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Mattering Matters: Agency, Empowerment, and Mobile Phone Use by Female Microentrepreneurs

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This article attempts to enrich our understanding of the role that mobile phones play in the empowerment of women in the developing world. We adapt and explicate an innovative social psychological concept, “mattering,” embed it in the literature that examines the impact of mobile phones on social development outcomes, and consider the utility of mattering for the ICT4D community. Mattering is the perception that others are aware of, interested in, and depend on us. Based on a sample of 335 female microentrepreneurs in Chennai, India, we created a valid and reliable measure of mattering and its three dimensions. Mattering was predicted by (1) entrepreneurial expectations, an element of an individual’s mindset; (2) social use of mobile phones; and (3) the perceived benefits of mobile phones for maintaining business networks. Findings suggest that mobile phone use plays a significant role in contributing to female entrepreneurs’ perception that they *matter*.

Keywords: mattering; empowerment; women; mobile phones; ICT4D

1. Introduction

For upwards of three decades, Sen’s capability approach (Nussbaum, 2000; Sen, 1980, 1999) has been a touchstone, albeit a contested one, among development scholars and practitioners. Only recently, however, have ICT4D researchers begun to explore the capability framework as a means for understanding a broader range of information and communication technology (ICT) impacts and development goals (Hamel, 2010; Andersson, Gronlund, & Wicander, 2012; Smith, Spence, & Rashid, 2011; Zheng, 2009). From a capabilities perspective, ICTs hold the potential to enhance the ability of individuals to “lead the lives they have reason to value” (Sen, 1999, p. 293). *A fortiori*, Sen (1999) contends that development is not just about the “accumulation of wealth and the growth of gross national product and other income-related variables” (p. 14), but is about building the capacity of individuals to make a wide range of choices. For ICT4D scholars, then, capability theory suggests the need to look beyond economic growth and to consider ICTs as “multi-purpose technologies which could empower individuals to attain development outcomes of their own choice” (Kleine, 2010, p. 675).

Viewing ICT4D through the Senian lens, however, is not without its theoretical and methodological difficulties. It has proved difficult to define and measure key concepts such as “functionings” and “capabilities” or to integrate the concept of agency into the capabilities approach (Fukuda-Parr, 2003; Malhotra & Schuler, 2005; Peter, 2003; Robeyns, 2003; Zheng & Stahl, 2011). The present paper attempts to enrich the idea of capabilities by focusing on how ICTs, particularly mobile phones, facilitate the achievement of core Senian concepts of individual

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agency, empowerment, and choice. Participating in that broader philosophical conversation is well beyond the scope of this study. Our goal instead is to advance our understanding of women's empowerment and the role of ICTs in promoting that goal. Specifically, we adapt and explicate an innovative social psychological concept, "mattering" (Rosenberg & McCullough, 1981), embed that concept in theories of agency and empowerment which might be more germane to the ICT4D domain, and explore possible future uses of the mattering concept in ICT4D research.

Mattering is the perception that "others depend on us, are interested in us, are concerned with our fate, or experience us as an ego-extension exercises a powerful influence on our actions" (Rosenberg & McCullough, 1981, p. 165). When gender inequality exists, women are not only disadvantaged economically and politically; they may also perceive that who they are and what they do are of little consequence to their significant others – that they do not matter.

We see mattering as a psychological asset or resource that might help expand an individual's agency, i.e. an individual's capacity to act independently and to make his or her own free choices. In the following sections, we offer our ICT4D-oriented conceptualization of mattering, consider predictors of mattering, and report findings that show how the use of mobile phones contributes to a heightened sense of mattering. Finally, we explore the theoretical links between mattering, agency, and empowerment. The current study will argue that mattering is a cognitive component of agency and thus a precursor to empowerment.

1.1 *Mattering as social development*

Mattering is an empirically verified and validated concept from the field of social psychology.¹ It is defined as the perception that people have of how significant they are to others (Rosenberg & McCullough, 1981). As conceptualized in the social psychology literature, mattering has three dimensions (Elliott, Kao, & Grant, 2004) – awareness, importance, and reliance. Awareness refers to the "merest of senses if others realize that we exist" (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. Elliott et al. established the discriminant validity of these three components of mattering and supported the earlier conclusion that mattering is an important element in an individual's self-concept and their sense of where they fit in their social networks. An individual's self-concept may comprise, among other things, the sense of her or his relevance to the others around them; a judgment regarding the extent to which his or her advice is valued; and an assessment of how much concern others have for them. For individuals, the perception that who they are and what they do matters to others might lead to a greater motivation to take risks, to innovate, and to be more optimistic overall. For society, mattering is an essential element of bonding in social networks and structures.

We fully recognize that structural inequalities constrain developmental outcomes. On the other hand, by introducing the social psychological attribute of mattering, we will believe it will allow researchers to focus new attention on the cognitive aspects of agency and empowerment. We contend that the feeling of mattering is part of a larger mindset that provides a woman with an impetus to engage in behaviors aimed at improving her life situation and that of their family (see, for example, Appadurai, 2004; Schoar, 2010; Verheul, Thurik, Grilo, & van der Zwan, 2012). Indeed, mattering might even engender the hope that it is possible to overcome those very poverty traps that limit an individual's fuller and more meaningful life (Banerjee & Duflo, 2011, Kahneman, 2011).

1.2 Agency, empowerment, and development outcomes

We assert that mattering can fruitfully be considered as an element in the process of empowerment. The empowerment of women is Millennium Development Goal (MDG) 3 (United Nations, 2000). How to achieve this goal is less clear cut, because empowerment can mean a variety of things in different contexts. In a literature review of the concept, Kabeer (1999) identified three components of empowerment that comprised access to resources, agency, and outcomes. The UNICEF Women's Equality and Empowerment Framework (1994) includes women's awareness of causes of inequality, capacity to direct one's own interests, and taking action to reducing structural inequality in its discussion of empowerment. The United Nations Development Programme's (UNDP) Gender Empowerment Measure focuses on inequalities in economic and political participation, decision-making power, and power over economic resources (UNDP, 1995). For purposes of this study, we adopt the World Bank (n.d.) definition: "Empowerment is the process of increasing the capacity of individuals or groups to make choices and to transform those choices into desired actions and outcomes. Central to this process are actions which both build individual and collective assets . . ."

