work *to send* email to your family and friends about things not connected with your business?

a. _____

b. _____

B45. How often do you *get email* on the computer at work from your family and friends about things not connected to your business? [Use SHOW CARD 2] _____

B46. How often do you use your computer at work *to send* email to customers? [Use SHOW CARD 2] [If NEVER, go to QB48; else go to QB47]

B47. How many days in the past week did you use your computer at work *to send* email to customers? [Use SHOW CARD 3] _____

B48. Why do / don't you use your computer at work *to send* email to customers?

a. _____

b. _____

B49. How often do you *get email* from your customers on your computer at work? [Use SHOW CARD 2] [If NEVER, go to QB51; else go to QB50]

B50. How many days in the past week did you *get email* from your customers on your computer at work? [Use SHOW CARD 3] _____

B51. How often do you use your computer at work *to send* email to employees? [Use SHOW CARD 2] [If NEVER, go to QB53; else go to QB52]

B52. How many days in the past week did you use your computer at work *to send* email to employees? [Use SHOW CARD 3] _____

B53. Why do / don't you use your computer at work *to send* email to employees?

a. _____

b. _____

B54. How often do you *receive email* from your employees on your computer at work? [Use SHOW CARD 2] [If NEVER, go to QB56; else go to QB55]

B55. How many days in the past week did you *receive* email from your employees on your computer at work? [Use SHOW CARD 3] _____

B56. How often do you use your computer at work *to send* email to business suppliers? [Use SHOW CARD 2] [If NEVER, go to QB58; else go to QB57]

B57. How many days in the past week did you use your computer at work *to send* email to business suppliers? [Use SHOW CARD 3] _____

B58. Why do / don't you use your computer at work *to send* email to business suppliers?

a. _____

b. _____

B59. How often do you *receive* email from business suppliers on your computer at work? [Use SHOW CARD 2] [If NEVER, go to QB61; else go to QB60]

B60. How many days in the past week did you *receive* email from business suppliers on your computer at work? [Use SHOW CARD 3] _____

B61. How often do you use your computer at work *to send* email to business-people in other parts of Chennai? [Use SHOW CARD 2] [If NEVER, go to QB63; else go to QB62]

B62. How many days in the past week did you use your computer at work *to send* email to business-people in other parts of Chennai? [Use SHOW CARD 3] _____

B63. Why do / don't you use your computer at work *to send* email to business-people in other parts of Chennai?

a. _____

b. _____

B64. How often do you *receive* email from business-people in other parts of Chennai on your work computer? [Use SHOW CARD 2] [If NEVER, go to QB66; else go to QB65]

B65. How many days in the past week did you *receive* email from business-people in other parts of Chennai on your computer at work? [Use SHOW CARD 3] _____

B66. How often do you use your computer at work *to send* email to business-people in other parts of India? [Use SHOW CARD 2] [If NEVER, go to QB68; else go to QB67]

B67. How many days in the past week did you use your computer at work *to send* email to business-people in other parts of India? [Use SHOW CARD 3] _____

B68. Why do / don't you use your computer at work *to send* email to business-people in other parts of India?

a. _____

b. _____

B69. How often do you get email from business-people in other parts of India on your workplace computer? [Use SHOW CARD 2] [If NEVER, go to QB71; else go to QB70]

B70. How many days in the past week did you use your computer at work *to receive* email from business-people in other parts of India? [Use SHOW CARD 3] _____

B71. How often do you use your computer at work *to send* email to business-people outside India? [Use SHOW CARD 2] [If NEVER, go to QB73; else go to QB72]

B72. How many days in the past week did you use your computer at work *to send* email to business-people outside India? [Use SHOW CARD 3] _____

B73. Why do / don't you use your computer at work *to send* email to business-people outside India?

a. _____

b. _____

B74. How often do you *receive* email from business-people outside India on your computer at work? [Use SHOW CARD 2] [If NEVER, go to B76; else go to B75]

