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Abstract: Some of the most important resources are intangible, such as knowledge and access to networks. In the developing world, technology can facilitate these resources and address basic human needs in a variety of ways: from provision of farmer training and cloud-controlled clean water systems to health information and mobile money services. Some of these services expand access to resources in ways that particularly benefit women. In environments where women are disadvantaged socially and economically, information and communications technologies (ICT) can enable women to access valuable information, consider a broader range of business opportunities, access wider markets, partake in educational programs, and share experiences with and gain mentorship from other women. However, there are large gender gaps in the access to technology, particularly in rural areas. To begin, I briefly discuss the role of technology in development, and consider the extent and significance of technology gender gaps. Next, I review key barriers to reducing these gaps, and discuss the concept of social innovation as it applies to technology interventions. Examples from five social innovations in India — a country with large technology gender gaps — illustrate the range of possibilities for innovative access to and use of ICT for diverse target groups. I conclude with some suggestions for further improvement in this area.

Keywords: communications, development, entrepreneurship, gender, ICT, India, internet, mobile phone, social innovation, technology

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Some of the most important resources are intangible, such as knowledge and access to networks. In the developing world, technology can facilitate these resources and address basic human needs in a variety of ways: from provision of farmer training and cloud-controlled clean water systems to health information and mobile money services. Some of these services expand access to resources in ways that particularly benefit women. In environments where women are disadvantaged socially and economically, information and communications technologies (ICT) can enable women to access valuable information, consider a broader range of business opportunities, access wider markets, partake in educational programs, and share experiences with and gain mentorship from other women. However, there are large gender gaps in the access to technology, particularly in rural areas. Worldwide, women are 14 percent less likely than men to have access to a mobile phone, and 23 percent less likely to have access to the internet, although in some regions the gender gaps are much larger (GSMA 2015).

To begin, I briefly discuss the role of technology in development, and consider the extent and significance of technology gender gaps. Next, I review key barriers to reducing these gaps, and discuss the concept of social innovation as it applies to technology interventions. Examples from five social innovations in India (a country with large technology gender gaps) illustrate the range of possibilities for innovative access to and use of ICT for diverse target groups. I conclude with some suggestions for further improvement in this area.

Technology, Development, and Gender

Institutionalist scholars have long discussed the important role technology plays in economic development processes (Cole and Mogab 1987; Greenwood and Holt 2008; Solo 1974). While technology is often linked to direct job creation, GDP growth, emergence of new services and industries, workplace transformation and business innovation (Kvochko 2013), institutionalists note that technology is not exogenous. Rather, it influences cultural habits and human perceptions of what counts as a resource (Greenwood and Holt 2008). Technology shapes the flow of goods, services, capital, and people, as well as the way resources are combined to "do" and to "make." This impacts not only production processes and the viability of various industries, but also interrelationships among nations at the macro-level and individuals at the micro-level. The Schumpeterian concept of creative destruction — a technological "process of shattering the status quo of existing products and services" (Warnecke 2013, 456) — inevitably influences power relations, leaving some groups behind and propelling others forward in the wake of change. Industrial, employment, and educational policies can exacerbate these gaps or reduce them. In many developing countries, however, some combination of limited financial resources, corruption, weak governance systems, and frequent crises has limited the state's ability to address these gaps.

Although technology is often treated as a singular concept, it is, in fact, a rather broad and diverse concept that comes in many different forms. It can be tangible or intangible, automated, semiautomated, or labor-intensive in nature (*WebFinance* 2016). One of the most commonly discussed forms of technology in the developing world is ICT: the physical infrastructure and applications like mobile phones, landlines, computers, and the internet, as well as the educational and policy environment supporting ICT use. Whether a certain form of technology is deemed "appropriate" or "inappropriate" is determined by several factors, including cultural, economic, and political context. However, technological investment is often aimed at the formal sector of the economy — the regulated, measured sector with more secure employment prospects. Investing in the informal (unregulated) sector is riskier since the operations often take place "in the shadows," and may frequently move or be closed down (Carter 2016; Sparks and Barnett 2010, 2).