One innovative approach to understanding empowerment is a simple model offered by Alsop and Heinsohn (2005). Alsop and Heinsohn envision empowerment as a process in which individuals use their agency ("the capacity to make meaningful choices," p. 8) to engage with an opportunity structures (i.e. formal and informal institutions) in order to achieve "degrees of empowerment." Degrees of empowerment (whether an opportunity to make a choice exists; whether a person actually uses the opportunity to choose; and whether the choice resulted in the desired result) in turn enables development outcomes. Significantly for our discussion of mattering, Alsop and Heinson suggest that indicators of agency include an individual's endowment of "*psychological, informational, organisational, material, social, financial, and human*" assets (p. 8) [emphasis added].

Kleine (2010, 2011) builds on the work of Alsop and Heinson as well as the sustainable livelihood framework (Department for International Development, 1999) in order to operationalize the capability approach specifically for ICT4D research. Kleine's "Choice Framework" consists of three elements (structure, agency, and degrees of empowerment) that are roughly similar in meaning and mechanism to the Alsop and Heinson model, except that Kleine explicitly includes ICTs as an element of structure. However, with regard to development outcomes, Kleine takes a strong Senian tack. In the Choice Framework, the principal and overarching development outcomes are choice itself, with secondary outcomes including increased knowledge, income, mobility, or voice.

Of special relevance to our discussion of mattering is the framework's increased emphasis on agency and agency assets. Agency is taken to be a process by which individuals utilize their assets or resources in goal-oriented behaviors. The Choice Framework extends and amplifies the Alsop and Heinson list of assets to include 10 different types of resources, ranging across

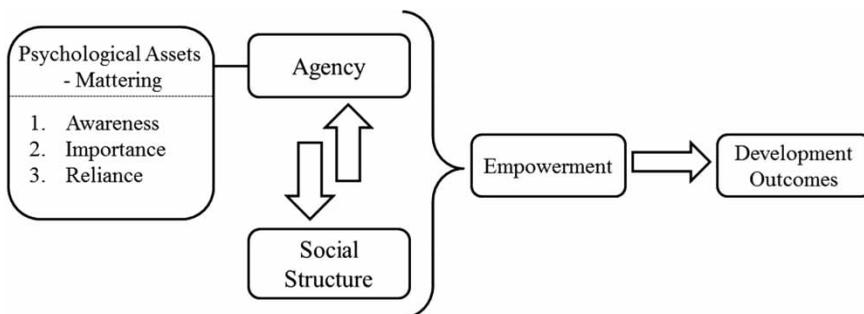


Figure 1. Agency assets, mattering, and empowerment (adapted from Kleine, 2011).

levels of analysis. Resources at the level of individual include aspects of human capital (e.g. education, health) and psychological assets, under which we classify mattering.

Figure 1 shows the theoretical space in which mattering participates. Mattering is one of the many resources that build agency. Agency in general can be the property of both individuals and groups. Our focus is on individual-level agency as measured by mattering. In examining predictors of mattering, however, we will also be investigating some of the other social, material, and psychological assets that in principle are parts of agency. In so doing, we will also shed some new light on the complex relationships between agency resources.

1.3 *Mobile phones, microenterprises, and development*

The economic impact of mobile phones on microenterprises (i.e. reducing transaction costs, increasing income and productivity, and enhancing market efficiency and competition) is fairly well established (Donner & Escobari, 2010). However, given that microenterprise dynamics generally put a brake on economic development (Schoar, 2010); other researchers have looked for non-economic outcomes of mobile phone use (Alampay, 2006; Horst & Miller, 2006; Sridhar & Sridhar, 2006). Bhavnani, Chiu, Janakiram, and Silarszky (2008) suggest that mobile phones enhance psychological well-being. In the latest GSMA study (2011), the majority of the women surveyed – 8 or 9 in 10, depending on location – reported that mobile phones allowed them to lead more secure, connected, and independent lives. Smith et al. (2011) report that mobile phones strengthen family ties and also promote feelings of well-being. Other research suggests that mobile phones may improve a woman's sense of control, increase self-esteem and self-confidence, and positively alter power relationships in a positive fashion (Bayes, von Braun, & Akhter, 1999; Garrido & Roman, 2006; Huyer, 2005; Maier & Nair-Reichert, 2007; Slater & Tacchi, 2005).

Likewise, we will offer evidence that mobile phone calls endow female microentrepreneurs with a heightened sense that their business activities *matter*. This sense of *mattering* constitutes part of their psychological assets such as greater optimism and willingness to take risks and innovate – traits that are typically associated with successful business owners. A larger stock of these psychological assets opens up more choices for the women as they grapple with the challenges of being a female business owner in a traditionally patriarchal society; that is, they have greater agency to improve their lives and their families' lives through their businesses.

2. Research method

In this section, we first describe the sample design and then report the validity and reliability checks that were conducted to operationalize the contextualized form of mattering. Other agency assets namely human, psychological, and material are also described and a correlation matrix was calculated to examine the inter-relationships between these different agency assets. Finally, a hierarchical multiple regression was conducted to determine the antecedents of mattering.

2.1 *Sample design and characteristics*

The research site was Chennai, India. India in general is a promising site for research about mobile phone use and the empowerment of women: first, because there is digital divide in India, with women being 31% less likely than men to own a mobile phone (GSMA, 2011); and second, because women living in cities, such as Chennai, make up the largest proportion

Table 1. Sample characteristics.

