

Chapter 6

The Role of Information Technologies in Changing the Status of Women to Improve Human Conditions

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6.1 Introduction

Experiences all over the world have shown that women drive development, and holding them back has an adverse impact on economic growth (Dlodlo 2009). The level of social and political development is also affected by the level of women's contribution to society (Best and Maier 2007). Therefore, those societies that discriminate by gender pay a high price in terms of their ability to grow and reduce poverty (Sharma 2003).

The meaning of quality differs in different parts of the world, especially between developed countries and developing countries (Glenn and Gordon 2001). In developing countries equality refers to reducing the number of women who are living in poverty and situations of violence, increasing women's literacy and education rates, providing access to resources and financial aid, and increasing women's participation in public and professional life (Glenn and Gordon 2001). Best and Maier (2007) argue that long-standing gender inequalities in developing countries lead to a gap that is difficult to close. As for developed countries, despite great progress, industrialized nations are also far from reaching gender equality, as wage gaps and limited access to executive power pose unique problems (Glenn and Gordon 2001). Even in developed countries, women represent far less than half of a nation's use of intellectual capital, skilled labor, and economic contribution (Leahy and Yermish 2002).

The international community sees information and communication technologies (ICT) as the most effective tool in the context of strengthening gender development and economic development almost simultaneously (Best and Maier 2007). Many results have demonstrated that it can be a vital tool in triggering a revolutionary change that is beneficial to both women and men (Dighe and Reddi 2006; Hafkin and Huyer 2006). Hence, the goal of this paper is to identify existing theories and the state-of-the art in this field.

6.2 Literature Review

The objective of our literature review was derived from challenge number five of the Millennium Project (Glenn et al. 2001) and adapted to the context of IS. The review follows a method presented by Watson and Webster (2002), which focuses on journal and conference publications because of their traditionally high quality and timeliness. The review followed three steps:

- (1) *Defining a research basis.* We chose Science Direct and EBSCO Business Source Premier as a starting point for the analysis. The search covers an unrestricted timeframe and sought the keywords “information technology” and “woman” in the papers’ titles, abstracts, and keywords (Table 6.1).
- (2) *Extracting and categorizing relevant research.* Our search yielded 297 articles, of which 245 articles were published in Science Direct and 52 were published in EBSCO Business Source Premier. Among these articles we identified 20 candidate articles that focus on the role of women in correlation with IT and that cover either the aspects of women’s roles that are supported by IT or the aspects of women’s roles in IT. Among these 20 articles, 12 were from Science Direct, and 8 were from EBSCO Business Source Premier.
- (3) *Analyzing the research.* It was apparent that, among these 20 relevant studies, ICT was usually described as a diverse set of technological tools and resources (Nath 2001; Pattanaik 2005) and as a tool to get human voices heard (Shirazi 2011), challenge long-standing inequalities, open up new perspectives, and raise awareness about inequity (Mbarika et al. 2007; Nath 2001; Pattanaik 2005; Sandys 2005; Shirazi 2011).

Three main perspectives are prevalent in the IS literature: *gender and technology*, *gender in the IT workplace*, and *empowerment*. The gender and technology category includes papers that deal with problems of digital divide, female-friendly IT design, and women’s perceptions of IT. The Gender in the IT workplace category covers a broad range of barriers that women experience at their workplaces as well as barriers that prevent them from entering the IT industry. The empowerment category groups the kinds of empowerment that come from IT: social-economic, political, economic, and psychological empowerment.

Table 1 Research approach

	Science direct	EBSCO business source premier
Source	All sources	All sources
Time frame	All years	All years
Search term 1	Woman	Woman
Search field 1	TITLE-ABSTR-KEY	TITLE
Search term 2	[AND] “information technology”	[AND] “information technology”
Search field 2	TITLE-ABSTR-KEY	TITLE

6.3 Results and Discussion

Having identified papers that are relevant to the role of women and IT in conjunction with the three broad categories to which the papers belong, the next step is to describe the current state of our research topic in the literature. A qualitative approach to the categories of *gender and technology*, *gender in the IT workplace*, and *empowerment of women* identifies subtopics for each of these categories. Since the categorization of our results has a hierarchical structure, our descriptions begin with the high-level category (e.g., *gender and technology*) before delving more deeply into the category.

