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doi: <https://doi.org/10.57709/2910989>

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# MOBILE PHONES AND GENDER INEQUALITY: CAN WE HEAR HER NOW?

by

KARI A. N. MACKEY

Under the Direction of Jelena Subotic

## ABSTRACT

Are mobile phones the best vehicle for reducing gender inequality in the developing world? ICT experts champion the use of mobile phones to improve women's lives, and various stakeholders have invested millions of dollars to launch mobile phone programs for women. Yet, given high female illiteracy rates, patriarchal societies, and other structural and cultural barriers in developing countries, many scholars contend that limited access to ICTs can perpetuate gender inequality. Rooted in the theory that women's empowerment and equality are inseparable and necessary components for the realization of sustainable economic and social development, this paper aims to determine if stakeholders are jumping on the mobile phone bandwagon too soon by using a multivariate regression of cross national data to demonstrate whether or not mobile phones fall short of advancing women at the same rate that men develop.

**INDEX WORDS:** Information communication technologies, Gender inequality, Women empowerment, Mobile phones, Economic empowerment, Development

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by

KARI A. N. MACKEY

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of

Master of Arts

in the College of Arts and Sciences

Georgia State University

2012

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2012

MOBILE PHONES AND GENDER INEQUALITY: CAN WE HEAR HER NOW?

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August 2012

## ACKNOWLEDGEMENTS

First and foremost I would like to thank Dr. Jelena Subotic for serving as my committee chair and for providing much needed guidance and support. Additionally, I am grateful for the sound advice and direction of Dr. Charles Hankla and Dr. Carrie Manning, both of whom also served on my thesis committee.

I am honored to call Laura Neuman my mentor and friend, and I wish to thank her for believing in me and introducing me to the right access to information (ATI). Although the end product of this thesis did not concentrate on ATI in the way that I initially hoped it would, it is undoubtedly my passion for ATI that has led me to explore other, connected means for empowering vulnerable and marginalized populations such as information and communication technologies.

Of course, I am thankful for my parents, brother, family, and dear friends for loving me and never doubting me. But it is to my husband and best friend, Carlton Mackey, to whom I am truly indebted. Without him none of this would be possible. For the countless hours of care he provided to our son while I typed away in a coffee shop, for the financial support he lent to sustain my grad school habit, and for the prodding and pushing he did when I had absolutely no desire to read or write another word on political theory, it is to him that I dedicate this thesis.

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## 1 INTRODUCTION

Are mobile phones the best vehicle for reducing gender inequality in the developing world? For years, scholars within the Information and Communication Technologies (ICT) community have suggested the adoption of new technologies as a means to advance the status of women in developing countries. It has been argued that ICTs can deliver more than just information to women and may also contribute to women's empowerment and development, in addition to serving as a means for poverty eradication (Maier and Nair-Reichert, 2008). More recently, ICT experts have championed the use of mobile phones in particular as a way to improve the lives of women. Various stakeholders, including donors, non-profits, governments, and private firms have invested millions of dollars to launch mobile phone programs for women around the world. The United States Agency for International Development (USAID) alone, in the midst of a recovering economy that still suffers from historically high unemployment rates, will invest close to US\$4 million of tax payer dollars over the next four years to help reduce the mobile phone gender gap by 50 percent, placing mobile phones in the hands of an additional 150 million women in developing countries (Kiplinger, 2011; Trading Economics, 2011; GSMA, 2011).

Given the high illiteracy rates that women in developing countries face, as well as patriarchal societies and other structural and cultural barriers, many scholars contend that women's access to ICTs is limited, thereby perpetuating inequalities and "have-not situations" (Spence, 2010). However, focusing mainly on development and empowerment in general, extant literature often fails to shed light on the impact that mobile phones specifically have on gender inequality. Furthermore, much of the literature is anecdotal in nature, rather than scientific. With so much money being poured into mobile phone programs, it is worth examining the bigger

picture. Do mobile phones help to reduce gender inequality? While they may indeed advance women's development, if this progress is not relative to that of men's progress, then women will continue to suffer from the plight of unequal access to healthcare, education, capital, voice, political participation, information, land, etc., as well as general inferiority. Rooted in the theory that women's empowerment and equality are inseparable and necessary components for the realization of sustainable economic and social development, this paper aims to determine if stakeholders are jumping on the mobile phone bandwagon too soon by using a multivariate regression of cross national data to demonstrate whether or not mobile phones fall short of advancing women at the same rate that men develop. While mobile phones might help women progress, if they are not serving to decrease gender inequality as well, they may be contributing to a vicious cycle of inequity. In addition to examining the relationship between mobile phones and gender inequality, this paper provides stakeholders with recommendations for advancing the status of women commensurate to men, creating a more enabling environment for the use of mobile phones in development projects targeted to women, and increasing scholarship on the issue of gender inequality.

## **2 LITERATURE REVIEW**

### **2.1 Why Gender Inequality?**

According to the literature, scholars and popular women's movements have advocated for the empowerment of women prior to the introduction of this term as a key strategy for women's development by the Beijing Declaration and Platform for Action in 1985 (Charlier and Caubergs, 2007). The Beijing Declaration was unanimously adopted by 189 countries attending the Fourth World Conference on Women and identifies "12 'critical areas of concern' considered to be

major obstacles to gender equality and women's empowerment" (United Nations Economic and Social Commission for Asia [UNESCAP], 2012). According to section 13 of the document:

Women's empowerment and their full participation on the basis of equality in all spheres of society, including decision-making process and access to power, are fundamental for the achievement of equality, development and peace. (Beijing Declaration, 1985)

Scholars have noted that empowerment is tied to "the seizing of power" as self-esteem and self-confidence is improved, and to "the collective power to change gender relations in the economic, political, legal and socio-cultural spheres" (Charlier and Caubergs, 2007). Another expert indicates that empowered women can "bloom from their hidden potentialities;" exhibit power of thought, word, and organization; and are able to "participate in the socioeconomic development for their emancipation from less human conditions to more human condition" (Haider and Atkar, 1999; Islam and Sultana, 2005). Some suggest that "women empowerment is the development of mental and physical capacity, power or skills in women for them to operate meaningfully in their social milieu, thereby experiencing a more favorable level of social recognition and subsequently enhance their economic status (Akomolafe, 2006; Danjuma, Malami, Gatawa, 2011).

While much of today's international development literature related to women's advancement continues to highlight the importance of empowering women, it often focuses more on the economic empowerment of women. Because women lack equal access to basic services, resources, and opportunities including support mechanisms, raw materials, credit, transportation, health care, market information, education, etc., women represent the majority of people living in severe poverty" (Danjuma, Malami, Gatawa, 2011). According to the literature, when "women

are affected by poverty, susceptible to disease, and prone to environmental degradation,” development is compromised and economic empowerment of women becomes “imperative” (Danjuma, Malami, Gatawa, 2011). Economic empowerment entails equipping women with the skills, education, and training necessary for entering the market and embarking on economic ventures to emancipate them from poverty (Danjuma, Malami, Gatawa, 2011). Scholars believe that “if individual women gain economic independence, they would have more decisional power over their lives and create change from within” (Salime, 2010). When economically empowered, women are also better able to participate in decision making within their families and externally in society.

In addition to impacting the progress of individuals, the empowerment of women is said to help advance whole societies. Women are known to be the main providers of care for their children, families, and communities. In this vein, studies have shown that “when women have increased income or greater control over resources, more resources are allocated to children’s well-being including food and education” thereby transforming whole communities (Onyishi and Agbo, 2010). And because “working women contribute to household income and expenditure...empowering women to become entrepreneurs” can impact “the economy of developing nations” as well as the “quality of family life” (Onyishi and Agbo, 2010).

The empowerment of women, while essential to the advancement of individual women and important to society writ large, does not necessarily equate to gender equality. When women are empowered, but advance at a rate unequal to that of men’s progress, as has been the case for women throughout much, if not all, of history, gender inequality persists. Furthermore, the empowerment of women in one particular area does not necessarily ensure the empowerment of women in another area, therefore maintaining gender inequality. It is surprising to see that the

terms “women empowerment” and “gender equality” are often used synonymously throughout the literature with no regard to the fact that these two concepts are quite different. Even the third Millennium Development Goal sandwiches them together as “Promote gender equality and empower women” (United Nations Development Program [UNDP], 2012). While gender equality may entail the empowerment of women, the former is not a promised result of the latter. It seems to be a vicious cycle, and the consequence may be a continuation of limited or a complete lack of access to a host of life-altering resources such as:

...women’s access to position of influence and power is limited, their occupational choices are narrower, and their earnings are lower than men that they must struggle to reconcile activities outside their home with their traditional roles and they are constrained by the norms, beliefs, customs and values.