B75. How many days in the past week did you *receive* email from business-people outside India on your computer at work? [Use SHOW CARD 3] _____

B76. Have you ever used Google Translate or some other computer program to translate your emails or documents from one language to another?

a. Yes	☐
b. No	☐

[If Yes, ask QB77; else skip to QB78]

B77. How often have you used a translation option? [Use Show card 2] _____

B78. How often do you use the computer at work to browse the Internet for information about prices and other business news? [Use SHOW CARD 2] [If NEVER, go to QB80; else go to QB79]

B79. About how many days in the past week did you use the computer at work to browse the Internet for information about prices and other business news? [Use SHOW CARD 3]

B80. Why do / don't you use the computer at work to browse the Internet for information about prices and other business news?

a. _____

b. _____

B81. [Ask only if use computer at work to browse Internet for information about prices and business news; else go to QB82] Compared to a year ago, would you say you are using the computer at work more or less or about the same amount to browse the Internet for information about prices and other business news? [Use SHOW CARD 4]

B82. How often do you use the computer at work to search the Internet for information about ways to do things better in your business? [Use SHOW CARD 2] [If NEVER, go to QB84; else go to QB83]

B83. About how many days in the past week did you use the computer at work to search the Internet for information about ways to do things better in your business? [Use SHOW CARD 3]

B84. Why do / don't you use the computer at work to search the Internet for information about ways to do things better in your business?

a. _____

b. _____

B85. [Ask only if using work computer to search Internet for ways to do things better in business] Compared to a year ago, would you say you are using the computer at work more or less or about the same amount to search the Internet for information about ways to do things better in your business? [Use SHOW CARD 4]

B86. How often do you use the computer at work to download new computer programs or apps to use in your business? [Use SHOW CARD 2]

B87. Why do / don't you use the computer at work to download new computer programs or apps to use in your business?

a. _____

b. _____

B88. [Ask only if downloading programs or apps to use in business; else go to B88] Compared to a year ago, would you say you are using the computer at work more or less or about the same amount to download new computer programs or apps to use in your business? [Use SHOW CARD 4]

B89. How often do you use the computer at work to look at online web sites for news, sports, or stories about famous people? [Use SHOW CARD 2] [If NEVER, go to QB91; else go to QB90]

B90. About how many days in the past week did you use the computer at work to look at online web sites for news, sports, or stories about famous people? [Use SHOW CARD 3]

B91. Why do / don't you use the computer at work to surf to online web sites for news, sports, or stories about famous people?

a. _____

b. _____

B92. How often do you use the computer at work to chat online with your family and friends about things not connected to work? [Use SHOW CARD 2] [If NEVER, go to QB94; else go to QB93]

B93. About how many days in the past week did you use the computer at work to chat online with your family and friends about things not connected to work? [Use SHOW CARD 3]

B94. Why do / don't you use the computer at work to chat online with your family and friends about things not connected to work?

a. _____

b. _____

B95. How often do you use the computer at work to chat online with your business suppliers? [Use SHOW CARD 2] [If NEVER, go to QB97; else go to QB96]

B96. About how many days in the past week did you use the computer at work to chat online with your business suppliers? [Use SHOW CARD 3]

B97. Why do / don't you use the computer at work to chat online with your business suppliers?

a. _____

b. _____

B98. [Ask only if use computer at work to chat online with business suppliers; else go to B99] Compared to a year ago, would you say you are using the computer at work more or less or about the same amount to chat online with your business suppliers? [Use SHOW CARD 4]

B99. How often do you use the computer at work to chat online with customers? [Use SHOW CARD 2] [If NEVER, go to QB101; else go to QB100]

B100. About how many days in the past week did you use the computer at work to chat online with customers? [Use SHOW CARD 3]

B101. Why do / don't you use the computer at work to chat online with customers?

a. _____

b. _____

B102. [Ask only if use workplace computer to chat online with customers; else go to B103] Compared to a year ago, would you say you are using the computer at work more or less or about the same amount to chat online with customers? [Use SHOW CARD 4]