This underinvestment contributes to large gaps in technological familiarity and access, given the global landscape of significant informal employment. In one third of the world's countries, more than 65 percent of non-agricultural work occurs in the informal sector. In half the world's countries, this figure exceeds 50 percent (ILO 2016, 19). A significant portion of informal workers are own-account workers, often resource-constrained informal entrepreneurs who are running micro-enterprises for lack of other employment options. Such "necessity-based" entrepreneurs could experience significant productivity improvements from ICT, including checking prices, reducing the response time to customers and suppliers, lowering customer acquisition costs, and decreasing travel time (Deen-Swarray et al. 2013).

In most countries, women comprise the majority of informal entrepreneurs and workers. They face multiple layers of disadvantage and generally have less access to technology than men. Around the world, women are 14 percent less likely to own a mobile phone than men, but this percentage differs significantly from region to region. In South Asia, for example, women are 38 percent less likely to own a mobile phone than men (GSMA 2015). A sizable portion of the South Asian gap is attributable to India, where 114 million fewer women than men have mobile phones (Fox 2016). Table 1 illustrates the large portion of unconnected women (without ownership of a mobile phone) around the world.

Table 1. Unconnected Women (Without Ownership of a Mobile Phone)[1]

Region	Percent of Women	Number of Women
Middle East & North Africa	48%	84 million
Sub-Saharan Africa	64%	307 million
Europe & Central Asia	42%	59 million
South Asia	72%	594 million
East Asia & Pacific	54%	531 million
Latin America & Caribbean	49%	149 million
OVERALL	59%	1.7 billion

Source: GSMA (2015).

Even when women have mobile phones, they use them differently than men. In many countries, women are far less likely to send a text message or access the internet on a mobile device. The size of the gap differs from country to country. For example, women in China are about 47 percent less likely than men to use text messaging, and 31 percent less likely to use the internet on a mobile device. In India, these figures are 40 and 14 percent, respectively (GSMA 2015). Fully 81 percent of Indian women have never used the internet on a mobile device (GSMA 2015, 29).

Examining internet access more broadly (e.g., using a computer), we see a gender gap here as well. Nearly 25 percent fewer women than men access the internet around the world (Intel 2012). As Table 2 shows, the smallest gender gap in internet access is in Latin America and the Caribbean (10 percent), while the largest is in Sub-Saharan Africa (43 percent). There is significant cross-country variation in internet access. For example, only 17 percent of women in India access the internet, compared to 45 percent of Chinese women (Poushter 2016; Wu 2016). For most countries, internet access is higher for highly educated, higher-income, and younger groups (Poushter 2016). Nonetheless, a 2015 study of nine developing countries revealed that women are 50 percent less likely to access the internet compared to men with similar ages, education levels, and incomes (*World Wide Web Foundation* 2015).

Table 2. Gender Gap in Internet Access

Region	Gender Gap (%)
Middle East & North Africa	34%
Sub-Saharan Africa	43%
Europe & Central Asia	29%
South Asia	33%
East Asia & Pacific	20%
Latin America & Caribbean	10%
OVERALL	23%

Source: Intel (2012).

Why Does the Gender Gap in Technology Matter?

Gender gaps in technology contribute to at least three forms of gender inequality: (i) unequal access to knowledge, training, and employment, particularly decent work; (ii) unequal opportunities for self-discovery, social and professional relationship-building; and (iii) unequal understanding of legal rights and modes for civic participation (Intel 2012; UNESCO 2013). This impacts all facets of life — from perceptions of one's capabilities to the development and realization of those capabilities — encompassing work, leisure, social inclusion, safety and personal security, and engagement in multiple forms of community.

It is possible for technology to contribute to women's empowerment. UNESCO suggests that "empowerment has five components: women's sense of self-worth; their right to have and to determine choices; their right to have access to opportunities and resources; their right to have the power to control their own lives, both inside and outside the home; and their ability to influence the direction of social change to create a more just social and economic order, both nationally and internationally" (UNESCO 2013, 8). This means that technological knowledge, access, and effective utilization are all critical, and we can see evidence of progress toward these goals in some areas.