(Nikkah, Redzuan, and Abu-Samah, 2012)

Just as the empowerment of women can have positive implications for society, the same holds true for reducing gender inequality. Gender inequality has also been shown to affect not only individual women, but societies as a whole (Kayode, 2009). In a study by Olaoye Ismail Kayode, it is noted that “areas with large and persistent gender inequalities pay the price of more poverty, illness, malnutrition, and other deprivations, even death” (2009). Another study indicates that “societies that discriminate on the basis of gender pay the cost of greater poverty, slower economic growth, weaker governance, and a lower living standard of their people” (Nikkah, Redzuan, and Abu-Sama, 2012). Josefa S. Francisco, in her paper on “Gender Inequality, Poverty and Human Development in South East Asia,” explains the impact of gender inequality on societies:

Gender-based disparities are bad for growth, wealth creation, and poverty reduction. By limiting women's capacity 'to do' and 'to be,' the productive capacity and potential of women are also concomitantly limited, restricting their contributions in the economy and stunting the capacity of the economy to become more dynamic. Persistent inequities on account of gender affect the distribution of costs and benefits from economic arrangements, including regional economic integration and trade agreements... Gender inequality not only erodes human security, but also deepens festering structural conflicts, vulnerabilities, and exclusions in society. Inequality slows down human development. (2007)

While it is important to note that women empowerment and gender inequality are different concepts, it does seem irresponsible to decouple the two given the positive attributes of empowering women and the negative impact that gender inequality can have on whole societies. According to one economic scholar, "gender equality...and women's empowerment are now widely recognized as integral and inseparable parts of any sustainable strategy for economic growth and pro-poor development" (Mayoux, 2010). Yet in practice, this does not always seem to be the case. Far too often various stakeholders engage in development projects targeted at women that ignore one part of the equation. Most likely due to a lack of research, limited funds, and/or scarce resources, many projects focus on the advancement of women, but fail to address the fact that this advancement is taking place at a rate unequal to that of men's progress. Granted the task is tall, but if we wish to eject ourselves from this vicious cycle, it is worth ensuring that development efforts, like placing mobile phones in the hands of millions of women, both empower women while reducing inequality.

## 2.2 The Role of ICTs and Mobile Phones

Given the gross inequalities between women and men in the developing world as referenced above, various stakeholders have spent countless hours and contributed tremendous effort to determine the best routes toward reducing gender inequality and improving the status of women globally. Among the various actors taking up these issues is the Information Communication Technologies for Development (ICT4D) community which focuses on using ICTs for furthering political and social development in developing countries. The Millennium Development Goals (MDGs)—or poverty and hunger eradication, provision of primary education and basic healthcare, and the *elimination of gender inequality*—are often the focus of ICT4D efforts (Toyama and Dias, 2008).

Literature on the role of ICTs in the global advancement of women is surprisingly scant but growing at an impressive rate. In general, advocates for ICTs stress the pertinence of technology to the advancement of women in developing countries, while others, though not denying the ability of new technologies to improve the quality of women's lives, argue that their limited access to ICTs perpetuate gender inequalities and ensure their marginal status in society. Before examining the literature on ICTs as they relate to the advancement of women and gender inequality, it is worthwhile to reflect on the roots of information communication technologies for development (ICT4D) more broadly.

Early academic and policy writings on the use of ICTs in development projects often focused on poverty alleviation. In the late 1990s, one of the leading communication institutes, Panos, noted that several stakeholders, including governments, donors, and development organizations were “rushing to realize the benefits that Internet access promises in the fight against poverty” (Heeks, 1999). In a paper on ICTs and development, Richard Heeks suggests

that ICTs offer a lot to the poor through the provision of information on health, education, and agriculture (1999). In the introductory paragraph of Charles Kenny's paper on the costs and benefits of employing ICTs for poverty alleviation, the following summary of ICT contributions is offered:

Radio and the telephone have a long history demonstrating their utility in developing countries. The Internet has also already proved itself useful in these countries, increasing both the incomes and quality of services received by citizens. Using Internet-based systems to make phone calls has reduced the cost of international communication; the Internet is being used to ease the export and import of goods; and countries such as India are earning billions of dollars a year exporting IT services and software. (2002)

Other scholars contend that ICTs can alleviate poverty by placing economies "on a higher income trajectory over time" and enabling developing countries to "leapfrog" stages of development and be at par with the level of development in the West" (Maier & Nair-Reichert, 2007; Alampay, 2005). One scholar notes that ICTS have "proven to be increasingly fundamental for social and economic development" because "access to basic ICT infrastructure is a key to increasing the flow of information and improving communications and by extension increasing the possibilities and opportunities" (Kayode, 2009). In turn, ICTs have "proven to be a great leveler between the developed and the developing countries of the world" (Kayode, 2009). Sylvia Maier and Usha Nair-Reichert offer a list of ways in which ICTs "can foster greater market integration," including:

- They allow firms and individuals in developing countries to participate more competitively and with greater ease in the regional, national and global

- economies and reduce uncertainty in doing business;
- Information regarding prices enables producers to plan their product mix and input purchases in an efficient manner;
- Access to ICTs allows producers to sell their products in the most profitable markets and determine the optimum timing of sale;
- Availability of price information shrinks the informational asymmetry between the rural producers and middlemen;
- ICTs reduce the exploitation of rural producers by e-middlemen;
- Increased information facilitates technology diffusion, adoption and innovation at a much faster pace;
- Increased information about the availability of jobs could result in better and faster matching between landless laborers and available jobs, ultimately leading to increased productivity;
- ICTs provide greater access to weather-related information and credit opportunities. (2007)

In addition to contributing to poverty alleviation and economic progress broadly, ICTs have been hailed as a tool for development through empowerment, especially of women. Women are empowered when they enjoy an increased ability to take control over decision making processes regarding life-changing issues (Kayode, 2009). According to Kayode, “this includes having full access to complete information and to self-discern the quality and credibility of such information in making these decisions” (2009). By bringing the internet to rural, poverty-stricken areas, women within these communities can “become more autonomous” and better able to “shape their own lives in meaningful ways through networking, knowledge

gathering, flexing their voices, becoming activists, and resisting the status quo” (Wheeler, 2007). Other scholars contend that new technologies can increase women’s participation in democratic processes, ensure better access to information, and expand “business, employment, social, and education opportunities” (Phillips, 2003).

Mobile phones in particular have recently been hailed as *the* answer for promoting women’s empowerment (Lloyd, 2010). While otherwise isolated, immobile, impoverished, or illiterate, mobile phones have enabled women to communicate with their husbands while they work far from home, obtain medical care for their children, run a small enterprise, and report violence (Lloyd, 2010). As compared to other ICTs, such as computers, mobile phones are easier to learn and more accessible (Lloyd, 2010). And for those implementing development projects for women, such as mWomen program director Trina DasGupta, “mobile technology also scales up for large populations in ways that social programs rarely achieve” (Lloyd, 2010).

Vikas Nath offers a particularly convincing argument on the impact that ICTs can have on women and societies (2001). Linking ICTs with their ability to deliver information and thus increase knowledge, Nath explains that “knowledge is empowering, while the lack of knowledge is debilitating” (2001). For women in particular, “knowledge and its widespread dissemination in an absorbable and usable form is therefore quintessence to initiate the change process for women’s development” (Nath, 2001). Because women have historically been distanced from “the global pool of information and knowledge” due to “societal, cultural, and market constraints,” women are less empowered than men—a potentially damaging fact when one considers the role of women in society (Nath, 2001). As women’s traditional roles in society cause them to be “more rooted than men in the confines of their locality,” they are often more

aware than men of their communities' needs (Nath, 2001). Therefore, sharing knowledge not only empowers individual women, but advances whole communities.

Although many scholars promote the use of ICTs for women's empowerment and overall development, several do so cautiously because of their ability to inadvertently maintain or worsen gender inequality. While new technologies have the ability to help women transcend their limited access to education, information, transportation, markets, etc., unequal access to ICTs in and of themselves can serve to perpetuate or exacerbate these inequalities. Insufficient training, high equipment and connection costs, severe poverty, and "highly patriarchal social structures" can hinder women's access to information and communication technologies (Maier & Nair-Reichert, 2007). Furthermore, women's gross underrepresentation in the development and implementation of new technologies are believed to adversely affect their ability to equally enjoy the benefits of ICTs (Maier & Nair Reichert, 2007).

Maier and Nair-Reichert, in their article regarding the empowerment of women through ICT-based business initiatives, break down the root causes of women's unequal access to new technologies (2007). For women entrepreneurs in the developed world, the inability to easily obtain seed funding and a general resistance by male government officials to women's empowerment has barred some women from accessing ICTs (Maier & Nair-Reichert, 2007). Additionally, illiteracy and unfamiliarity with new technologies at the village level triggers distrust in conducting business transactions via computers (Maier & Nair-Reichert, 2007). Finally, societal challenges often limit women's access to ICTs. Fear of shifting power structures, uncertainty about professional opportunities following marriage, and the overburden of juggling family and work obligations "may result in women opting out of ICT-driven developmental efforts (Maier & Nair-Reichert, 2007). In an article regarding internet cafes in

Egypt, Deborah Wheeler echoes Maier and Nair-Reichert's sentiments, suggesting that women in the Arab world face several obstacles in accessing ICTs, including "illiteracy, lack of access, prohibitive costs, IT knowledge, and lack of technical training," as well as "powerful authoritarian states that curb the flow of online information (i.e., censorship) and restrict freedom of use (i.e., state cyberpolicing and persecution of individuals who use the Web in ways it finds threatening)" (Wheeler, 2007).