B103. How often do you use the computer at work to chat online with your business employees? [Use SHOW CARD 2] [If NEVER, go to QB105; else go to QB104]

B104. About how many days in the past week did you use the computer at work to chat online with your business employees? [Use SHOW CARD 3]

B105. Why do / don't you use the computer at work to chat online with your business employees?

a. _____

b. _____

B106. [Ask only if use workplace computer to chat with business employees; else go to B107] Compared to a year ago, would you say you are using the computer at work more or less or about the same amount to chat online with your business employees? [Use SHOW CARD 4]

B107. How often do you use the computer at work to chat online with business-people in other parts of Chennai? [Use SHOW CARD 2] [If NEVER, go to QB109; else go to QB108]

B108. About how many days in the past week did you use the computer at work to chat online with business-people in other parts of Chennai? [Use SHOW CARD 5]

B109. Why do / don't you use the computer at work to chat online with business-people in other parts of Chennai?

a. _____

b. _____

B110. [Ask only if use workplace computer to chat with business-people in other parts of Chennai; else go to B111] Compared to a year ago, would you say you are using the computer at work more or less or about the same amount to chat online with business-people in other parts of Chennai? [Use SHOW CARD 4]

B111. How often do you use the computer at work to chat online with business-people in other parts of India? [Use SHOW CARD 2][If NEVER, go to QB113; else go to QB112]

B112. About how many days in the past week did you use the computer at work to chat online with business-people in other parts of India? [Use SHOW CARD 3]

B113. Why do / don't you use the computer at work to chat online with business-people in other parts of India?

a. _____

b. _____

B114. [Ask only if use workplace computer to chat with business-people in other parts of India; else skip to B114] Compared to a year ago, would you say you are using the computer at work more or less or about the same amount to chat online with business-people in other parts of India? [Use SHOW CARD 4]

B115. How often do you use the computer at work to chat online with business-people outside India? [Use SHOW CARD 2] [If NEVER, go to QB117; else go to QB116]

B116. About how many days in the past week did you use the computer at work to chat online with business-people outside India? [Use SHOW CARD 3]

B117. Why do / don't you use the computer at work to chat online with business-people outside India?

a. _____

b. _____

B118. [Ask only if use workplace computer to chat with business-people outside India; else skip to B119] Compared to a year ago, would you say you are using the computer at work more or less or about the same amount to chat online with business-people outside India? [Use SHOW CARD 4]

B119. How often do you use the computer at work to buy something online for your personal use? [Use SHOW CARD 2]

B120. Why do / don't you use the computer at work to buy something online for your personal use?

a. _____

b. _____

B121. How often do you use the computer at work to buy something online for your family and friends? [Use SHOW CARD 2] [If NEVER, go to QB123; else go to QB122]

B122. Why do / don't you use the computer at work to buy something online for your family and friends?

a. _____

b. _____

B123. How often do you use the computer at work to buy something online for your business? [Use SHOW CARD 2] [If NEVER, go to QB125; else go to QB124]

B124. About how many days in the past week did you use the computer at work to buy something online for your business? [Use SHOW CARD 3]

B125. Why do / don't you use the computer at work to buy something online for your business?

a. _____

b. _____

B126. [Ask only if use workplace computer to buy something for business; else skip to B127] Compared to a year ago, would you say you are using the computer at work more or less or about the same amount to buy something online for your business? [Use SHOW CARD 4]

B127. How often do you use the computer at work to download music? [Use SHOW CARD 2] [If NEVER, go to QB129; else go to QB128]

B128. Why do / don't you use the computer at work to download music?

a. _____

b. _____

B129. How often do you use the computer at work to play video games online? [Use SHOW CARD 2]

B130. Why do / don't you use the computer at work to play video games?

a. _____

b. _____

[Go to SECTION 11]