In India, for example, nearly half of female internet users looked for government services information online, 54 percent looked for financial services information, 77 percent improved their education, 59 percent searched for a job, 59 percent found greater opportunities by expanding their networks, and 32 percent increased their incomes (Intel 2012). In China, internet use is associated with greater civic participation, both formal and informal in nature (Zheng and Pan 2012). However, a study of nine developing countries found that only 21 percent of connected female users looked up information on heath, transport, or legal rights (*World Wide Web Foundation* 2015). Of course, the policy landscape for education and human rights is as important as the landscape for technological infrastructure. In all countries, more work needs to be done for improved utilization of technology services, in addition to increasing access.

At the macro-level, gender gaps in technology lead to underutilization of human capital, with impacts on economic growth, as women are not able to contribute as much as they could to the economy. In the formal sector, women generally hold a small fraction of science, technology, engineering, and mathematics jobs (UNESCO 2013). In the informal sector, female entrepreneurs are largely focused on daily sustenance, not on accelerated business growth. Thus, informal entrepreneurship is not associated with broader economic growth (Warnecke 2013). GDP in developing countries could increase by $13-16 billion USD every year by doubling the number of women with internet access alone (Intel 2012). As ICT increasingly becomes a conduit for the arrangement and delivery of more financial, health, government, and educational services, lack of ICT access impacts an even broader array of development outcomes.

Bridging the Gap: Technology as Social Innovation

Several barriers stand in the way of reducing the technology gender gap (GSMA 2015; Intel 2012; UNESCO 2013):

- Awareness of options and their utility
- Cost

- Cultural/social norms
- Education levels and basic literacy
- Employment opportunities
- Infrastructure coverage and quality
- Operator/agent trust (existence of local players)
- Policies supporting gender equality
- Technical literacy and confidence

These barriers, both individual and system-level in nature, are often interrelated. While some barriers (e.g., cost) impact all consumers, women still face undue disadvantages given their lower earned income and/or less bargaining power inside the household (GSMA 2015). Given the variety of barriers, technology interventions may take several different forms.

Social innovation is "a novel solution to a social problem that is more effective, efficient, sustainable, or just than existing solutions and for which the value created accrues primarily to society as a whole rather than private individuals" (Phills, Jr., Deiglmeier and Miller 2008, 36). For technology to be used as a social innovation, it will "enrich the lives of vulnerable groups and build their potential as changemakers," with the aim of ultimately driving systemic change, increasing scale and impact, and multiplying positive results (Ashoka 2014, 2). Social innovations can be designed and delivered by any individual, group, or type of organization, regardless of funding method or time horizon of the approach. Social innovations can be business-based, but need not be. Such innovations can also spring from activism, advocacy, or policy work.[2]

Several factors shape the focus areas for social innovations, including the level of technology awareness and utilization for the target population, the specific barriers and goals in mind, and the broader institutional context. This is well illustrated by a discussion of five programs operating in India, since 83 percent of Indian women do not access the internet and 55 percent have never sent a text message (GSMA 2015; Intel 2012).

Social Innovation in Practice

In New Delhi, India, the non-governmental organization (NGO), *Feminist Approach to Technology*, runs a community technology center to reach out to underprivileged girls. The center tackles cultural stigmas about the suitability of technology use for females, increases awareness of higher education opportunities, and builds computer skill levels. To set girls at ease, the staff is female-only. At a broader level, the group engages in policy advocacy, supports women in technical professions, advocates for gender-inclusive technology education, and builds capacity of women's organizations (*Feminist Approach to Technology* 2015).