	<i>M</i>	SD
Number of hired workers	1.5	2.12
Number of years in business (mode)	5	–
Mobile phone ownership (years)	3	2.37
Economic sector of microenterprise	Service	54.2%
	Trade	19.5%
	Manufacturing	26.3%
Age of microentrepreneur	37.60	8.90
Married	81.5%	
Number of children (mode)	2	
Personal bank account (yes)	50.7%	
Education	Never been to school	5.5%
	High school	86.8%
	Post-secondary	7.7%
Numeracy	Does not recognize numbers	4.4%
	Simple arithmetic	72.0%
	Calculate taxes	23.6%
Self-described caste	Lower	25.4%
	Middle	66.0%
	Upper	8.7%
Self-described social class	Poor	10.7%
	Lower	20.9%
	Lower middle	22.4%
	Middle middle	34.3%
	Upper middle/upper	11.6%
Domestic help	Part-time/full-time	6.6%
	Husband shares	37.0%
	Other family members share	13.4%

of mobile-phone dependent owners of microenterprises (Ilavarasan & Levy, 2010; Chew, Ilavarasan, & Levy, 2011, 2012; Srivastava, 2005).

A survey of women who own microenterprises was conducted in Chennai from March to May, 2011. We defined a microenterprise as a business that has between 0 and 10 hired workers, excluding family members. Data for the survey were gathered using a multi-stage random sampling technique, coupled with a random walk procedure (Chew, Ilavarasan, & Levy, 2010, 2012; Chew, Levy, & Ilavarasan, 2011). Interviewers were given quotas that approximated the distribution of microenterprises by number of hired employees as reported by the Indian government's National Sample Survey Organization (NSSO, 2010). The survey had a response rate of 80% and produced an initial *N* of 598 that included both mobile phone owners and non-owners. The findings reported here are based on those 335 female microentrepreneurs who owned at least one mobile phone. Table 1 lists the sample characteristics.

2.2 Operational measures

The following section describes the operationalization of the dependent variable – mattering and 13 independent variables. Appendix 1 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 reported.

2.2.1 *Dependent variable: mattering*

To create a measure of mattering that was appropriate to the research context and in order to evaluate the theoretical character, reliability, and validity of the construct, we conducted both an exploratory and confirmatory factor analysis. The three dimensions of mattering (importance, awareness, and reliance) were adapted from Elliott et al. (2004). *Importance* refers to the extent to which people are the object of others’ interest and concern and we measured importance with present study, items that probed the significance of entrepreneurs’ business activities to their family and social networks. *Awareness* refers to the merest perception that others realize that we exist and we measured awareness with items that asked about 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 and we measured reliance by items that inquired about the financial independence of the women as a proxy for the extent to which their family can depend on their business success.

A principal-axis factor analysis with varimax rotation was conducted to determine the underlying structure for the 14 items measuring the concept of mattering. A three-factor solution was requested, based on the fact that the items were designed for the three dimensions of awareness: importance, awareness, and reliance.² 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 2 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 were dropped from the sub-scales construction. The second factor, which seemed

Table 2. 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 am hoping my business will make me financially independent			.67	.46
3. I started my business because I did not 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.

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 mattering, 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 sub-scales. The awareness and importance sub-scales had reliability coefficients comparable to those found in existing studies. The reliance sub-scale had a lower, but still acceptable, reliability coefficient. Table 3 provides a conceptual mapping of the sub-scales from interpersonal communication to the research context.

A confirmatory factor analysis indicated that the three-factor concept of mattering in this study was an adequate fit, $\chi^2 = 242.59$, $df = 63$, $p < .001$, $RMSEA^3 = .069$, $CFI = 0.940$ (see Figure 2). 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. Furthermore, in the interest of having fewer predictors in the regression models later, a grand 14-item mattering measure was constructed ($\alpha = .84$, $M = 4.10$, $SD = 0.45$).

2.2.2 Independent variables: respondent's agency resources

In addition to mattering, we examined measures of human capital resources and psychological resources which, along with mattering, make up an individual's set of agency assets. Education was measured by how much formal education the women entrepreneurs had and varied between "never been to school" to "master's degree or higher." Caste was measured 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. 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 be understood in the context of dual home-work challenges (Maier & Nair-Reichert, 2007).

Three measures of psychological assets were created: entrepreneurial expectations, perceived benefits of mobile phone use for managing business relationships, and perceived impact of mobile phone on increased business productivity. Entrepreneurial expectations are a businessperson's predictions about the likelihood of future, hoped-for economic outcomes and were measured by items in which respondents were asked about growth of their businesses in terms of anticipated workforce expansion and anticipated profits. The entrepreneurial expectation index comprised six items, $\alpha = .80$, $M = 3.61$, $SD = 0.69$.

Two indices of the perceived benefits of mobile phones were created. 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" ($\alpha = .80$, $M = 2.50$, $SD = 1.22$).

Table 3. Conceptual mapping of interpersonal mattering to mattering in current research context.

Interpersonal mattering (based on Elliott et al., 2004)	Mattering in context of female microentrepreneurs
<p>Awareness ($\alpha = .82-.87$)</p> <ul style="list-style-type: none"> • 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 	<p>Awareness ($\alpha = .82$)</p> <ul style="list-style-type: none"> • 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
<p>Importance ($\alpha = .79-.86$)</p> <ul style="list-style-type: none"> • 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 do not 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 • No one would notice if one day I disappeared • If the truth be known, no one really needs me 	<p>Importance ($\alpha = .85$)</p> <ul style="list-style-type: none"> • 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
<p>Reliance ($\alpha = .83-.87$)</p> <ul style="list-style-type: none"> • 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 	<p>Financial independence ($\alpha = .65$)</p> <ul style="list-style-type: none"> • My business generates some additional income for my family, but it is not the only source of money we have • I am hoping my business will make me financially independent • I started my business because I did not want to be idle at home

The perceived benefit of mobile phone use for 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