6.3.1 Gender and Technology

Women's perception of IT. New technology is often portrayed as a male domain (Dlodlo 2009; Wasserman and Richmond-Abbott 2005). Researchers explain that those gender-specific differences have their origins in the fact that women have traditionally constructed a more distant relationship to technology than men have and have underestimated their usage skills (Kelan 2007; Rasmussen and Håpnes 1991; Wasserman and Richmond-Abbott 2005). Socio-cultural and religious influences and preconceptions about women's ability to understand and manipulate technology hinder women from actively engaging in the use of ICT (Bimber 2000; Dlodlo 2009; Wasserman and Richmond-Abbott 2005).

Female-friendly IT design. Researchers argue that technology may be “gendered by design” because men's values have been institutionalized in the technology through its creators, embedding a cultural association with masculine identity in the technology itself (Bimber 2000; Kaminski and Reilly 2004; Kelan 2007). Especially the Internet is biased toward men because of gender inequality in the professions that produce Internet technologies, the commercial success of male-oriented pornography, and so on (Bimber 2000). ICT and its content—designed by men in the English language and without considering women's interests, concerns, perspectives, and required information—create a significant obstacle for women, especially in the developing world (Dlodlo 2009; Parmentier and Huyer 2008; Sandys 2005).

Within this context are two main perspectives on female-friendly IT design: that which views women as users of IT design and that which is concerned with women as designers of IT. Fountain (2000) highlights that women as users have the power to shape IT design. However, the influence of users, although important and far-reaching, is limited; designers fashion technology more deeply, pervasively, and fundamentally. In this regard, women are poorly represented as IT designers and experts, so research should pay attention to the potential role women might play as designers in the information-based society (Fountain 2000; Wajcman and Lobb 2007).

Gender digital divide. Studies on the digital divide address who (e.g., individuals, organizations/communities, societies/countries/world regions) uses what attributes (e.g. income, education, geography, age, profitability, sector) to connect to what kind of technology (e.g., phone, Internet, computer) and how they do it (e.g., pain access, usage, real impact) (Hilbert 2010, 2011). Adoption of gender analysis regarding ICT developments sheds light not only on the digital divide between developed and developing nations but also on a gender divide between men and women in terms of access to, usage of, and benefits of ICTs (Best and Maier 2007; Brännström 2011; Dighe and Reddi 2006; Hilbert 2011; Sandys 2005; Wasserman and Richmond-Abbott 2005). As available statistical data show, in developing countries women are less likely than men are to use ICTs (Brännström 2011; Dighe and Reddi 2006; Huyer 2005; Sandys 2005), leading related research to conclude that a gender digital divide exists and poses a severe threat to women (Hafkin and Huyer 2006; Hilbert 2011). However, our findings also indicate that the digital divide is closing, and in some countries like Kenya the process is rapid (Brännström 2011). Other case studies and research papers show that ICTs hold the promise of empowering women (Hafkin and Huyer 2006; Hu 2003; Sandys 2005; Sharma 2003). In any case, the extant literature is inconclusive, arguing either that ICT is a threat to women or that it is a unique opportunity for empowerment.

6.3.2 *Gender in the IT Workplace*

Barriers to entering the IT field. The literature presents two dominant viewpoints about the barriers to women's entering the IT field. As Trauth (2002, p. 99) argues, one perspective "focuses on the presumption of inherent differences between women and men to explain the perception of IT as a male domain [...]." Social influences during childhood and adolescence, such as parents, media, race, ethnicity, and socio-economic status, influence girls' choices in many ways and constrain their education and career decisions later (Fountain 2000; Kaminski and Reilly 2004; Kelan 2007; Sanders 2005). Research has found that women perceive the IT workplace negatively, as a field for "geeks and nerds" (Gürer and Camp 2002; Kelan 2007; Rasmussen and Håpnes 1991; Wentling and Thomas 2009). Women also frame the work as difficult, isolated, unattractive, and lacking the necessary social interaction and work-family balance (Armstrong et al. 2007; Kelan 2007; Wentling and Thomas 2009). Other impediments are the general lack of role models and networking opportunities (Armstrong et al. 2007; Ballard et al. 2006; Fountain 2000; Medeiros 2005; Riemenschneider et al. 2006; Wentling and Thomas 2009).