In rural areas of India, infrastructure for internet service is much more limited, so social innovations often take a different approach. *Internet Saathi* is a partnership between Google and Tata Trusts; it provides basic training on usage and benefits of internet for women via specially designed internet cycle carts stationed in easily accessible village areas. The cycle, fitted with a basket of smartphones and tablets, is stationed in a village for two days/week for four-to-six months, emulating a common sales/distribution system for products and services. The trainers are known in their communities and are members of local self-help groups or NGOs (*India Today* 2015). When the program was developed in 2015, the goal was to reach 4,500 villages and 500,000 women by the end

of 2016 (*India Today* 2015). Outcomes surpassed expectations, with 9,000 female trainers reaching one million women in five Indian states so far (Purnell 2016).

Although mobile technology is more common than computers, women are less likely than men to use phone features other than receiving (and, to a lesser extent, making) calls (GSMA 2015). The *Self Employed Women's Association*, a trade union for informal entrepreneurs in India, is working to change this by providing text messages with "up-to-date spot and future commodity prices for each market" (GSMA 2013, 29). This enables women to maximize the price they get for produce, more effectively plan their crops, make harvesting decisions, and save money and time by receiving pricing information on their phones rather than in person (GSMA 2013). This improves the cost-benefit ratio for mobile phones, but there are alternatives for members who are unable to purchase one. Prices are posted on a village computer "bulletin board," and there is a pilot program testing an interactive voice response system for illiterate members (GSMA 2013).

India's e-governance initiative also plays a role. Common service centers (CSCs) are kiosks in rural villages. Today, the country has more than 157,000 kiosks, and there are plans for another 100,000 in rural areas over the next year (Mukul 2016). The goal is to have one CSC for each rural local government. The kiosks, run by local entrepreneurs who fund the startup costs for computer and internet access, facilitate access to citizen records, banking, insurance, mobile recharges, e-ticketing, women's digital literacy programs, and basic literacy programs. About 20,000 CSCs are currently run by women, and women-run CSCs have higher earnings than those run by men (*e-Governance Services India Ltd* 2014).

For women with relatively higher education and income levels, often operating in the formal sector, technology training takes different forms, such as using the internet to augment business skills and networks. The *Cherie Blair Foundation for Women* operates an e-Mentoring Program reaching a total of 2,000 women in eighty countries, including India. Mentors are entrepreneurs or individuals with corporate or NGO experience, and mentees are either running or preparing to launch their own business. Mentees must communicate in English, have weekly email access, and be able to Skype for two hours per month for a year (*Cherie Blair Foundation for Women* 2016). In the last year, 97 percent of mentees "gained business skills, 97% built confidence, 80% found ways to access new markets and 33% were able to keep their business from failing due to participation in the programme" (*Cherie Blair Foundation for Women* 2016).

Table 3 illustrates the variety of barriers addressed by the five social innovations discussed above. All five approaches impact awareness of options and utility, cultural and social norms, employment opportunities, as well as technical literacy and confidence. By contrast, only one of the five social innovations (*Feminist Approach to Technology*) works on policies for gender equality.

As Table 4 reveals, social innovations also take different paths to scale (spreading the benefits as widely as possible). Madeline Gabriel (2014) suggests four common paths to scale: growing the organization; forming strategic partnerships; building a delivery network; and spreading knowledge, "know-how," and training. These paths are not mutually exclusive. For example, *Internet Saathi*'s strategic partnership works to grow the program and spread knowledge through digital literacy training.

Table 3. Barriers Addressed by Technology Innovations

Barriers addressed	Feminist Approach to Technology	Internet Saathi	e-Mentoring Program	SEWA	Common Service Centres
Awareness of options & utility	X	X	X	X	X
Cost	X	X		X	X
Cultural/social norms	X	X	X	X	X
Education levels; basic literacy		X			X
Employment Opportunities	X	X	X	X	X
Infrastructure coverage/quality		X			X
Operator/agent trust	X	X		X	
Policies for gender equality	X				
Technical literacy/confidence	X	X	X	X	X

Source: compiled by author.