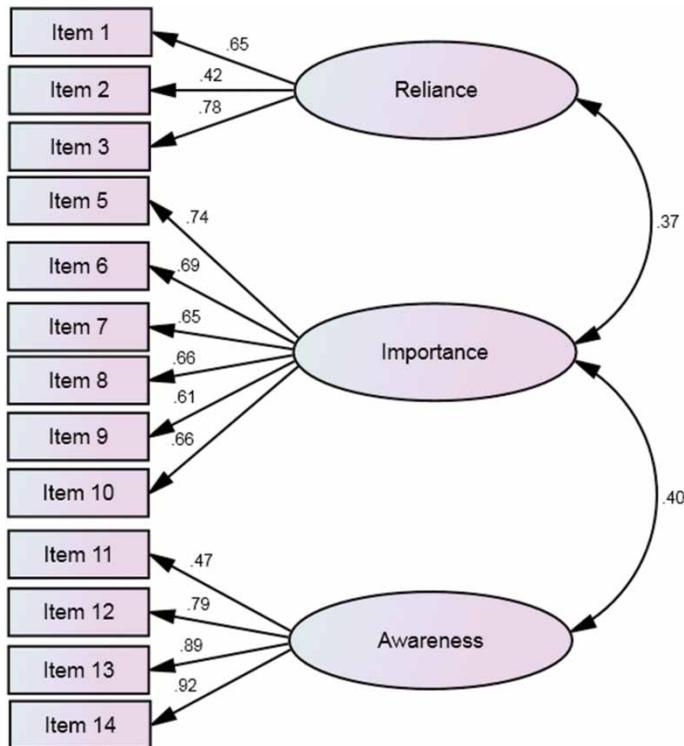


Figure 2. Confirmatory factor analysis of operational measures of mattering. $\chi^2 = 242.59$, $df = 63$, $p < .001$, RMSEA = .069, CFI = 0.940. Items 1–14 correspond to the respective items listed in Table 2.

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” ($\alpha = .97$, $M = 3.62$, $SD = 1.21$).

2.2.3 Independent variables: respondent’s mobile phone use

Two measures – mobile phone use for business and mobile phone use for social communication – were constructed. The business use of mobile phones was indexed by 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, $\alpha = .82$, $M = 1.64$, $SD = 0.72$.

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, $r(335) = .556$, $M = 3.53$, $SD = 0.82$. We recognize that the line between business use of mobiles and social uses may not always be distinct (Donner, 2009). However, by deploying items that ask about both behaviors, we might be better able to obtain a more complete understanding of the goals and outcomes of mobile phone use.

2.2.4 *Microenterprise characteristics*

Material and financial assets include such microenterprise characteristics as 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 study.

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 how 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.

3. Findings

Pearson product-moment correlations were calculated using SPSS (2011) version 19.0. [Table 4](#) shows the Pearson product-moment correlations among the dependent and independent variables. Mattering was positively correlated with the entrepreneurial expectations of the business women, the social use of mobile phones, perceived benefit of mobile phones for maintaining business relationships, number of hired workers, formality, and the availability of domestic help.

Education was also positively correlated with entrepreneurial expectations, business use of mobile phones, perceived usefulness of mobile phones for increased productivity, and the formality of the business. Taken together, higher education appears to be correlated with two characteristics (stronger motivation and business-related use of mobile phone) that would enable the microenterprises to perform better.

Female entrepreneurs who used their mobile phones for social calls more saw less utility in the mobile phones for business purposes. Their customer reach was smaller and they tended not to perceive mobile phones as useful for maintaining business relationships or for increased productivity. This result introduces a minor twist in current research which suggests that microentrepreneurs do not differentiate the use of mobile phones for business and social purposes. (In fact, in our previous work, we have supported this observation that the line between using mobile phones for lives and livelihoods is blurred.) So while microentrepreneurs do not distinguish business and social uses, those who tend to use mobile phones for social calls have a less optimistic view of the role of the devices for improving their businesses.

Table 4. Pearson product-moment correlations among the dependent and independent variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	M	SD
1. Mattering	1													4.20	0.45
2. Entrepreneurial expectations	.48**	1												3.72	0.69
3. Business use of mobile phones	.06	.12*	1											1.64	0.72
4. Social use of mobile phones	.22**	.09	.02	1										3.53	0.82
5. Relationship maintenance	.14**	.13*	.43**	-.21**	1									2.50	1.22
6. Perceived productivity	.10	.29**	.50**	-.24**	.54**	1								3.52	1.21
7. Customer reach	.05	-.01	.37**	-.13*	.28**	.17**	1							1.21	0.53
8. Hired workers	.13*	.19**	.40**	.03	.20**	.25**	.31**	1						1.50	2.12
9. Formality	.21**	.39**	.17**	.13*	.03	.26**	.15**	.20**	1					0.52	0.73
10. Education	.07	.17**	.32**	.07	.03	.23**	.04	.10	.36**	1				2.98	1.26
11. Caste	.03	.12*	.14*	.14*	.02	.10	.15**	.17**	.24**	.26**	1			1.83	0.56
12. Class	.09	.20**	.23**	.25**	-.01<	.04	.03	.18**	.24**	.35**	.47**	1		3.16	1.20
13. Age	-.06	-.10	-.17**	.02	-.03	-.15**	.12*	.02	-.06	-.26**	.02	-.10	1	37.60	8.90
14. Domestic help	.11*	.05	.09	.07	.03	.03	.03	-.07	.08	.10	.01<	.06	.01<	1.01	0.27

*Correlation is significant at the .05 level (two-tailed).

**Correlation is significant at the .01 level (two-tailed).

Table 5. Hierarchical multiple regression analysis summary predicting mattering.

		<i>B</i>	<i>T</i>	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
	Entrepreneurial expectations	.43	8.41	.000
	Social use of mobiles	.21	4.21	.000
	Mobile use for relationship maintenance	.12	2.46	.014

Notes: Dependent variable: mattering.

$F(6, 328) = 21.37, p < .001$; adjusted R^2 for Model 2 = .27; ΔR^2 for additional variables = .22.