SECTION 11
OPINION ON COMPUTERS AT WORKPLACE

B131. I am going to read you some statements about computers at work and I would like you to tell me how much you agree or disagree with each. [Use SHOW CARD 1]

a. I get more work done because I have a computer at work.	
b. Because of my computer at work, it takes me less time to do accounting.	
c. Because of my computer at work, it takes me less time to do my inventory list.	
d. Because of my computer at work, my employees are able to work more efficiently.	
e. My computer at work helps me to build better relationships with my customers.	
f. With a computer at work, my interactions with suppliers have become easier.	
g. Having a computer at work makes my suppliers more confident in doing business with me	
h. Having a computer at work makes e my customers more confident in doing business with me.	
i. A computer at work is an important tool to help my business grow.	
j. A computer at work helps me to relax by playing games or listening to music.	
k. My computer at work helps me to balance my responsibilities at home and in my business.	
l. Because of my computer at work, I feel more confident in running my business.	
m. Because of my computer at work, I feel more self-reliant	
n. Through my computer at work, I am able to do business with strangers without much hesitation	
o. Having a computer at work makes it easier to deal with male customers.	

B132. Does your business have a permanent website online?

a. Yes	☐
b. No	☐

[If No, go to go to SECTION 12]

B133. For how many years have you had a permanent website? _____ years

B134. Why was a website created for your business?

a. _____

b. _____

B135. Do you update the website regularly?

a. Yes	☐
b. No	☐

B136. What language is used on your business website? [Check ALL that apply]

a. Tamil	☐
b. English	☐
c. Other: _____	☐
d. Other: _____	☐

B137. Have you ever advertised your business on some other website?

a. Yes	☐
b. No	☐

SECTION 12
INTERNET CAFÉ

B138. How often do you go to Internet café to use the computers for personal purposes? [Use SHOW CARD 2] _____

B139. Why do / don't you go to Internet café to use the computers for personal purposes?

a. _____

b. _____

B140. Do you ever use computers at an Internet café for business purposes?

a. Yes	☐
b. No	☐

[If No, go to SECTION 13; else ask B141]

B141. For how many years you have been using Internet cafés for business purposes? _____ years

B142. Why did you first start going to Internet cafés for business purposes?

a. _____

b. _____

B143. Approximately many kilometers away from your business is the Internet café you use? _____KM

B144. Do you ever feel uncomfortable going to the Internet café, because most of the customers are men?

a. Yes	☐
b. No	☐

B145. Please tell me how much you agree or disagree with the following statements. [Use SHOW CARD 1]

a. When I go to the Internet café, I hardly ever need help from an Internet café worker on how to browse the Internet.	
b. I always take a relative or friend with me so I will feel more comfortable.	
c. I hardly ever get help using the computers from other people using the computers at the Internet café.	
d. Instead of going to the Internet café myself, I always send a worker to use the computers there for business.	

B146. Why do you use the Internet café for business now? [Probe: Any other reasons?]

a. _____

b. _____

B147. Please tell me about the Internet cafés that you use:

a. Is the Internet café is a branch of Internet café chains. (Example: Sify, Webworld of Reliance)?	☐ Yes	☐ No
b. Is the Internet café an independent private enterprise?	☐ Yes	☐ No
c. Is the Internet café run by the government?	☐ Yes	☐ No
d. Is the Internet café run by a non-governmental organization?	☐ Yes	☐ No

B148. Does anyone else from your business use an Internet café for work matters? [Ask all]

a. Managers / supervisors	☐ Yes	☐ No
b. Other workers	☐ Yes	☐ No

SECTION 13
BUSINESS GROWTH

B149. How much do you agree or disagree with the following statement: I think my business is a success. [Use SHOW CARD 1]

B150. Why do you say that?

a. _____ __
b. _____ __

B151. How much do you agree or disagree with this statement: I am not satisfied with how my business is doing now. [Use SHOW CARD 1]

B152. Why do you say that?

a. _____ __
b. _____ __

B153. Have you moved your business to a larger location in the past year?

a. Yes	☐
b. No	☐

B154. How much do you agree or disagree with these statements: [Use SHOW CARD 1]:

a. I am thinking it may be necessary soon to move my business to a larger location.
b. I am thinking that it may necessary soon to hire more paid employees for my business
c. Five years from now, I think I will be satisfied with how much money my business is making.
d. Five years from now, I think my business will have more hired workers than it does now.