Table 4. Potential Paths to Scale for Technology Innovations

Path to Scale	Potential Strategies	Examples	How does it work?
Spread knowledge, "know-how", and influence	Campaigning; consulting; training	Feminist Approach to Technology; e-Mentoring Programme	Train women or girls to use technology and envision educational or business possibilities
Build a delivery network	Franchising; licensing; micro-consignment	Common Service Centres	Franchise model expands local entrepreneurship opportunities and extends digital services to rural areas
Form strategic partnerships	Collaborating with public/NGO programs; creating business alliances or joint ventures	Internet Saathi	Collaboration between Google (private company) and Tata Trusts (philanthropic agency) expands mobile internet access to rural areas
Grow the organization	Establishing new branches; increasing delivery scope	Self Employed Women's Association	Text-based price notification system makes SEWA membership & mobile phone ownership more attractive

Sources: First two columns adapted from Gabriel (2014) and Warnecke and Houndonougbo (2016); latter two columns compiled by author.

Moving Forward, One Connection at a Time

Technology plays a powerful, often behind-the-scenes role connecting women to each other and to their capabilities. Although significant gender gaps persist in ICT familiarity, access, and utilization, particularly in rural areas, it has become clear that social innovations can reduce these gaps. Interventions can occur in multiple spheres, targeting formal and informal sector workers, entrepreneurs, or youth. Depending on the particular barriers being addressed, social innovations can take a preventive or remedial approach. Further progress is needed, but several challenges face technology-based social innovations. Cost is a major issue, impacted by the monopolization of technology solutions; limited awareness of open-source software; struggles to access reliable, timely

data and to upgrade technology; and grant funding limitations for technology endeavors (Ashoka 2014). Human capital shortages also play a major role.

Given these challenges, technology-based social innovation is particularly suitable for strategic partnerships among governments, corporations, NGOs, and social businesses. Start-up costs for technology programs can be prohibitive for NGOs, while corporations may not have the on-the-ground expertise to effectively target the most disadvantaged groups. Governments play a critical role even when not directly engaged in these programs. Infrastructure investment is one piece of the puzzle, but government policies (and enforcement of those policies) also shape legal rights, education, and employment opportunities for women and girls. This broader institutional context influences social and cultural norms about what females should or should not do, thereby adjusting the rules of the game.

Footnotes

[1] Some women may be able to borrow a phone, but this does not allow the same level of technological literacy (GSMA 2015).

[2] This is broader than social entrepreneurship, which generally refers to a venture of some sort (whether for-profit, non-profit, or a hybrid model), and aims to be financially sustainable and scalable or replicable over time.

References

Ashoka. *Social Innovation Mapping: Social Entrepreneurs Changing Lives through ICT*. Washington, D.C.: Ashoka, 2014.

Carter, Saidah Nash. "From an Informal to Formal Economy: How Technology and Information Offer a Pull-through Mechanism." Available at https://blogs.thomsonreuters.com/answerson/informal-formal-economy/. Accessed December 12, 2016.

Cherie Blair Foundation for Women. "Mentoring Women in Business Programme." *Cherie Blair Foundation for Women*, 2016. Available at www.cherieblairfoundation.org/programmes/mentoring/. Accessed November 15, 2016.

Cole, William E. and John W. Mogab. "The Transfer of Soft Technologies to Less-Developed Countries: Some Implications for the Technology/Ceremony Dichotomy." *Journal of Economic Issues* 21, 1 (1987): 309-320.

Deen-Swarray, Mariama, Mpho Moyo and Christoph Stork. "ICT Access and Usage Among Informal Businesses in Africa." *Emerald Insight* 15, 5 (2013): 52-68.

e-Governance Services India Ltd. VLE Handbook for CSC Services. e-Governance Services India Ltd, 2014. Available at http://varanasi.nic.in/csc/2-V1.2-VLE%20Handbook.pdf. Accessed June 12, 2016.

Feminist Approach to Technology. "Feminist Approach to Technology." *Feminist Approach to Technology*, 2016. Available at www.fat-net.org. Accessed May 16, 2016.

Fox, Justin. "India's Puzzling Gender Gap." *Bloomberg View*, October 17, 2016. Available at www.bloomberg.com/view/articles/2016-10-17/india-s-puzzling-gender-gap. Accessed December 14, 2016.