To determine the antecedents of mattering, a hierarchical multiple regression was conducted with mattering as the dependent variable. As Table 5 demonstrates, when number of hired workers, formality, and the availability of domestic help were entered, a significant overall linkage between mattering and the combination of these predictors was found, $F(3, 331) = 7.37, p < .001$, with formality significantly contributing to the prediction. When entrepreneurial expectations, social use of mobiles, and the perceived benefit of mobile phones for relationship maintenance were added, the prediction was improved, $\Delta R^2 = .22, F(3, 328) = 33.22, p < .001$.⁴

The beta weights and significant values, presented in Table 5, indicate which variables contribute most to mattering. With this combination of predictors, there are three significant predictors of mattering: entrepreneurial expectations, $\beta = .43$, social use of mobile phones, $\beta = .21$, and the perceived benefit of mobile phones for maintaining business relationships, $\beta = .12$. Two of the three predictors (entrepreneurial expectations and perceived benefit of mobile phones) are attitudinal variables and the third predictor (social use of mobile phones) is a self-reported measure of behavior. Entrepreneurial expectations are indicative of the individual's motivation and, in the context of the present study, could be considered as one of the psychological assets that build individual agency and perhaps lead to increased mobile phone use, as a means for fulfilling expectations of microenterprise growth. As predictors of mattering, both social use of mobile phones and perceived benefit of mobile phone use point to the function of ICTs as facilitating the acquisition of additional agency assets that potentially empower women.

4. Discussion

In an effort to advance ICT4D theory by situating its concepts and processes in larger, longer-established theories and frameworks, we explicated the concept of mattering and contextualized it in the growing literature that examines the impact of mobile phones in building agency assets. We found that to the degree that a female microentrepreneur used her mobile phone to access and maintain her social network, the more likely it was that her store of agency assets in the form of mattering would increase. We also found empirical support for the proposed construct of mattering and for its three dimensions (awareness, importance, and reliance), specifically that phone calls to family and friends increased a woman's feelings that her business activities were important to her family and friends, that those role partners were aware of the economic growth of her microenterprise, and that family and friends were relying on her for their well-being. Thus,

even though the notional motivation for a female microentrepreneur's phone calls with family and friends might have been nominally personal, it also appears that her role as a businesswoman might have been implicit in those conversations, thereby helping to create the effect we have called *mattering*.

The regression analysis demonstrated that, after controlling for other variables, the sense of *mattering* was not predicated on physical agency assets such as the size or formality of the businesses (after controlling for the other variables). *Mattering* then is primarily a function of human interaction and perceptions; and in the context of this study, human interaction that is facilitated by the social use of mobile phones and the perceptions associated with this use. This insight gives support to the strategy of theorizing ICT impacts through a Senian lens and suggest that the capabilities perspective offers a promising, still under-appreciated, approach to ICT4D research.

Just as there are many paths to development, there are many different types of assets that might provide the poor in development countries with a wider range of life choices. This study focused on one psychological asset in the form of *mattering* that can be accrued through human interaction facilitated by the mobile phone. *Mattering*, as discussed here, is an asset that builds individual agency. In turn, an individual's increased agency creates a mechanism for the individual to negotiate structural constraints and opportunities, with resulting consequences for the individual's empowerment and ultimately on development outcomes.

From a methodological standpoint, the validation of the construct of *mattering* and its three dimensions offer ICT4D researchers a way of operationalizing empowerment that is grounded in the social agents. Beyond codifications of empowerment that draw on possible changes to systemic inequalities in economic and political participation, *mattering* offers the socio-psychological dimension of empowerment that is grounded in lives of individuals and social networks.

4.1 *Limitations*

Like all social science research, the generalizability of the findings in this study is limited to historic time and place – roughly a decade into the twenty-first 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 study and was not investigated. For now, the findings and discussion points of this study 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.

The findings of the study are also limited by the nature of the close-ended questions used and by our quantitative analytical strategy. The questionnaire probed for the microentrepreneurs' sense of empowerment as defined by the researchers in the form of *mattering*. It may be that the respondents experience empowerment in some other ways beyond what the questions probed for. Subsequent in-depth interviews or qualitative research might add depth and help triangulate the findings presented here.

In addition, by conceptualizing *mattering* as a function of mobile phone use, this study does not rule out the possibility of a 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 studies on business growth (Chew et al., 2011) and we were able to assess the statistical support for the plausibility of a recursive relationship. The evidence clearly suggested that the causal direction was from technology use to increased business growth and not for the reverse.

Those findings are of course only suggestive for the present study, since the research reported here examines the social and not the economic outcomes of mobile phone use. However, we would suggest that, in the first instance at least, the use of a mobile phone by women who own microenterprises is likely to precede the very microenterprise growth that, when observed by others, results in the signaling that the business women perceive as mattering. Whether a reverse causal or recursive relationship exists between mobile phone use and mattering will be the subject of subsequent research using panel and experimental designs.

5. Conclusion

5.1 *Implications for ICT4D research*

The question for the ICT4D research community is whether the concept of mattering offers a fruitful way to engage with the complexities of development and to investigate the part ICTs play in creating agency, increasing empowerment, and facilitating development outcomes. We expect mattering to be a significant addition to the theoretical armamentarium of ICT4D scholarship, because mattering-as-agency asset is part of an individual's overall mindset. We see mindset as that collection of perceptions, expectations, and "common-sense" which motivates a person's allocation of time, effort, and resources in order to achieve self-defined goals. As such, mattering might be a significant driver of ICT behaviors, as individuals turn to ICTs to acquire additional agency resources.

While most research on the utility of the mobile phone for entrepreneurship is focused on economic outcomes, this study highlights one non-economic impact. In short, the mobile phone helps validate the women's status as a business owner. However, it remains to be seen whether a heightened sense of mattering will lead to other positive development outcomes. Indeed, we believe that mattering as a form of empowerment is in and of itself a development outcome.