Referred to as "the darker side" of distributing mobile phones to women, Melissa Ulbricht of MobileActive.org indicates that "changes in gender relations and power dynamic, a potential increase in violence, ...invasion of privacy, and increased control by a male partner" are possible outcomes of such programming. Ulbricht refers to a thesis study by Aramanzan Madanda regarding gender relations and the adoption of ICTs in Uganda which found that despite an increase in the use of women using mobile phones, underlying gender structures largely remained and that "a strong intersection between use of especially mobile phones and escalation of gender based violence" exists (Madanda, 2011; Ulbricht, 2011). Citing an Inter Press Service article regarding the Uganda study, Ulbricht writes:

"Traditionally, in Busoga (one of the study sites), a woman must seek her spouse's consent to go anywhere, whether to visit a relative or go to the market," Madanda explained. "But now women can be directly in touch with relatives and other people without their husband's consent and since men have lost that power to control the women some turn to violence." (Kagumire, 2010; Ulbricht, 2011)

Drawing from a paper by Geeta Shroff and Matthew Kam on the empowerment of impoverished Indian women, Ulbricht notes that "if a women is given too much power via a mobile phone, other members of the family may not be comfortable with this 'and that might

actually hurt the woman in some way” (Shroff & Kam, 2011; Ulbricht, 2011). In another article Simon Clark shares the story of Maryam—a 24 year Afghani woman whose “husband was so outraged when he discovered the [mobile phone] she had smuggled into their Kabul home that he beat her with his fists and a whip” (2011).

Inability to easily access ICTs is not the sole impediment to women’s empowerment through new technologies. Even when women can own or use mobile phones and other technologies with ease and the support of their communities, because women are often excluded from the production of ICTs, their needs are not represented in the end products, thereby resulting in services and software that may not serve to advance women. Nancy Spence posits that “one of the greatest challenges in harnessing ICTs for the social transformation of women is to see women as ICT producers, developers, and decision makers, not simply as consumers, to ensure further equal participation of women in the information society (2010). Anita Gurumurthy echoes this sentiment and explains:

What will contribute to transformation, particularly the transformation of gender relations, is whether or not women and men are involved in community-based processes to determine what is useful, and whether or not women’s indigenous knowledge and their concerns, interests, and rights are factored into the production and dissemination of content. (2006)

Most scholars suggest that ICTs are not an end, but rather a means to an end that is insufficient when not paired with other development measures. Many articles championing the use of new technologies for development also cautioned stakeholders from placing all of their eggs in the ICT basket. In an interview with Jenny Aker, co-author of the article, "Mobile Phones and Economic Development in Africa," Aker notes that mobile phones are not “the silver

bullet...they can't replace certain things like investment in public goods, in health and education" (MacDonald, 2011). In the June 2008 edition of *Computer*, in which "authors pay increased attention to the innovations involving wireless technology, mobile phones, and digital video," the introduction provides a sort of disclaimer, if you will:

The articles in this special issue share a cautious, self-reflective tone. The authors, speaking from hard-won experiences, rarely make extravagant claims for themselves or their technology. Technology provides one piece of the larger puzzle of development, but rarely a total solution. Channels for information and communication might be lacking, but so too are a physical infrastructure, individual education, and social structure—all of which are typically required to accomplish meaningful change. (Toyama and Dias, 2008)

The literature regarding the impact that mobile phones have specifically on gender inequality, as opposed to just women empowerment, is insufficient and largely reflects a barrage of anecdotes often found in policy papers and non-profit blogs. Scientific field studies, such as the one conducted in Uganda by Mandanda, are few and far between and mostly limited to a particular country or region. In order to help provide a more holistic picture and contribute much needed scholarship on the relationship between mobile phones and gender inequality, this thesis draws on information from around the globe, comparing data from countries across different regions and that exhibit varying levels of development via a multivariate statistical regression analysis. Ultimately, this study reflects that mobile phones lack any statistically significant impact on gender inequality.

### 3 HYPOTHESIS

Given the importance of gender equality to development, it is worthwhile to determine if mobile phones are really the best vehicle for reducing gender inequality in the developing world. Many scholars believe that mobile phones empower women and therefore help them to progress both economically and socially. On the other hand, extant literature also tells us that in developing countries, cultural and structural barriers often restrict women's access to ICTs or exclude them from playing a role in the production of ICTs, thereby exacerbating, or at least maintaining gender inequality. Even when mobile phones are placed directly in the hands of women, patriarchal cultures can bar them from the full enjoyment of the benefits that mobile phones promise. And as noted above, scholars have drawn a strong link between countries exhibiting more gender inequality and higher rates of poverty, illness, malnutrition, and even death among their citizens (Kayode, 2009). If mobile phones are not helping to reduce gender inequality, then in order to ensure that mobile phone programs for women are having the greatest positive impact possible, key stakeholders should take the necessary steps to ensure that these projects address inequities and help to advance women at a rate commensurate to men's progress.

In order to determine if there is a causal link between mobile phones and gender inequality, I have explored both hypotheses in support of and skeptical of mobile phones. Because gender disaggregated data regarding the *use* of mobile phones is not as readily available as is the number of mobile phone subscriptions per one hundred inhabitants in each county, I have used the latter for this model. The selection of this data will be explained in greater detail below. Additionally, to measure gender inequality, I rely on the Global Gender Gap score also further discussed below. An increase in this score signifies a decrease in gender inequality. If

mobile phone advocates are right in believing that mobile phones reduce inequality, then we can expect the following hypothesis to be supported:

*As the number of mobile phones subscriptions in a country increases, the Global Gender Gap score increases as well, other things equal*

If on the other hand skeptics have rightly argued that mobile phones perpetuate or increase gender inequality, then the following hypothesis should be upheld:

*As the number of mobile phones subscriptions in a country increases, the Global Gender Gap score remains constant or decreases, other things equal*

With mobile phone subscriptions (M) as the independent variable, Global Gender Gap score (G) as the dependent variable, and controls for country income level (I), religious favoritism (R), level of democracy (D), average years of education (E), average life expectancy (H), literacy rate (L), measure for income inequality (N), and percent of agricultural labor force (A) all further detailed below, the mathematical expression for the model that I seek to test is:

$$G = \alpha + \beta_1 M + \beta_2 I + \beta_3 R + \beta_4 D + \beta_5 E + \beta_6 H + \beta_7 L + \beta_8 N + \beta_9 A + \mu$$

#### **4 METHODS AND DATA COLLECTION**

In order to test the influence of mobile phone access on gender inequality, this study employs a straightforward multivariate regression analysis on 80 cases using Stata statistical analysis software. Despite high hopes to use a cross-sectional time-series model, scarce data availability severely limited the scope of this study and further highlights the need for more and better datasets for use in statistical analysis within the social sciences. This small  $n$  study consists of those countries<sup>1</sup> for which information is fully available from the datasets discussed

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<sup>1</sup> The eighty countries included in this study are: Albania, Algeria, Angola, Argentina, Bangladesh, Benin, Bolivia, Botswana, Brazil, Bulgaria, Burkina Faso, Cambodia, Cameroon, Chad, Chile, China, Colombia, Costa Rica,

below, and even then, data was not available for one particular year across all variables. While most data was generated in 2008, values for some of the variables were drawn from other years as noted<sup>2</sup>. Fortunately, given the number of countries included in this study, the sample does retain rather strong diversity in region, income, religion, political structure, population size, geographic area, etc. Of the 80 countries included in this study, 25 percent represent Latin America and the Caribbean, 30 percent are located in Africa or are neighboring islands, just over 21 percent are in Asia, and about 22 percent hail from Europe.

## 4.1 Data Sources

### 4.1.1 *Mobile Phone Subscriptions (M)*

Every year, the International Telecommunication Union (ITU) publishes a “Yearbook of Statistics” including data “about the evolution of the telecommunication sector, the availability of ICTs in households and the usage of ICTs by individuals” as collected and processed through “questionnaires sent to telecommunication/ICT ministries, telecommunication regulatory authorities and national statistics offices (International Telecommunication Union [ITU], 2011). The most ideal dataset for this study is mobile phone use, access, and/or subscriptions disaggregated by gender as this information would better reflect who is using the mobile phones—be it men or women; however, I was disappointed to learn that this information is not easily accessible, free of charge, and in some instances, does not exist. To circumvent the issue of data inaccessibility, aggregated data that highlights the number of mobile cellular subscriptions per 100 inhabitants in 2008 is used. It is assumed that as the number of mobile

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Croatia, Cyprus, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Ethiopia, Gambia, Georgia, Ghana, Greece, Guatemala, Honduras, Hungary, India, Indonesia, Iran, Italy, Jamaica, Jordan, Kazakhstan, Kenya, Kyrgyzstan, Latvia, Lesotho, Lithuania, Macedonia, Madagascar, Malawi, Malaysia, Mali, Mauritania, Mauritius, Mexico, Nicaragua, Nigeria, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Romania, Russia, Singapore, Slovenia, South Africa, Spain, Sri Lanka, Tanzania, Thailand, Trinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, Uruguay, Venezuela, Yemen, and Zambia.