Gabriel, Madeline. *Nesta-Making It Big: Strategies for Scaling Social Innovations*. London, UK: Nesta, 2014.

Greenwood, Daphne T. and Richard P.F. Holt. "Institutional and Ecological Economics: The Role of Technology and Institutions in Economic Development." *Journal of Economic Issues* 42, 2 (2008): 445-452.

GSMA. *Women and Mobile: A Global Opportunity*. London, UK: GSMA, 2013.

——. *Bridging the Gender Gap: Mobile Access and Usage in Low- and Middle-Income Countries*. London, UK: GSMA, 2015.

India Today. "Tata Trusts, Google to Launch Internet Literacy Campaign for Rural Women." *India Today*, 2015. Available at http://indiatoday.intoday.in/story/tata-trusts-google-to-launch-internet-literacy-campaign-for-rural-women/1/449027.html. Accessed December 1, 2016.

Intel. *Women and the Web*. Intel Corporation, 2012.

International Labor Organization (ILO). *World Employment Social Outlook: Trends 2016*. Geneva, Switzerland: ILO, 2016.

Kvochko, Elena. "Five Ways Technology Can Help the Economy." *Weforum*, 2013. Available at www.weforum.org/agenda/2013/04/five-ways-technology-can-help-the-economy/. Accessed December 15, 2016.

Mukul, Pranav. "Govt to Set up 1 Lakh Common Service Centres in Rural Areas: Ravi Shankar Prasad." *Indian Express*, March 23, 2016. Available at http://indianexpress.com/article/india/india-news-india/govt-to-set-up-1-lakh-common-service-centres-in-rural-areas-ravi-shankar-prasad/. Accessed December 10, 2016.

Phills, Jr., James A., Kriss Deiglmeier and Dale T. Miller. "Rediscovering Social Innovation." *Stanford Social Innovation Review* (Fall 2008): 34-43.

Poushter, Jacob. "Smartphone Ownership and Internet Usage Continues to Climb in Emerging Economies." Washington, D.C.: Pew Research Center, February 22, 2016.

Purnell, Newley. "How Google's Bicycle-Riding Internet Tutors Are Getting Rural Indian Women Online." *Wall Street Journal*, October 3, 2016.

Solo, Robert. "Problems of Modern Technology." *Journal of Economic Issues* 8, 4 (1974): 859-876.

Sparks, Donald L. and Stephen T. Barnett. "The Informal Sector in Sub-Saharan Africa: Out of the Shadows to Foster Sustainable Employment and Equity?" *International Business and Economics Research Journal* 9, 5 (2010): 1-12.

UNESCO. *Doubling Digital Opportunities: Enhancing the Inclusion of Women and Girls in the Information Society*. Geneva, Switzerland: UNESCO, 2013.

Warnecke, Tonia. "Entrepreneurship and Gender: An Institutional Perspective." *Journal of Economic Issues* 47, 2 (2013): 455-463.

Warnecke, Tonia and Ahiteme N. Houndonougbo. "Let There Be Light: Social Enterprise, Solar Power, and Sustainable Development." *Journal of Economic Issues* 50, 2 (2016): 362-372.

WebFinance. "What Is Technology?" Available at www.businessdictionary.com/definition/technology.html. Accessed December 15, 2016.

World Wide Web Foundation. Women's Rights Online: Translating Access into Empowerment. Washington, D.C.: *World Wide Web Foundation*, 2015.

Wu, Kate. "She's Connected: China's Female Internet Users Top 300 Mil." All-China Women's Federation, 2016. Available at

www.womenofchina.cn/womenofchina/html1/survey/1601/1568-1.htm. Accessed December 1, 2016.

Zheng, Jianwen and Zhongdang Pan. "Internet Use, Social Network, and Civic Participation in Urban China." Paper Submitted to the World Association for Public Opinion Research 65th Annual Conference, Hong Kong, June 14-16, 2012. Available at https://wapor2012.hkpop.hk/doc/papers/ConcurrentSessionsIV/IVE/IVE-4.pdf. Accessed November 25, 2016.