Furthermore, given the important role that mobile phone communication plays in heightening a sense of mattering, it also might be possible to establish theoretical and empirical links to the concept of social capital (Loury, 1977; Putnam, 1993) and its subtypes of bonding and bridging social capital (Gittell, & Vidal, 1998). In principle, feeling that one matters might also strengthen those very social bonds that generate social capital. Social ties that provide emotional and psychological support in the form of bonding social capital can be maintained in that family and friends who are far away can still stay in touch with female entrepreneurs and offer help when needed. Bridging social capital in the form of business opportunities can be enhanced by the use of mobiles since the female entrepreneurs can tap on the social networks of friends to grow their businesses. The increased bonding and bridging social capital brought about by the mobile phones would invariably increase the sense of mattering.

Other questions for future research might include some of the following. Does mattering amplify the role of ICTs in acquiring or building other agency resources? Which resources? If an individual believes that he or she matters to some set of role partners, is that individual more likely or less likely to use ICTs, to acquire other agency assets that he or she thinks those role partners need or value? Does mattering encourage individuals to use ICTs in their efforts to negotiate social structure and thereby become aware of empowering choices?

5.2 *Policy applications*

While MDG 3 (promoting gender equality and empowering women) is under review as part of post-MDG agenda building, it seems likely that notions of empowerment and development outcomes, explicitly or not, will continue to be part of any future global consensus. Although this

study only carried out an initial exploration of mattering in the context of ICT4D, the analysis showed that it is possible to create a robust measure of mattering and to theorize mattering as a precursor of empowerment and choice. For policy-makers and development practitioners seeking a more complete understanding of why a given ICT intervention succeeds or fails, the inclusion of mattering in evaluation and impact studies might provide more nuanced insights. For example, failure to achieve desired development outcomes might be caused in part because an individual's agency assets such as mattering are inadequate to negotiate an empowering outcome with structural constraints.

From a programmatic perspective, efforts to build psychological assets such as mattering might ultimately boost an individual's sense of empowerment and result in significant development outcomes. In our own recent work, for instance, on entrepreneurial motivations and economic growth in female-owned microenterprises (Chew, Ilavarasan, & Levy, 2013), we found that having an entrepreneurial mindset amplified the positive impact of mobile phone use on microenterprise profits. Since mattering is also an agency-boosting psychological asset, it might possibly respond to targeted efforts at building an individual's sense of social self-worth (see, for example, GSMA Development Fund and the Cherie Blair Foundation for Women, 2011). Moreover, recruitment to and retention in ICT skills training courses might be strengthened by explicit messages regarding the potential of newly acquired ICT skills to increase well-being both economic and social in the sense of greater respect or mattering.

We do not mean to suggest that increased attention to mattering by policy-makers and practitioners will bring about an immediate and complete solution to the complex and often vexing problem of how to integrate ICTs into development. But, as this study indicates, that by generating the cognitive resource of mattering, ICTs "can enhance poor peoples' individual and collective agencies; strengthen their existing individual and/or community assets; and enhance their 'informational capabilities'" (Gigler, 2011, p. 24). Governments and international donors are slow, and some would say grudgingly to the conclusion that economic development should not be seen as the only desired outcome of development. As Sen (1999) observes, freedom is both the primary goal and the principal means of development. To the degree then that agency has a central role in creating freedom to choose, ICTs and the psychological resource of mattering matter.

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Notes

1. The idea of mattering can also be traced to frameworks emerging from the symbolic interactionism school in sociology. According to this school, people create societies through interactions with others by attaching subjective meaning interpreted mutually (Stryker, 2008). Thus, in the case of mattering, a person might feel important due to his or her perception that others are perceiving him or her to be important.
2. The assumption of independent sampling was met. Assumptions of normality, linear relationships between pairs of variables, and the variables being correlated at a moderate level were also met for the given sample.
3. 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.
4. The six variables in Model 2 also significantly predicted business growth, $F(6, 328) = 21.37, p < .001$, adjusted $R^2 = .268$, a medium-sized effect (Cohen, 1988). Business growth was operationalized as the year-over-year percentage by which microenterprise revenues changed as reported by the microentrepreneur.

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References

- Alampay, E. A. (2006). Beyond access to ICTs: Measuring capabilities in the information society. *International Journal of Education and Development Using Information and Communication Technology*, 2(3), 4–22.
- Alsop, R., & Heinsohn, N. (2005). *Measuring empowerment in practice – Structuring analysis and framing indicators*. Washington, DC: The World Bank.
- Andersson, A., Gronlund, A., & Wicander, G. (Eds.). (2012). Special issue: Development as freedom - how the capability approach can be used in ICT4D research and practice. *Information Technology for Development*, 18(1), 1–86.
- Appadurai, A. (2004). The capacity to aspire: Culture and the terms of recognition. In V. Rao & M. Walton (Eds.), *Culture and public action* (pp. 59–84). Stanford, CA: Stanford University Press.
- Banerjee, A. V., & Duflo, E. (2011). *Poor economics: A radical rethinking of the way to fight global poverty*. New York, NY: Public Affairs.
- Bayes, A., von Braun, J., & Akhter, R. (1999). *Village pay phones and poverty reduction: Insights from a Grameen Bank initiative in Bangladesh* (ZEF Discussion Papers on Development Policy No. 8). Retrieved from TeleCommons Development Group website: <http://www.telecommons.com/villagephone/Bayes99.pdf>
- Bhavnani, A., Chiu, W-w. R., Janakiram, S., & Silarszky, P. (2008). *The role of mobile phones in sustainable rural poverty reduction*. Washington, DC: The World Bank. Retrieved from http://siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/The_Role_of_Mobile_Phones_in_Sustainable_Rural_Poverty_Reduction_June_2008.pdf
- Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. Scott Lang (Eds.), *Testing structural models* (pp. 136–162). Newbury Park, CA: Sage.