B155. Last month approximately how much money did your business make before expenses?

_____

B156. Do you think that next year, profits in your business are likely to:

a. Increase	☐
b. Stay about the same	☐
c. Decrease	☐

B157. If someone wanted to start a business like yours today, how much of a bank loan would be needed? _____

B158. [Ask only applicable questions] How much do you agree or disagree with the following statements? Using [Ask all] is helping my business make a bigger profit right now. [Use SHOW CARD 1]

a. My mobile phone(s)	
b. Computer at work	
c. Computer at home	
d. Internet at work	
e. Internet at home	
f. Internet cafés	

B159. How much do you agree or disagree with the following statements? In the future, using [Ask all] will help my business make a bigger profit. [Use SHOW CARD 1]

a. My mobile phone(s)	
b. Computer at work	
c. Computer at home	
d. Internet at work	
e. Internet at home	
f. Internet cafés	

B160. How much do you agree or disagree with the following statements? [Ask all. Use SHOW CARD 1]

a. There is substantial demand for our product/services.
b. I will be content if my business stays about the same size as it is now.
c. I won't think of myself as a successful businessperson unless my profits grow every year.
d. I won't think of myself as a successful businessperson unless I can hire some new workers every year.
e. One year from now, I expect to be making more money in my business.
f. One year from now, I expect to have more hired workers in my business.
g. Five years from now, I expect to be making more money in my business.
h. Five years from now, I expect to be having more workers in my business

B161. Compared to a year ago, has the annual income of your business:

a. Increased [By what percentage?]	☐ Yes, by ____%
b. Remained the same	☐ Yes
c. Decreased [By what percentage?]	☐ Yes, by____%

B162. Why do you think the annual income of your business has increased/decreased/remained the same?

a. _____

b. _____

B163. Businesses like yours have many choices about what to do with increased income. Did you ever use part of your increased revenue to… [Check all that apply. Probe]

a. Buy more supplies	
b. Start a new branch	
c. Pay off loans	
d. Hire more workers	
e. Move to another location	
f. Get a better mobile for business use	
g. Get a better computer for use in your business	
h. Get an Internet connection for the computer at work	
i. Get an Internet connection for your computer at home	
j. Save some money to reinvest later in your business	
k. Save money for things you need at home	
l. Buy some things for your family	
m. Pay for more education for your family	
n. Save money for health emergencies	
o. Anything else? _____	

B164. Compared to a year ago, has the number of hired workers in your business:

a. Increased [How many?]	☐ Yes, by _____
b. Remained the same	☐ Yes
c. Decreased [How many?]	☐ Yes, by_____

B165. Why has the number of hired workers in your business increased/ decreased/stayed the same?

a. _____

b. _____

B166. Are you a member of any self-help group?

a. Yes	☐
b. No	☐

[If Yes, ask QB167, else go to QB168]

B167. Please give the name of the group: _____

B168. Is your business registered with the government?

a. Yes	☐
b. No	☐

[If Yes ask QB169 and Q B170; else go to Q B171]

B169. What kind of registration do you have?