<sup>2</sup> Data was generated in 2008 unless otherwise noted.

phone subscriptions in a given country increases, especially to over 50 percent of the population since on average women represent more than 50 percent of the global population, that more women will have access to mobile phones or enjoy mobile phone subscriptions. While I agree that future studies should be conducted using gender disaggregated data, given the idea that aggregated data can still capture an increase in the number of women accessing mobile phones, I believe that the findings of this study still provide much needed insight into the impact that mobile phones have on gender inequality.

#### **4.1.2 Gender Inequality (G)**

Several indices that measure gender inequality exist, such as the Organization for Economic Cooperation and Development (OECD) 2009 Social Institutions and Gender Index (SIGI) and the United Nations Development Program (UNDP) Gender Inequality Index (GII); however, these indices do not cover as many countries as the World Economic Forum Global Gender Gap Index. Therefore, the latter was used in this study.

According to the 2011 Global Gender Gap Report, the Global Gender Gap Index is “a framework for capturing the magnitude and scope of gender-based disparities and tracking their progress...the Index benchmarks national gender gaps on economic, political, education, and health-based criteria” (Hausmann, Tyson, and Zahidi, 2011). The Index “focuses on measuring gaps rather than levels,” and more specifically, “it captures gaps in outcome variables rather than gaps in mean or input variables” (Hausmann, Tyson, and Zahidi, 2011). The Global Gender Gap Report provides the following example for why measuring gaps is important:

...rich countries have more education and health opportunities for all members of society and measures of education levels thus mainly reflect this well-known fact, although it is quite independent of the gender-related issues faced by each country

at its own level of income. The Global Gender Gap Index, however, rewards countries for smaller gaps in access to these resources, regardless of the overall level of resources. Thus the Index penalizes or rewards countries based on the size of the gap between male and female enrollment rates, but not for the overall levels of education in the country. (Hausmann, Tyson, and Zahidi, 2011)

With regard to outcomes versus means, the Index aims to “provide a snapshot of where men and women stand with regard to some fundamental outcome variables related to basic rights such as health, education, economic participation and political empowerment” (Hausmann, Tyson, and Zahidi, 2011). In this way “variables related to country-specific policies, culture or customs” are excluded (Hausmann, Tyson, and Zahidi, 2011). The example provided by the report is the variable included in the Index which compares the gender gap in “high-skilled jobs such as legislators, senior officials and managers (an outcome variable), whereas “data on length of maternity leave,” a policy or input variable, is not used (Hausmann, Tyson, and Zahidi, 2011).

Perhaps most important, the Global Gender Gap Index “ranks countries according to their proximity to gender equality rather than women’s empowerment” (Hausmann, Tyson, and Zahidi, 2011). In other words, the index focuses on a decrease or increase in the gap between men and women with regard to economic participation and opportunity, educational attainment, health and survival, and political empowerment. It does not highlight whether women have advanced beyond men and are therefore “‘winning’ the ‘battle of the sexes’” (Hausmann, Tyson, and Zahidi, 2011). Rather, countries are only rewarded when “outcomes for women equal those for men” (Hausmann, Tyson, and Zahidi, 2011).

As previously mentioned, the four pillars captured by the Global Gender Gap Index include economic participation and opportunity, educational attainment, health and survival, and

political empowerment. The following table (Table 4.1) excerpted from the Global Gender Gap Report 2011 provides a breakdown of the structure of the index:

**Table 4.1 Structure of the Global Gender Gap Index**

Subindex	Variable	Source
<b>Economic Participation and Opportunity</b>	Ratio: Female labour force participation over male value	International Labour Organization, <i>Key Indicators of the Labour Force Market (KILM)</i> , 2009.
	Wage equality between women and men for similar work (converted to female-over-male ratio)	World Economic Forum, <i>Executive Opinion Survey 2011</i>
	Ratio: Estimated female earned income over male value	World Economic Forum, calculations based on the United Nations Development Programme methodology (refer to the <i>Human Development Report 2009</i> ).
	Ratio: Female legislators, senior officials and managers over male value	International Labour Organization, <i>LABORSTA</i> Internet, online database, 2008 or latest data available; United Nations Development Programme, <i>Human Development Report 2009</i> , the most recent year available between 1999 and 2007.
	Ratio: Female professional and technical workers over male value	International Labour Organization, <i>LABORSTA</i> Internet, online database, 2008 or latest data available; United Nations Development Programme, <i>Human Development Report 2009</i> , the most recent year available between 1999 and 2007.
<b>Educational Attainment</b>	Ratio: Female literacy rate over male value	UNESCO Institute for Statistics, <i>Education Indicators</i> , 2009 or latest data available; World Bank's <i>World Development Indicators &amp; Global Development Finance</i> , online database, 2009 or latest available data; United Nations Development Programme, <i>Human Development Report 2009</i> , the most recent year available between 1997 and 2007.
	Ratio: Female net primary level enrolment over male value	UNESCO Institute for Statistics, <i>Education Indicators</i> , 2010 or latest data available; World Bank's <i>World Development Indicators &amp; Global Development Finance</i> , online database, 2009 or latest available data.
	Ratio: Female net secondary level enrolment over male value	UNESCO Institute for Statistics, <i>Education Indicators</i> , 2010 or latest data available; World Bank's <i>World Development Indicators &amp; Global Development Finance</i> , online database, 2009 or latest available data.
	Ratio: Female gross tertiary level enrolment over male value	UNESCO Institute for Statistics, <i>Education Indicators</i> , 2010 or latest data available; World Bank's <i>World Development Indicators &amp; Global Development Finance</i> , online database, 2009 or latest available data.
<b>Health and Survival</b>	Sex ratio at birth (converted to female-over-male ratio)	Central Intelligence Agency, <i>The CIA World Factbook</i> , data updated weekly, 2011.
	Ratio: Female healthy life expectancy over male value	World Health Organization, <i>Global Health Observatory database</i> , data from 2007.
<b>Political Empowerment</b>	Ratio: Women with seats in parliament over male value	Inter-Parliamentary Union — <i>National Women in Parliaments</i> , 30 June 2011.
	Ratio: Women at ministerial level over male value	Inter-Parliamentary Union, <i>Women in Politics: 2010</i> , up to January 2010 or latest available data.
	Ratio: Number of years of a female head of state or government (last 50 years) over male value	World Economic Forum calculations, as of 30 June 2011.

Note: In instances of multiple sources, the first source listed is the primary source, followed by the secondary source if data were not available from the primary source; if data were not available from the primary or secondary sources, the third source listed was used.

In order to construct the Index, the data is converted to female/male ratios in order to capture gaps. Next the “ratios are truncated at the ‘equality benchmark,’” which is “1” for most variables and translates to “equal numbers of women and men” (Hausmann, Tyson, and Zahidi, 2011). Only two variables, sex ratio at birth and health life expectancy are slightly higher or lower than “1.” In this way, countries are not rewarded for achieving higher ratios of women to men; instead, they are highlighted when equality has been achieved and a score is equal to “1.”

Weighted averages are then calculated to create a subindex score (Hausmann, Tyson, and Zahidi, 2011). Lastly, final scores are calculated by taking “an un-weighted average of each subindex score” (Hausmann, Tyson, and Zahidi, 2011). “The highest possible score is 1 (equality) and the lowest possible score is 0 (inequality)” (Hausmann, Tyson, and Zahidi, 2011). For the purpose of this paper, the Global Gender Gap Index scoring mechanism has not been altered.

#### **4.1.3 Country Income Level (I)**

It is well known that gender inequality is usually lower in higher income countries (Dollar and Gatti, 1999). As higher income countries invest more resources in education and healthcare for girls, whole societies are improved, and gender gaps often decrease. In order to account for country income level, a control variable has been included in this model using the World Economic Outlook Database Purchasing-Power Parity (P) rates, which “convert economic statistics into a common currency before comparing them” (Relly and Sabharwal, 2009). Each value is presented in current international dollar units (billions) and represents the “gross domestic product based on purchasing-power parity valuation of country gross domestic product” (International Monetary Fund [IMF], 2011).

#### **4.1.4 Religious Favoritism (R)**

Some scholars have noted a relation between religious preference and gender inequality (Dollar and Gatti, 1999). Also, those religions known to be more pervasive in politics, such as Islam and Shari’a Law are thought to have a greater impact on gender relations and equality. Although using religion as an indicator for gender inequality has generated heated and controversial findings and debate, it is worth including the variable as a control in this study. At the very least, I thought it would be interesting to determine if religion has any noted impact

in my model. Religion is also serving as a control for culture, since culture and religion are often closely linked.