Barriers while working in the profession. The fact that the number of women in IT field is declining has triggered discussions about how to retain those who are currently employed (Armstrong et al. 2007). The literature that explores workplace conditions has identified several barriers for women who work in the IT profession, including discrimination (Armstrong et al. 2007; Panteli et al. 2001;

Riemenschneider et al. 2006; Stevens 2009), lack of respect (Riemenschneider et al. 2006; Stevens 2009), lack of consistency (e.g., lack of consistency at the organizational level; lack of consistency in how supervisors treat employees) (Riemenschneider et al. 2006), promotion barriers (Armstrong et al. 2007; Riemenschneider et al. 2006), work-family conflict (Armstrong et al. 2007; Güler and Camp 2002; Riemenschneider et al. 2006; Stevens 2009), work stress (Riemenschneider et al. 2006), difficulty into keeping up with the pace of the IT industry (Kelan 2007), and lack of confidence (Stevens 2009). Only a little research has been conducted about male IT employees, their perceptions, and opinions in regard to the shortage of women in their profession (Kelan 2007).

Work conditions for women in IT. There is a tendency for women to be at a disadvantage compared to men in terms of their terms and conditions of employment (Panteli et al. 2001). Researchers claim that women are consistently paid less than men are for similar work, even after years of education and experience (Armstrong et al. 2007; Baroudi and Igbaria 1995; Dubnoff and Kraft 1986; Klawe and Leveson 1995; Panteli et al. 2001; Roan and Whitehouse 2007; Wright and Jacobs 1994) and that it is more difficult for women than men to advance in their careers, especially to managerial jobs, because they are more likely than men are to interrupt their careers, to work part-time, and to work under short-term contracts. (Armstrong et al. 2007; Fountain 2000; Panteli et al. 2001). Exclusion from male-dominated social networks in the organization is a particular obstacle in terms of gaining skills, job leads, and mobility in the organization (Trauth et al. 2003), and it limits women's ability to build technical skills and knowledge (Trauth et al. 2003). Working long hours and the need for continuous learning in order to keep up with changes in the field and required skills make it nearly impossible to balance work and family obligations (Armstrong et al. 2007; Fountain 2000). We also included in this sub-topic research that identifies women's attitudes toward such work conditions and barriers. Trauth et. al. (2003) distinguish three types of women in this regard: those who tend not to focus on the fact that they are women, those who accept the uneven playing field, and those who have experienced the uneven playing field and are willing to speak up about it.

6.3.3 Empowerment of Women

Addressing the gender dimensions of access, need, and use of ICT is central to women's empowerment in the area of ICT. As Nath (2001) explains, effective initiatives and projects have to take women's needs and concerns regarding ICTs into account in order to ensure that women and men benefit equally.

Socio-economic empowerment. Relevant research about socio-economic empowerment deals with a variety of topics in the context women's use of ICTs. Under the topic of socio-economic empowerment, we included articles that discuss women's empowerment in the realms of education, health care, and violence against women. Combinations of traditional and new ICTs are applied in

education in order to support the education and training of women and girls in formal and informal learning, distance education, and establishing e-learning centers. Sandys (2005) argues that education initiatives that focus on women in poor communities or on computer literacy have already demonstrated the value of ICT for women.

There is vast potential for ICT to facilitate global, regional, and national health initiatives for women. Organizations like Satellife¹ and HealthNet² have successfully provided medical information and connected medical specialists to developing countries. ICT is an effective tool in disseminating information about women's health, including sexual and reproductive rights and health (Sandys 2005). ICT can also help women to fight against violence. For example, ICT can be used to foster awareness about the many forms that violence against women can take on the Internet and to develop a community that can respond to these issues. By using ICT, women's groups can participate in the development of policies, legislation, and other actions to combat the exploitation of women and girls (Sandys 2005).

Political empowerment. Women and their organizations have pioneered strategic and empowering uses of ICT to promote women's rights (Sandys 2005). For example, Shirazi observes that "blogging in Iran has helped repressed and marginalized groups reach out, including women's and human rights activists, ethnic and religious minorities and Iranian youth to get their voices heard and to challenge the long-standing univocal government and Islamic religious authorities [...]" Women in Zambia use mobile phones to keep informed about court hearings in order to mobilize women to meet at the courthouse to advocate for women's rights (Keifer-Boyd 2011). ICT in this context is used as a tool to promote women's rights, keep them informed, and help them to challenge authorities.