B170. How many years ago did you register? _____ years

B171. Is your business registered with an association?

a. Yes	☐
b. No	☐

[If Yes ask Q B172 and Q B173, else go to Q B174]

B172. Please name the association(s):

a. _____

b. _____

B173. When was the first time you registered with an association? _____

B174. Does your business have a PAN number?

a. Yes	☐
b. No	☐

B175. Does your business have a bank account to use just for business purposes?

a. Yes	☐
b. No	☐

[If Yes, ask B176, B177, and B178; else go to QB179]

B176. How many years ago did you get that bank account? _____ years

B177. Can you make deposits to that bank account using your mobile phone?

a. Yes	☐
b. No	☐

B178. Can you withdraw money from that bank account using your mobile phone?

a. Yes	☐
b. No	☐

B179. For maintaining the financial and business records of your business, which of the following statements is most applicable? [Select only one]

a. Financial accounts and business records are not kept for this business.	☐
b. Accounts are written by hand but not given to an accountant.	☐
c. Accounts and business records are written by hand and then given to an accountant.	☐
d. Accounts and business records are kept in a computer located at home.	☐
e. Accounts and business records are kept in a computer at this business.	☐

Please go to PART C

PART C

Now we have a few questions about you and then we will be finished with this interview.

C1. Please tell me about your language abilities. Do you speak, read, or write… [Ask all]

Language	Speak	Read	Write
a. Tamil	☐	☐	☐
b. English	☐	☐	☐
c. Other(s) (specify): _____	☐	☐	☐
_____	☐	☐	☐

C2. Please tell me about your numerical abilities. [Check only one]

a. I cannot recognize or write numbers.	☐
b. I can recognize numbers but cannot read or write them.	☐
c. I can read and write numbers but cannot do any calculations.	☐
d. I can do simple addition, subtraction & multiplication, etc.	☐
e. I can calculate interest rates, tax calculations etc.	☐

C3. How old are you? _____ years

C4. According to you, do you belong to:[Mark only ONE]

a. An upper caste group	☐
b. A middle caste group	☐
c. A lower caste group	☐

C5. According to you, do you belong to: [Mark only ONE]

a. The upper class	☐
b. The upper middle class	☐
c. The middle middle class	☐
d. The lower middle class	☐
e. The lower class	☐
f. The poor class	☐

C6. What is your religion? _____

C7. Are you physically disabled? :

d. Yes	☐
e. No	☐

C8. Do you have a personal bank account that you do not use for business?

a. Yes	☐
b. No	☐

[If Yes, ask QC9and QC10; else go to QC12]

C9. Do you make withdrawals or payments on your own from that account?

a. Yes	☐
b. No	☐

C10. Is it a joint account?

a. Yes	☐
b. No	☐

[If Yes, ask Q C11, else go to QC12]

C11. With whom is the joint account? _____

C12. How much formal education have you had? [Check all that apply]

a. Never been to a school	☐
b. Primary school	☐
c. High school/Std. 10	☐
d. Higher secondary school/Std. 11	☐
e. Bachelor's degree/BA/BCOM/ BSc/BE/BTech/MBBS	☐
f. Master's degree/MA/MSc/ME/MTech/MS	☐
g. Diploma	☐
h. Certificate holder	☐
i. Other: _____	☐

C13. Have you undertaken any formal computer training?

a. Yes	☐
b. No	☐

C14. Does anyone in your family have experience running a business? .

a. Yes	☐
b. No	☐

[If Yes, ask QC15. Probe: Anybody else? If No, go to QC19]

C15. Who else?

a._____

b._____

C16. Do they ever give you advice about running your business?

a. Yes	☐
b. No	☐

C17. Do any of them work in your business?

a. Yes	☐
b. No	☐

[If Yes, ask QC18; else go to QC19]

C18. Who?

a._____

b._____

C19. Here are some things that people who own businesses sometimes say. Please tell me how strongly you agree or disagree with each statement. [Use SHOW CARD 1]

a.	Because of my business, I am feeling more confident about my life in general.
b.	Because of my business, I have gained respect among my friends and in my neighbourhood.
c.	Because of my business, my parents feel proud of me.
d.	Because of my business, my parents-in-law are proud of me.
e.	Because of my business, my husband shows me more respect.
f.	Because of my business, my opinions are considered to be important in family decisions.
g.	I am confident that I can run a successful business.
h.	Male customers think that a woman can run a successful business.
i.	Male suppliers think that a woman can run a successful business.
j.	I think the men in my family approve of my dealing with male customers and suppliers in my business.
k.	I sometimes wonder whether my business interferes with my responsibilities at home.
l.	My neighbors approve of my dealing with male customers and suppliers in my business.