Rather than use a group of dummy variables to identify whether or not the majority of citizens in a particular country claim a specific religion (i.e. Indonesia would receive a “1” for the Muslim indicator and a “0” for Roman Catholic, Other Christian, Shinto, and so on), this study employs the 2008 Government Favoritism of Religion Index accessed through the Association of Religion Data Archives. Religious favoritism is defined as “subsidies, privileges, support, or favorable sanctions provided by the state to a select religion or a small group of religions” (Grim and Finke, 2006). On a scale of 0-10, a higher score on the Government Favoritism of Religion Index indicates a higher level of favoritism. As previously noted, countries with higher levels of religious favoritism, such as Islamic countries with Shari’a law, exhibit greater levels of gender inequality.

#### **4.1.5 Level of Democracy (D)**

In addition to income and religion, political factors have been linked to varying levels of gender inequality (Kenworthy and Malami, 1999). The literature on the issue of democracy as it relates to gender inequality varies, with some scholars noting that more democratic countries exhibit lower levels of inequality, while others do not see a strong link. In the event that there is a causal link, it seemed important to include the variable as a control in this study. In order to prevent issues of multicollinearity, “thick” democracy scores that often encompass measurements of general freedom, including gender equality were not used. Instead, data has been obtained from the Polity IV Project scores, which capture regime authority on an 11-point scale ranging from 0-10, or low democracy to high democracy (Marshall, 2010).

#### **4.1.6 Education (E)**

According to the literature, education has been emphasized as a means for shaping both men's and women's beliefs, thereby "encouraging non-traditional attitudes" and decreasing gender inequality (Kane, 1995). To control for education, a variable representing the mean years of schooling as provided by the United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute for Statistics (UIS) via the UNDP International Human Development Indicators (HDI) has been included. The variable specifically accounts for the "average number of years of education received by peoples ages 25 and older, converted from education attainment levels using official durations of each level" (United Nations Educational, Scientific and Cultural Organization Institute for Statistics [UIS], 2011).

#### **4.1.7 Health/Life Expectancy (H)**

According to Amartya Sen, mortality—commonly measured by life expectancy--can serve as an indicator of economic success and failure as well as social inequalities, like gender bias (2001). Countries that exhibit higher levels of life expectancy often have higher levels of national income and lower levels of gender inequality. While this phenomenon would suggest that the health and education variables are closely correlated, the Pearson Correlation Coefficient for these two controls is only 0.6369, as discussed in greater detail below and shown in Table 5.5. Therefore, my model does account for the overall health of each country and includes a control variable for life expectancy at birth. As with the education data employed in this study, the health data was sourced through the HDI as referenced above and is "expressed as an index using a minimum value of 20 years and an observed maximum value over 1980-2010" (HDI, 2011).

#### **4.1.8 Literacy (L)**

Literacy has long been recognized as an important tool for the exercise of socioeconomic rights (Acharya, 2004). When illiterate, citizens are less able to participate in public and political life. Furthermore, given the link between literacy and education<sup>3</sup> and the aforementioned impact that the latter is noted to have on gender inequality, it would seem that the same holds true for the former—that increased levels of literacy result in decreased gender inequality. To control for literacy, national literacy rates for adults aged 15 years and older were obtained from the UIS 2008 and 2009 data. According to UNESCO, a person is considered to be literate when they “can both read and write with understanding, a short, simple statement on his or her everyday life” (2011).

#### **4.1.9 Income Inequality (N)**

While the literature review did not directly point to a link between income inequality and gender inequality, given the suggested relationship between national income and gender inequality, I was compelled to include a control variable for income inequality. Data for this variable was taken from The Standardized World Income Inequality Database (SWIID). The SWIID “standardizes the United Nations University’s World Income Inequality Database and other inequality data while minimizing reliance on problematic assumptions by using as much information as possible from proximate years within the same country” (Solt, 2009). The SWIID employs the Gini Index which has “a theoretical range from zero, which indicates that each reference unit receives an equal share of income, to one hundred, indicating that a single

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<sup>3</sup> Curious if there is a statistically significant link between higher literacy rates and a larger average number of years of education among peoples aged 25 years and older, I regressed literacy on education, controlling for income, democracy, health, and income inequality. The resulting p-value for literacy is 0.000, and the adjusted R-squared for this model is 0.8082. Furthermore, as demonstrated in Table 5.5 below, literacy and education are highly correlated with a Pearson correlation coefficient of 0.8853.

reference unit receives all income and all others receive nothing” (Solt, 2009). The most recent data for each sample country was used, but sadly ranged from 2001-2009.

#### **4.1.10 *Agricultural Labor Force (A)***

Rural women make up the majority of the agricultural labor force in most developing countries, and yet “female farmers are often underestimated and overlooked” (Danida, 2008). Because gender inequality is pervasive in the agricultural sector, I wondered if the presence of agriculture-based economies impact and therefore act as an indicator for higher levels of gender inequality. To control for this, I used data from the World Resource Institute’s Earth Trends Environmental Information Portal. More specifically, a variable representing the agricultural labor force as a percent of the total labor force was employed. Unfortunately, the most recent data available is from 2004.

## **5 FINDINGS AND ANALYSIS**

An initial peek at the data through a summary table (Table 5.1) reveals that the sample mean for the 2008 Global Gender Gap score is approximately 0.67, which nicely corresponds to the population average that is also 0.67 when rounded to the nearest tenth. This score signifies that about 67 percent of the global gender gap had been closed in 2008, up slightly from 66 percent in 2006 when the index was initiated. The summary table also indicates that an astonishing 81 percent of sample country inhabitants had mobile phone subscriptions in 2008. Also interesting are the mean values for adult literacy at 83 percent, life expectancy at 76 years, education at 7 years, and percent of the labor force in agriculture at 33 percent. As these numbers are higher than I expected them to be, I am amazed by the income inequality that exists on a global scale. When the mean income inequality value of 40.39826 is considered (expressed

in Table 5.1 below as “gini”), literacy rates, life expectancy, education, and industry in developed countries are really driving up global averages.

**Table 5.1 Data Summary**

Variable	Obs	Mean	Std. Dev.	Min	Max
country	0				
year	80	2008.6	.4929888	2008	2009
gender	80	.6646325	.0533501	.4609	.7568
mobile	80	81.35538	38.47551	2.46	175.24
income	80	419.1052	1130.387	3.276	9068.187
religion	80	4.562425	3.312484	0	10
democ	80	5.3375	4.885897	-7	10
educ	80	7.34125	2.647602	1.3	12.1
health	80	.7612375	.1487172	.424	.972
literacy	80	83.16125	18.80897	26.2	99.8
gini	80	40.39826	7.631273	23.42101	63.5195
agriculture	80	32.88625	24.77863	.1	92.2

To begin examining the relationship between mobile phone subscriptions and gender inequality, I first ran a very simple linear regression (Table 5.2) of the independent variable, mobile phone subscriptions (M), on the dependent variable, gender inequality (G). While the overall model is significant with a p-value of 0.0010 and the independent variable proved significant with a p-value of 0.001 and a t-score of 3.43, the adjusted R-squared for this model is only 0.1198. It is worth noting, however, that the root mean squared error is very small at 0.05005, indicating that the model is rather accurate. However, graphical representation (Figure 5.1) of this model indicates issues with linearity.

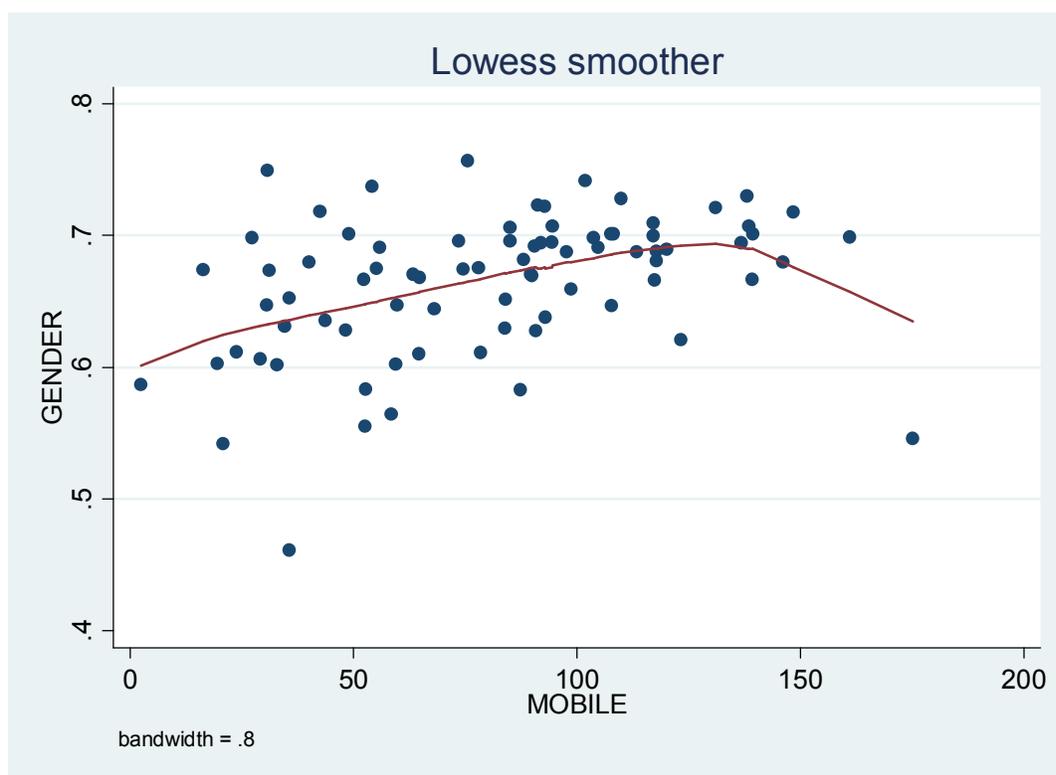
The coefficient for mobile phone subscriptions is positive and supports the pro-mobile phone hypothesis; as more of the population has access to mobile phones, the Global Gender Gap score increases, signifying a decrease in gender inequality. However, while positive, the coefficient is seemingly small at 0.0005017. Yet, according to this model, the overall impact is larger than the coefficient appears. An increase of one mobile phone per 100 inhabitants moves