- Byrne, B. M. (1989). *A primer of LISREL: Basic applications and programming for confirmatory factor analytic models*. New York: Springer-Verlag.
- Chew, H. E., Ilavarasan, P. V., & Levy, M. (2010). The economic impact of information and communication technologies on microenterprises in the context of development. *The Electronic Journal of Information Systems in Developing Countries*, 44(4), 1–19, Special Issue on ICTs and Development: Theories and Evidence. Retrieved from www.ejisdc.org/ojs2/index.php/ejisdc/article/view/747/340
- Chew, H. E., Ilavarasan, P. V., & Levy, M. (2012). A latency effect for mobile phone investments by micro-entrepreneurs. *Media Asia*, 39(2), 99–108. Retrieved from http://www.academia.edu/attachments/26256881/download_file
- Chew, H. E., Ilavarasan, P. V., & Levy, M. (2013, June). *The amplification effect of mobile phones: User expectations and economic outcomes in the context of development*. Paper presented at the 63rd annual International Communication Association conference, London.
- Chew, H. E., Levy, M., & Ilavarasan, P. V. (2011). The limited impact of ICTs on microenterprise growth: A study of businesses owned by women in urban India. *Information Technologies & International Development*, 7(4), 1–16.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16, 297–334.
- Department for International Development. (1999). *Sustainable livelihoods guidance sheets*. London: Author. Retrieved from <http://www.enonline.net/pool/files/ifc/dfid-sustainable-livelihoods-guidance-sheet-section1.pdf>
- Donner, J. (2009). Blurring livelihoods and lives: The social uses of mobile phones and socioeconomic development. *Innovations: Technology, Governance, Globalization*, 4(1), 91–01.
- Donner, J., & Escobari, M. X. (2010). A review of evidence on mobile use by micro and small enterprises in developing countries. *Journal of International Development*, 22, 641–658.
- Effah, J. (2012). Mobilizing culture for e-business in developing countries: An actor network theory account. *The Electronic Journal of Information Systems in Developing Countries*, 52(5), 1–17.
- Elliott, G. C., Kao, S., & Grant, A. M. (2004). Mattering: Empirical validation of a social-psychological construct. *Self and Identity*, 3, 339–354.
- Eurostat. (2008). *Final report – information society: ICT impact assessment by linking data from different sources*. Luxembourg: Author. Retrieved from http://epp.eurostat.ec.europa.eu/portal/page/portal/information_society/documents/Tab/ICT_IMPACTS_FINAL_REPORT_V2.pdf
- Fukuda-Parr, S. (2003). The human development paradigm: Operationalizing Sen's ideas on capabilities. *Feminist Economics*, 9(2–3), 301–317.
- Garrido, M., & Roman, R. (2006). Women in Latin America: Appropriating ICTs for social change. In N. Hafkin & S. Huyer (Eds.), *Cinderella or Cyberella? Empowering women in the knowledge society* (pp. 165–190). Bloomfield, CT: Kumarian Press.
- Gigler, B.-S. (2011). *Information capabilities: The missing link for the impact of ICT on development* (E-Transform Knowledge Platform Working Paper). Washington, DC: The World Bank. Retrieved from http://siteresources.worldbank.org/INFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/InformationalCapabilitiesWorkingPaper_Gigler.pdf
- Gittell, R. J., & Vidal, A. (1998). *Community organizing: Building social capital as a development strategy*. Thousand Oaks, CA: Sage.
- GSMA Development Fund and the Cherie Blair Foundation for Women. (2011). *Women and mobile: A global opportunity: A study on the mobile phone gender gap in low and middle-income countries*. Retrieved from http://www.cherieblairfoundation.org/uploads/pdf/women_and_mobile_a_global_opportunity.pdf
- Hamel, J.-Y. (2010). *ICT4D and the human development and capabilities approach: The potentials of information and communication technology* (UNDP Human Development Research Paper 2010/37). Retrieved from <http://http://mpr.ub.uni-muenchen.de/25561>
- Horst, H., & Miller, D. (2006). *The cell phone: Anthropology of communication*. Oxford: Berg.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55.
- Huyer, S. (2005). Women, ICT and the information society: Global perspectives and initiatives. *Proceedings of the International Symposium on Women and ICT: Creating Global Transformation*, June 12–14. Baltimore: Association for Computing Machinery (ACM).