C20. Are you: [Check ONE]

a. Married	☐
b. Unmarried	☐
c. Divorced	☐
d. Widow	☐
e. Other:	☐

[If the response is b, go to QC 28; else continue with QC21.

C21. How many children do you have?

Boys	Girls
1. Age _____yrs	1. Age _____ yrs
2. Age _____ yrs	2. Age _____ yrs
3. Age _____ yrs	3. Age _____ yrs
4.Age _____ yrs	4. Age _____ yrs

C22. [Ask only if boys are listed in QC21] How much do you agree or disagree with this statement: In the future, I want my son(s) to take over my business. [Use SHOW CARD 1]

C23. Please explain your answer: _____

C24. [Ask only if girls are listed in QC21] How much do you agree or disagree with this statement: In the future, I want my daughter(s) to take over my business. [Use SHOW CARD 1]

C25. Please explain your answer: _____

C26. Do you *usually* bring any of your children to this business? [If Yes, ask QC27; else, go to QC28]

a. Yes	☐
b. No	☐

C27. What is the age of child/children who is/are usually brought to work?

C28. How do you manage things at home (cooking, caring for guests, children, elders etc.)? [Check all that apply.]

a. I have part-time domestic help.	☐
b. I have full-time domestic help.	☐
c. My mother and/or my in-laws share the work at home.	☐
d. My husband shares the work at home.	☐
e. I manage things alone myself	☐
f. I manage things at home some other way. (Please specify)	☐

C29. How many kilometres from this business do you live? _____ kilometres [If business is part of respondent's house, record as "0" kilometres]

C30. Among the relatives listed below, who lives with you? How many? [Write number for all that apply]

a. Parents	
b. Parents-in-law	
c. Brothers/sisters	
d. Brothers/sisters-in-laws	
e. Grandparents	
f. Others:	

Please tell us about your business background?

C31. Are you the first person in your family to own a business?

a. Yes	☐
b. No	☐

C32. Is your husband's family in business?

a. Yes	☐
b. No	☐

C33. Are your parents in business?

a. Yes	☐
b. No	☐

C34. Are you the only member of your family who earns money?

a. Yes	☐
b. No	☐

[If No, ask QC35, else go to QC37]]

C35. Who else earns money?

a. _____
b. _____
c. _____
d. _____

C36. Compared to other earning members, do you…

a. Earn more than others do.	☐
b. Earn less than others do.	☐
c. Earn just about the same amount others do.	☐

C36. Do you have a television set at home?

a. Yes	☐
b. No	☐

[If No, go to QC43; else go to QC38]

C37. Please tell me about your television:

a. Was it given to you by the government?	☐ Yes	☐ No
b. Did you buy it?	☐ Yes	☐ No
c. Do you have a cable connection?	☐ Yes	☐ No
d. Do you have Direct to Home (DTH) / satellite dish connection?	☐ Yes	☐ No

C38. How many hours did you watch television yesterday? _____hrs

C39. Do you think watching television has helped your business grow?

a. Yes	☐
b. No	☐

[If Yes, ask Q C41, else go to QC42]

C40. How has watching television helped your business grow?

a. _____

b. _____

C41. How many times in the past week have you watched each of the following kinds of television programs? [Use Show Card 3]

a. News	
b. Talk shows	

C42. Do you have a radio at home? [If No, end survey]

a. Yes	☐
b. No	☐

C43. How many times in the past week have you listened to each of the following kinds of radio programs? [Use Show Card 4]

a. News	
b. Talk shows	

C44. Do you think listening to the radio has helped your business to grow?

a. Yes	☐
b. No	☐

[If Yes, ask QC46, if No, end survey]

C45. How has listening to the radio helped your business grow?

a. _____

b. _____

This is the end of the survey.
Thank you very much!

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