**Table 5.2 Linear Regression of Mobile Phone Subscriptions on Global Gender Gap**

Source	SS	df	MS			
Model	.029432947	1	.029432947	Number of obs =	80	
Residual	.195419341	78	.002505376	F( 1, 78) =	11.75	
Total	.224852287	79	.002846231	Prob > F =	0.0010	
				R-squared =	0.1309	
				Adj R-squared =	0.1198	
				Root MSE =	.05005	

gender	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
mobile	.0005017	.0001464	3.43	0.001	.0002103	.0007931
_cons	.6238189	.0131571	47.41	0.000	.5976252	.6500126

**Figure 5.1 Lowess Smoother Graph Regressing Mobile on Gender**

the Global Gender Gap score by 0.02 or 40 percent of its standard deviation of 0.0533501 and 7 percent of its full range from 0.4609 to 0.7568.

Because we know that individuals do not live in a vacuum where only mobile phones exist and that several other factors need to be accounted for within this model, a second

regression was ran (Table 5.3). This time a multivariate regression was used including the following control variables: country income level (I), religious favoritism (R), democracy (D), education (E), health (H), literacy (L), income inequality (N), and agricultural labor force (A). To control for heteroskedasticity, the multivariate regression was run using robust standard errors.

**Table 5.3 Multivariate Linear Regression of All Variables on Global Gender Gap**

gender	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
mobile	-.0001705	.0003201	-0.53	0.596	-.0008089	.0004678
income	-4.85e-07	2.65e-06	-0.18	0.855	-5.77e-06	4.80e-06
religion	-.0037084	.0012448	-2.98	0.004	-.0061911	-.0012256
democ	.0017059	.0009302	1.83	0.071	-.0001493	.0035612
educ	.0065842	.0049457	1.33	0.187	-.0032796	.016448
health	-.0392967	.0437528	-0.90	0.372	-.1265589	.0479656
literacy	.00157	.0005881	2.67	0.009	.000397	.002743
gini	.0004942	.0006831	0.72	0.472	-.0008681	.0018566
agriculture	.0002811	.0004279	0.66	0.513	-.0005723	.0011346
_cons	.5083261	.0688652	7.38	0.000	.3709788	.6456735

This second model retains overall significance as well, but with an even better p-value of 0.0000. Furthermore, this model provides for a more complete picture of what variables are impacting gender inequality with an R-squared of 0.5304. Additionally, the root mean squared value remains small at 0.03884. To test the model specification, I ran a linktest in Stata (Table 5.4). Unable to reject the null hypothesis that there is no specification error in my model with an insignificant p-value for Yhat-squared of 0.629, I concluded that the model is correctly specified.

**Table 5.4 Linktest on Second Model**

Source	SS	df	MS			
Model	.119572145	2	.059786072	Number of obs =	80	
Residual	.105280143	77	.001367275	F( 2, 77) =	43.73	
Total	.224852287	79	.002846231	Prob > F =	0.0000	
				R-squared =	0.5318	
				Adj R-squared =	0.5196	
				Root MSE =	.03698	

gender	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
_hat	2.570125	3.236561	0.79	0.430	-3.874691	9.014941
_hatsq	-1.213104	2.49925	-0.49	0.629	-6.189745	3.763538
_cons	-.5058758	1.044646	-0.48	0.630	-2.586032	1.574281

To ensure that none of the variables are too closely correlated, I reviewed a correlation matrix (Table 5.5) and did not find anything alarming. The most closely correlated variables, as expected, are literacy and education with a Pearson Correlation Coefficient of 0.8853. I was initially concerned that literacy and gender inequality would correlate too closely given that the Global Gender Gap score accounts for female literacy rates. It seemed to make sense that as a given country's literacy rate increased, more of the female population would be accounted for within that literacy rate; however, the Pearson correlation coefficient for literacy and gender inequality is only 0.6195 and it was not necessary to collapse the two variables into a single index.

A look at the actual covariates in this second model reveals that mobile phone subscriptions are no longer significant with a p-value of 0.596 and a t-score of -0.53; I am left to reject both hypotheses and conclude that mobile phones have no significant impact on gender inequality. According to this model, few variables impact gender inequality. Country income, education, health, income inequality, and agricultural labor force are all insignificant with respective p-values of 0.855, 0.187, 0.372, 0.472, and 0.513. In fact, mobile phone subscriptions along with country income level have the most insignificant p-values at 0.596 and 0.855.

**Table 5.5 Correlation Matrix of All Variables**

	gender	mobile	income	religion	democ	educ	health	literacy	gini	agric
gender	1.0000									
mobile	0.3618	1.0000								
income	0.0303	-0.0056	1.0000							
religion	-0.2056	0.0519	-0.0312	1.0000						
democ	0.3904	0.4024	-0.1801	0.0315	1.0000					
educ	0.5955	0.7236	0.0297	0.0845	0.4642	1.0000				
health	0.2647	0.6449	0.1409	0.2728	0.3560	0.6369	1.0000			
literacy	0.6195	0.6852	0.1147	0.1294	0.4264	0.8853	0.6688	1.0000		
gini	0.0954	-0.1475	-0.0501	-0.2173	-0.0185	-0.2037	-0.2985	-0.0514	1.0000	
agric	-0.3706	-0.7722	0.0509	-0.2164	-0.4468	-0.7728	-0.7279	-0.7487	0.1623	1.0000

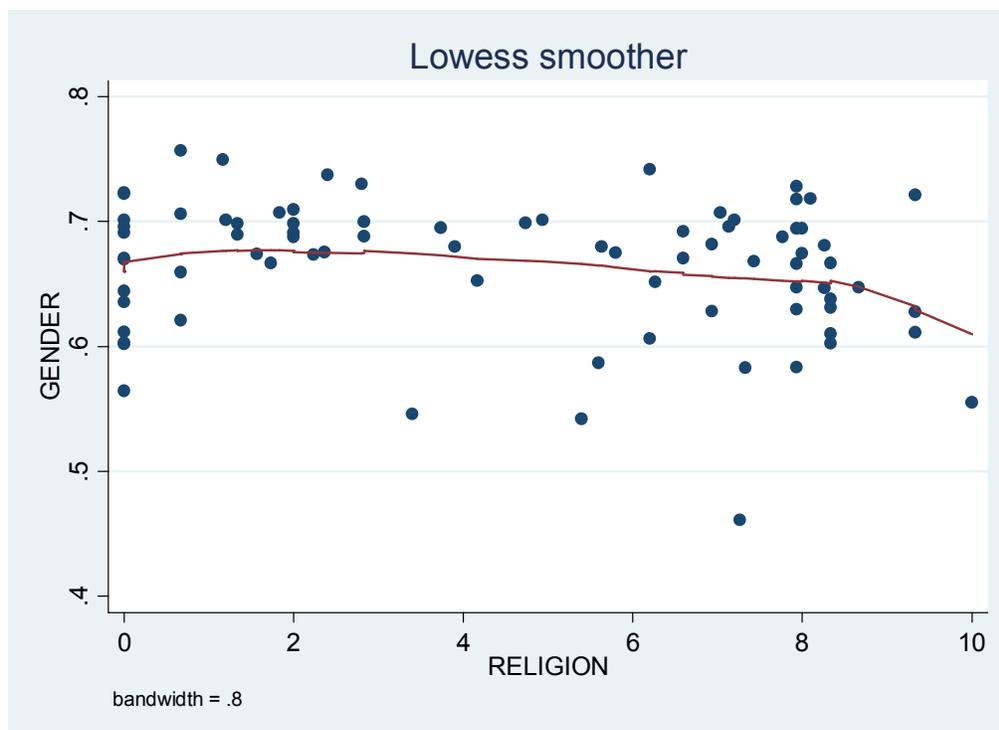
As many mobile phone advocates argue that “mobile technology has great potential for placing women in low-income countries on a higher income trajectory” thereby bringing “great benefits to businesses and...the wider economy” it is enlightening to note the insignificance of both the mobile phone and income variables (ExxonMobil, 2011). Granted, most advocates fail to consider the relationship between mobile phones and gender inequality, focusing merely on women’s development instead. But if we recall what the literature says about the impact of gender inequality on income as previously summarized in Kayode’s study--“areas with large and persistent gender inequalities pay the price of more poverty”—then we have a conundrum that needs to be addressed (2009). Increasing women’s access to mobile phones without simultaneously addressing the root causes of gender inequality may result in a wash, or in other words, the negation of the benefits attributed to mobile phone programs for women.