Economic empowerment. There is an evidence that internationally outsourced jobs like medical transcription work and software services have made a considerable difference in women's work opportunities in developing countries (Sandys 2005). For instance, women hold positions in most telephone operating companies in India (Valk and Srinivasan 2011). ICT also has the power to make time and distance less significant, so women can work from anywhere and at any time, even if they have young children, and become financially independent and empowered (Nath 2001). Jiyane and Mostert (2010) point out that ICT supports businesswomen in South Africa by connecting them with business partners. Another powerful application of ICT is as a part of knowledge networking—that is, electronic commerce that refers not only to "selling products and services on-line, but also to the promotion of a new class of ICT-savvy women entrepreneurs in both rural and urban areas" (Nath 2001).

Psychological empowerment. The psychological dimension of empowerment refers to women's sense of self-value and self-appreciation (Keifer-Boyd 2011). Hu (2003) defines psychological empowerment as "a motivational construct

¹ <http://www.satellife.org>.

² <http://www.healthnet.org>.

manifested in four cognitions: meaning, competence, self-determination, and impact [...]” This definition suggests that frequent use of IT at work raises women’s confidence, self-assurance, and innovativeness and provides them with a significant amount of influence and control at their workplaces. ICT’s psychological impact applies not only to the work environment but also to everyday life (Keifer-Boyd 2011).

6.4 Research Agenda

The results of the literature review suggest the need for future research on the impact of the changing status of women with regard to information systems on the improvement of the human condition. Generally speaking, there is little research on how the changing status of women in conjunction with IT can improve overall human conditions. Most of the papers in our review are concerned with the conditions women are currently under in the IT field, or they provide information about problems and challenges with regard to the role of women and IT. The impact of empowering women with IT about the human condition and about how entire human communities can benefit from the changing status of women by means of IT is only a side note in these articles. Hence, based on the current status of the literature, we propose three questions to further the research.

- (1) *How can the changing status of women by means of ICT improve human conditions?* Most of the extant research investigates the current status of women in IT or how IT can change their current status. However, a shift should be made to question how women’s changing status by means of ICT can improve human conditions.
- (2) *How can the changing status of women by means of ICT improve human conditions in accordance with regional considerations?* The Millennium Project (2011) distinguishes the problems that women experience according to whether they live in Africa, Asia and Oceania, Europe, Latin America, or North America. Our literature review also showed that the role of women and IT issues can be differentiated based on whether they live in developed countries or developing countries. Further elaboration is needed in order to clarify how improvement of certain regional problems can affect overall human conditions.
- (3) *What negative impact might the changing status of women by means of IT have on human conditions?* Every coin has two sides, and so far most papers have focused on the positive influence of IT. Additional research on the problems that might occur with regards to the role of women and IT topic would be useful because it has far reaching consequences on team work, virtualization of working practices and work-life balance.

6.5 Conclusion

This literature review provides both quantitative and qualitative insights into the current state of research on how IT contributes to the changing role of women. We believe that understanding the current body of knowledge is the first step to realizing how the impact of IT on the status of women might affect the human condition. Unfortunately, the extant literature illustrates the possible consequences for society but does not provide sufficient empirical evidence. This literature review provides evidence that research has not answered the main question of how the changing status of women can help improve the human condition and how information systems can influence this process. Thus, this study serves as a starting point for future research in this field.

This review has some limitations. First, the scope of our review is a limitation, as articles found in Science Direct and EBSCO Business Source Premier tend to have a technical focus. Therefore, initial research that considers a non-technical focus—that is, research in the social or psychological sciences—is necessary in order to validate and, if needed, to broaden the extracted discussions and trends. Second, other researchers may have come up with different classifications than ours, especially in relation to the category of empowerment. We do not claim that the present literature review is exhaustive but only that it presents an initial categorization of the trends and ongoing discussions.

We see the category of *gender and technology* as a comparatively new trend in the overall discussion of women and IT, whereas *gender in the IT workplace* and *empowerment* have been topics of discussion since the early 1990s, although the results of empowerment initiatives have not been discussed in depth. Further research in the areas of gender and technology and the results of empowerment initiatives is needed.

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