- Retrieved from <http://delivery.acm.org/10.1145/1120000/1117418/p1huyer.pdf?key1=1117418&andkey2=4565416521&coll=GUIDE&dl=GUIDE&CFID=57615068&CFTOKEN=33807020>
- Iavarasan, P. V., & Levy, M. (2010). *ICTs and urban microenterprises: Identifying and maximizing opportunities for economic development: Final report*. Ottawa: International Development Research Centre. Retrieved from http://www.idrc.ca/uploads/user-S/12802403661ICTs_and_Urban_Microenterprises_104170-001.pdf
- India Today*. (2012, February 29). GDP growth slows down to 6.1 per cent in Q3, lowest in two years. Retrieved from <http://indiatoday.intoday.in/story/economic-growth-slows-down-to-6.1-per-cent-in-q3/1/175792.html>
- Indjikian, R., & Siegel, D. S. (2005). The impact of investment in IT on economic performance: Implications for developing countries. *World Development*, 33(5), 681–700.
- Kabeer, N. (1999). Resources, agency, achievement: Reflections on the measurement of women's empowerment. *Development and Change*, 30, 435–464.
- Kahneman, D. (2011). *Thinking, fast and slow*. New York: Farrar, Straus and Giroux.
- Kleine, D. (2010). ICT4What? Using the choice framework to operationalise the capability approach to development. *Journal of International Development*, 22(5), 674–692.
- Kleine, D. (2011). The capability approach and the 'medium of choice': Steps towards conceptualising information and communication technologies for development. *Ethics and Information Technology*, 13, 119–130.
- Loury, G. C. (1977). A dynamic theory of racial income differences. In P. Wallace & A. M. L. Mond (Eds.), *Women, minorities and employment discrimination* (pp. 153–186). Lexington, MA: Heath.
- Maier, S., & Nair-Reichert, U. (2007). Empowering women through ICT-based business initiatives: An overview of best practices in e-commerce/e-retailing projects. *Information Technologies & International Development*, 4(2), 43–60.
- Malhotra, A., & Schuler, S. (2005). Women's empowerment as a variable in international development. In D. Narayan (Ed.), *Measuring empowerment: Cross-disciplinary perspectives* (pp. 71–88). Washington, DC: The World Bank.
- National Sample Survey Organization (NSSO). (2000). *Non-agricultural enterprises in the informal sector in India, 1999–2000 – key results. No. 456*. New Delhi: Ministry of Statistics and Programme Implementation.
- Nussbaum, M. (2000). *Women and human development: The capabilities approach*. Cambridge: Cambridge University Press.
- Organization for Economic Cooperation and Development. (2004). *The economic impact of ICT: Measurement, evidence and implications*. Paris: Author.
- Pearl, J. (2000). *Causality: Models, reasoning, and inference*. Cambridge: Cambridge University Press.
- Peter, F. (2003). Gender and the foundations of social choice: The role of situated agency. *Feminist Economics*, 9(2–3), 13–32.
- Prahalad, C. K. (2005). *The fortune at the bottom of the pyramid: Eradicating poverty through profits*. Upper Saddle River, NJ: Wharton School.
- Putnam, R. (1993). The prosperous community. *The American Prospect*, 4(13). Retrieved from <http://www.philia.ca/files/pdf/ProsperousCommunity.pdf>
- Quadir, K., & Mohaiemen, N. (2009). *CellBazaar: A market in your pocket. Innovations, Special edition for GSMA*, pp. 59–71. Retrieved from http://corp.cellbazaar.com/images/international/MIT_Innovations_CellBazaar.pdf
- Robeyns, I. (2003). *The capabilities approach: An interdisciplinary introduction*. Working Paper. Department of Political Science and Amsterdam School of Social Sciences Research. Amsterdam: University of Amsterdam. Retrieved from <http://www.soc.spbu.ru/img/up/files/File/1.8%20Robeyns%20The%20Capability%20Approach.%20An%20Interdisciplinary%20Introduction.pdf>
- Rosenberg, M., & McCullough, B. C. (1981). Mattering: Inferred significance and mental health. *Research in Community and Mental Health*, 2, 163–182.
- Rowlands, J. (1997). *Questioning empowerment*. Oxford: Oxfam.
- Samuel, J., Shah, N., & Hadingham, W. (2005). Mobile communications in South Africa, Tanzania and Egypt. *Intermedia*, 33(3), 32–42.
- Schoar, A. (2010). The divide between subsistence and transformational entrepreneurship. In J. Lerner & A. Schoar (Eds.), *International differences in entrepreneurship* (pp. 57–81). Chicago: University of Chicago Press.
- Sen, A. (1980). Equality of what? In S. McMurrin (Ed.), *The Tanner Lectures on human values* (Vol. 1, pp. 197–220). Salt Lake City, UT: University of Utah Press.

- Sen, A. (1999). *Development as freedom*. Oxford: Oxford University Press.
- Slater, D., & Tacchi, J. (2005). *ICT innovations for poverty reduction*. New Delhi: United Nations Educational, Scientific and Cultural Organization, Asia Pacific Regional Bureau for Communication and Information. Retrieved from <http://unesdoc.unesco.org/images/0013/001361/136121e.pdf>
- Smith, M., Spence, R., & Rashid, A. (2011). Mobile phones and expanding human capabilities. *Information Technologies & International Development*, 7(3), 77–88.
- Sridhar, K. S., & Sridhar, V. (2006). Telecommunications and growth: Causal model, quantitative and qualitative evidence. *Economic and Political Weekly*, 41(25), 2611–2619.
- Srivastava, R. (2005, January 5). *The informal sector and urban poverty*. *Infochange Urban India*. Retrieved from http://www.infochangeindia.org/urban_india_04.jsp
- Stryker, S. (2008). From Mead to a structural symbolic interactionism and beyond. *Annual Review of Sociology*, 34, 15–31.
- United Nations. (2000). *United Nations millennium declaration* (Resolution A/55/L.2 adopted by the General Assembly). Retrieved from <http://www.un.org/millennium/declaration/ares552e.htm>
- United Nations Children's Fund. (1994). *Gender equality and empowerment of women and girls: a policy review*. New York: Author.
- United Nations Development Programme. (1995). *The human development report*. Oxford: Oxford University Press.
- Verheul, I., Thurik, R., Grilo, I., & van der Zwan, P. (2012). Explaining preferences and actual involvement in self-employment: Gender and the entrepreneurial personality. *Journal of Economic Psychology*, 33, 325–341.
- World Bank. (n.d.). *Empowerment*. Retrieved from [http://web.worldbank.org/WBSITE/EXTERNAL/ TOPICS/EXTPOVERTY/EXTEMPOWERMENT/0,,contentMDK:20245753~menuPK:546167~pagePK:148956~piPK:216618~theSitePK:486411~isCURL:Y,00.html](http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTPOVERTY/EXTEMPOWERMENT/0,,contentMDK:20245753~menuPK:546167~pagePK:148956~piPK:216618~theSitePK:486411~isCURL:Y,00.html)
- Zheng, Y. (2009). Different spaces for e-development: What can we learn from the capability approach? *Information Technology for Development*, 15(2), 66–82.
- Zheng, Y., & Stahl, B. (2011). Technology, capabilities and critical perspectives: What can critical theory contribute to Sen's capability approach? *Ethics and Information Technology*, 13, 69–80.

Appendix 1. Independent variables and their reliability

Entrepreneurial expectations ($\alpha = .80$), 1 = strongly disagree, 5 = strongly agree

- (1) I would not 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 five 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 ($\alpha = .83$), 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 mobiles for maintaining business relationships ($\alpha = .80$), 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 mobiles for business productivity ($\alpha = .97$), 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 ID) number?
- (4) Does your business have a bank account to use just for business purposes?
- (5) Are financial records 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.