So which variables do impact gender inequality? The statistical analysis points toward religion and literacy at a 95 percent confidence interval with religion having the strongest p-

value at 0.004 and literacy second at 0.009. The coefficients for the significant variables differ greatly with one being positive and the other negative indicating that religion and literacy impact gender inequality differently. Religion, with a coefficient of  $-.0037084$  negatively impacts gender inequality. The more a given country demonstrates favoritism for a particular religion, the gender gap score decreases, indicating that less of that country's gender gap is closed and that gender inequality is actually higher. Graphical representation (Figure 5.2) of the relationship between religion and gender inequality demonstrates this negative relationship. That the model suggests religion impacts gender inequality is disconcerting given that religious culture is difficult to change or influence. This finding also corroborates with anecdotal studies that suggest handing mobile phones to women may have dire consequences in some religiously conservative cultures; recall the story of Maryam whose husband beat her when he discovered the mobile phone that she had been hiding from him.

While religion has a negative coefficient and impact on the Global Gender Gap score, literacy, on the other hand, has a coefficient of  $0.00157$  illustrating a positive impact on gender equality. As the rate of adult literacy in a particular country increases, the Global Gender Gap score increases and signifies that more of the gender gap is closed and that gender inequality is actually lower in that country. The Lowess smoother graph below (Figure 5.3) demonstrates the positive relationship between literacy and the Global Gender Gap score.

Lowering the confidence interval to 90 percent makes democracy significant as well, with a p-value of 0.071 and a t-score of 1.83. The coefficient for democracy is positive  $0.0017059$  indicating that as levels of democracy increase, the Global Gender Gap score

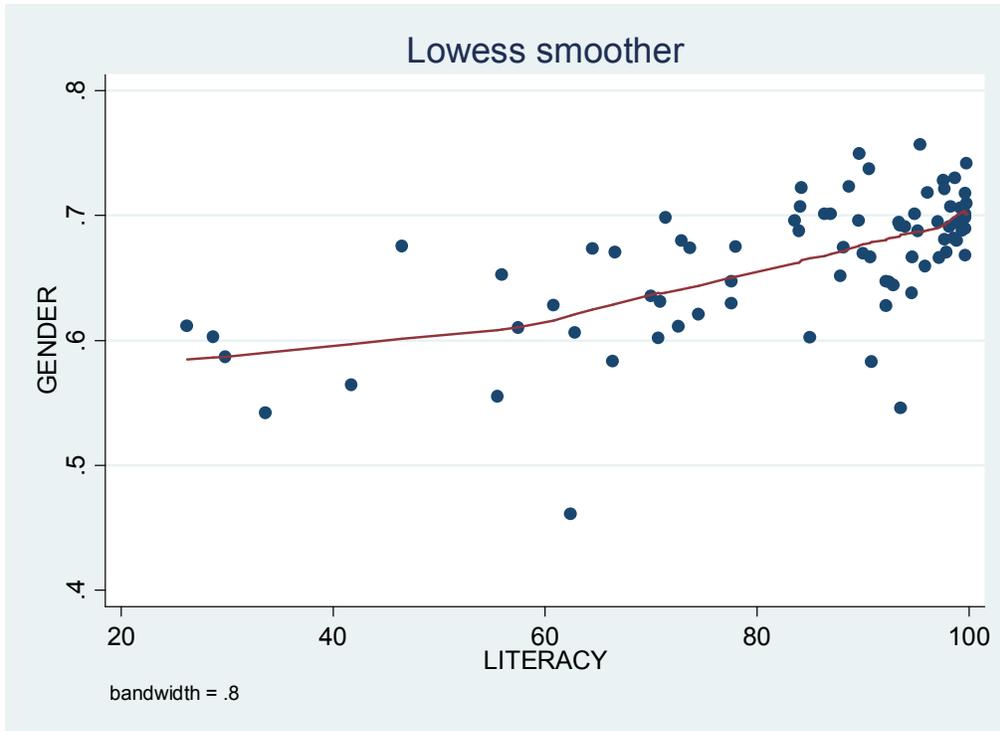


**Figure 5.2 Lowess Smoother Graph Regressing Religion on Gender**

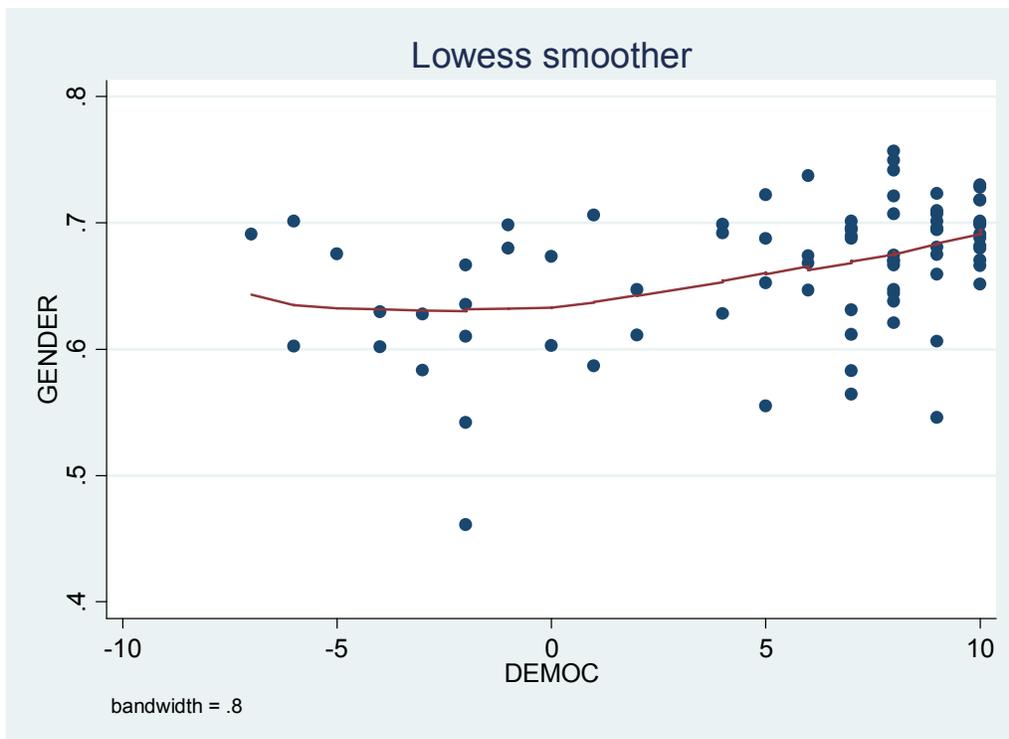
increases as well and gender inequality is reduced. The positive relationship between democracy and the Global Gender Gap score is reflected in the Figure 5.4 Lowess smoother graph.

Lowering the confidence interval to 90 percent makes democracy significant as well, with a p-value of 0.071 and a t-score of 1.83. The coefficient for democracy is positive 0.0017059 indicating that as levels of democracy increase, the Global Gender Gap score increases as well and gender inequality is reduced. The positive relationship between democracy and the Global Gender Gap score is reflected in the Figure 5.4 Lowess smoother graph.

While the findings of this study reflect significant values for religion, literacy, and democracy, the religion variable proves to have the greatest impact on the Global Gender Gap score. According to this model, a one point increase in the religion value moves the Global Gender Gap score by -0.12 or 2.4 standard deviations of 0.0533501 and 41 percent of its full



**Figure 5.3 Lowess Smoother Graph Regressing Literacy on Gender**



**Figure 5.4 Lowess Smoother Graph Regressing Democracy on Gender**

range from 0.4609 to 0.7568. The impact of a one percent increase in literacy is also noteworthy as such moves the score by 0.03, or more than half of its standard deviation and 10 percent of its range. On the other hand, a one point increase in the Polity IV democracy score only moves the Global Gender Gap score by 0.01 or about 20 percent of its standard deviation and 3 percent of its full range.

## **6 DISCUSSION AND RECOMMENDATIONS**

The issue of scarce data informs my first recommendation. There is a dire need for more and better data. The lack of data for recent years and various countries is appalling. I can imagine that this is a redundant recommendation in the field of social sciences. Some datasets were over ten years old, dating back to 2001, while others neglected to include whole regions, such as most of the Caribbean, sections of Africa, or smaller countries in general. I had hoped to use a time series model as I believe that running statistical analyses on more data over a longer period of time would have provided better information, but in order to do so I would have had to drop the literacy control variable along with a few others. I am thankful that a colleague convinced me to retain the literacy variable and run a basic multivariate linear regression instead given the fact that literacy was one of only two significant variables in the latter, more complete model.

In addition to the need for better data in general, both the literature review and my own experiences reflect a need to generate more and easily accessible gender disaggregated data. While some data employed in this study were available by gender, important variables like mobile phone access were not. Apparently Groupe Speciale Mobile Association, better known as only GSMA, generates and maintains gender disaggregated data regarding mobile phone users

across the globe, but this data has not been made public and I was unable to obtain access to it. As previously noted, this study would have been easier and more accurate if I were able to specifically determine whether *women's* access to mobile phones directly impacted gender inequality. While GSMA, through their mWomen (mobile women) programming has conducted studies and published an extensive report on the mobile phone gender gap in low and middle-income countries, presentation of their data and findings is aggregated by either region or various sections of society, such as rural women at work, women in the home, women at school, career women, etc. Unfortunately none of these presentations lend themselves well to running cross-national, statistical analyses. In order to ensure that development projects are born of a true need to address social, economic, and gender-related issues that have been thoroughly researched and analyzed using sound and comprehensive data, it behooves donors to support projects aimed at gathering this much needed information. Given the importance of literacy to the advancement of women, the need for more salient literacy information in particular is urgent.

In line with the need for better data, is the need for additional scholarship on the issue of gender inequality and women empowerment as separate concepts. Granted there is a sequencing issue here. It is hard to produce additional scholarship when quality and sufficient data are not readily available. At any rate, because women empowerment and gender inequality are two different concepts, it would be helpful to see the literature reflect more in-depth and comparative analyses on these two concepts. Far too often the two terms were lumped together in the same sentence, title, or abstract as if they were exchangeable, resulting in a watering-down of these very important but different concepts. Additionally, more attention should be paid to how development projects focused on women's empowerment can also address gender inequality, since merely empowering women does not promise equality. Monitoring and evaluation of these

projects must also produce separate indicators for the two terms. Or, at the very least, when the terms have not been considered separately in studies, program design, and performance monitoring, such should be expressly admitted and stakeholders should recognize that their work may not address or achieve both women empowerment and gender equality. Literature stemming from the gender and women's studies community fared slightly better at acknowledging the difference between the two concepts than did the international development literature.

Although we have witnessed an increase in research on the impact of ICTs--internet and mobile phones in particular--on women's empowerment and gender equality in recent years, a significant amount of this scholarship is limited to a handful of regions and countries, or is anecdotal in nature. Also, much of it is generated by practitioners—NGOs, private firms, etc.—and not scholars. There is a dire need for additional scholarship in this area, especially given the large amount of funding being poured into ICT projects. Just as earlier ICT projects, such as telecenters, largely failed due to sustainability issues, mobile phone programs are not immune to the same failures if stakeholders have not done their due diligence to ensure that these programs account for structural and cultural factors often overlooked in earlier projects. Of course the ICT community has demonstrated growth from lessons learned, but the general lack of empirical studies in this area is disconcerting. Perhaps as human beings we continue to learn best from doing, and the next decade will reconcile the current deficit of scholarship following the implementation of several new programs focused on placing mobile phones in the hands of women in low and middle income countries.

Furthermore, this study indicates that in order for gender equality to be fully realized, governments need to exercise less or no religious favoritism. Granted this finding resonates

when one thinks of the status of women in some Islamic countries under Shari'a law, the Vatican, etc., but I had unfoundedly hoped that this variable could serve as a control for cultural attitudes, and more specifically attitudes that exhibit higher levels of male dominance. In retrospect, this variable measures only what it is meant to measure – religious favoritism. But while the findings generated by this study do shed light on the impact of higher levels of religious favoritism on gender inequality, it would be helpful to examine the quantitative relationship between culture and gender inequality using data that better captures cultural attitudes. I truly believe that one of the largest impediments to gender inequality is cultural attitude and that more restricting attitudes need to shift toward greater openness and acceptance of true equality.

The second recommendation also signals sequencing issues as it requires additional scholarship on the issue. The design of ICT projects, especially mobile phone programs for women, need to expand their focus and not just concentrate on placing mobile phones in the hands of women or reducing the “mobile phone gap.” As this particular study was limited to examining the role that mobile phones have in reducing gender inequality, it is not able to negate any arguments that mobile phones may help to advance the status of women in general, albeit unparallel to men. In light of this and presuming that stakeholders will continue to fund mobile phone programs for women, it is important to stress that mere access to mobile phones is insufficient, and that, as demonstrated by this study, access does not promise a reduction in gender inequality. Mobile phones are not an end, but could serve as a means to an end with proper focus, implementation, and collaboration with other development projects. More specifically, mobile phones programs designed to empower women and increase literacy, paired with measures to strengthen democracy and ensure greater separation of church and state where

applicable, may better help reduce gender inequality. When mobile phone programs are implemented alongside such programming, they may begin to have a greater impact on society as a whole. Greater impact may lead to greater sustainability as key stakeholders are more encouraged to provide the resources necessary for maintaining mobile phone programs once the initial implementers have left. While the GSMA mWomen Program is working to address most of these needs and may currently be the best example of mobile phone programming for women, its design falls slightly short of including all of the necessary components to empower women and reduce gender inequality.

GSMA mWomen is a “global public-private partnership between the worldwide mobile industry and the international development community,” and aims to achieve the following key objectives:

- Shift mobile industry resources to reach underserved women and establish the women’s market segment as a key opportunity for the mobile industry;
- Catalyze the creation, launch and scaled distribution of life-enhancing mobile value-added services for underserved women;
- Support underserved women’s effective use and ability to engage with mobile technology; and
- Provide access to mobile products and services to enable women’s leadership and empowerment. (GSMA, 2012)

Illustrative activities for this project reflect a consideration of the need to address cultural and structural barriers to women’s access to mobile phones including the development of specially designed mobile phone applications that can be used as a tool to increase literacy. Activities also include the identification and implementation of new commercial and social

opportunities, products and services for women; however, the program lacks a broader campaign to help overcome cultural attitudes that are adverse to women empowerment and gender equality that are often the result of larger structural barriers like lower levels of democracy and/or strong integration of church and state (GSMA, 2012). Overcoming cultural barriers to women's access to mobile phones while failing to address larger structural barriers is only sufficient for placing more mobile phones in the hands of women. But as this study demonstrates, unless democracy is stronger and there exists greater separation of church and state, the end result may just be more women with mobile phones and not true gender equality. It is also worth noting that a key impetus for this program, as noted in the report, "Mobile and Women: A Global Opportunity," is the expected US\$13 billion in immediate revenue for the mobile operators (GSMA, 2012). The report further notes that "over the next five years, two out of every three potential new subscribers will be women" and that "by connecting all of these women, mobile operators have the potential to add 600 million subscribers and boost their collective annual revenues by US\$29 billion" (GSMA, 2012). Making corporations wealthier should not be the driving force of development programs for poor and underserved women.

## **7 CONCLUSION**

According to this study, mobile phones alone are not enough to reduce gender inequality. In fact, there appears to be no relationship between mobile phones and gender inequality, or one particular vehicle that is shown to be best at closing the gender gap. Rather there seems to be various moving parts working in unison. While increasing women's literacy, reducing religious favoritism, and strengthening democracy are demonstrated by this study to be statistically significant contributors to greater gender equality, this research was limited in scope. There are

surely other variables out there, such as cultural attitudes, affecting gender inequality that have yet to be put through the rigorous test of statistical analysis. In order to determine what they are, it is clear that better data and additional scholarship are needed.

In the meantime, we must continue to support literacy programs for women. Shifting money toward programs that equip women with mobile phones at the expense of basic literacy projects may be detrimental to gender equality efforts. If women's advancement continues to be second to that of men's progress, women will continue to suffer from the plight of gender inequality. Therefore, if the ICT community continues to push mobile phone programs for women, they need to be introduced alongside additional efforts to increase women's literacy, strengthen democracy, and reduce religious favoritism. When mobile phones are equipped with literacy "apps" and the women who receive them are provided with the adequate training and support to ensure that these apps are understood and used, mobile phone programs have a better chance at helping to close the global gender gap.

In addition to increasing women's literacy, we need to more closely examine the impact that democracy and religious favoritism have on gender inequality. While I posit that cultural attitudes are interwoven with these two concepts and may be the underlying factor affecting gender inequality, the variables employed in this study are not capable of demonstrating such and therefore, additional research is needed. Ironically, as I write these concluding remarks in an urban coffee shop populated with highly literate college students who have enjoyed more education than the entire world average in one of the most ethnically diverse, religiously tolerant, technically advanced, and rich countries in the world, I hear one male student exclaim to another, "Eric's arm got broken by a *girl!*" I am even more interested in examining the relationship

between cultural attitudes and gender inequality, and I think I have an answer to my question.

No, we still can't hear her now.

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