

# Information Technology Education and Employment for Women in Kenya

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## ABSTRACT

Sub-Saharan Africa women have historically assumed the roles of housewife and subsistence farmer. However, with the global growth of information and communications technologies (ICT) and digital divide interventions, women are enrolling in university programs which prepare them for employment in the formal workforce. In this paper, we present a study in which we interviewed 32 women enrolled in an ICT program at a Kenyan university. The interviews examined the women's responses to the program as well as the women's experiences in seeking and securing ICT-related employment. Our findings indicate that women were highly optimistic, embracing ICT as a practical mechanism for achieving entrée into the labor force and empowering women. However they perceive significant structural barriers, such as gender discrimination in hiring practices, organization's inability to recognize their mix of technical and business competencies, and national ICT policies which did not support the growth in the technology sector.

## Categories and Subject Descriptors

K.7.0 [The Computing Profession]: General

**General Terms:** Management

**Keywords:** Information Technology Workforce, Gender, Education

## 1. INTRODUCTION

Sahay and Avgerou [1] contend that ICTs "are expected to play a key developmental role" in poor countries. They further stated "many see in these technologies the potential for turning around uncompetitive industries and dysfunctional public administration, and for providing unprecedented opportunities for the information-intensive social services, such as health and education." Since the 1990s, a growing number of Non-Government Organizations, international donor agencies, and private corporations have increasingly committed themselves to alleviating the digital divide and promoting gender justice in developing countries. These institutions create and disseminate optimistic discourses about ICT and its positive impact on both economic development and social inclusion for women. For instance, the International Telecommunications Union (ITU) summarizes the benefits of ICT as follows:

*ICTs are important tools that provide the [Sub-Saharan Africa] women access to lifelong learning and training, to productive assets, and to credit. Neglecting to give women access to these tools not only deprives them and their families of income, but reduces the skill-level of a nation's human resource, limits national productivity, and bars a country from being competitive in the global market [2].*

While we concur that ICT and participation in the formal economy have the potential to facilitate the social inclusion and economic advancement of women in developing regions of the world, we also believe that structural determinants such as political policy, globalization, industrialization, and the economy play a large role in enabling these laudatory outcomes. In what follows, we explore the relationships among economic development, gender equity and ICT. Through this discussion, we show how structural determinants help to shape gender relations.

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## 2. ECONOMIC DEVELOPMENT, GENDER AND THE DIGITAL DIVIDE

Since the late 1990's there has been an increasing interest in redressing the intractable problem which has come to be known as the digital divide. The concept of the digital divide has been useful in articulating disparities in access to ICT, particularly in the developing world. More recently, the digital divide discourse has broadened to include not only issues relating to access to ICTs, but also the capability and capacity in leveraging ICT for the advancement of historically underserved populations, the development of local content on an ICT platform, and the creation of appropriate policy measures to cultivate an enabling environment for using ICT [3].

In the developing country context, digital divide policies and programs typically utilize ICT to advance modernization, promote social and economic development, and improve of the status of women. Gender inequality tends to slow economic growth, according to Christiaan Poortman, World Bank Vice President for the Middle East and North Africa.

*"No country can raise the standard of living and improve the well-being of its people without the participation of half its population. Experience in other countries have shown over and over again that women are important actors in development - to hold them back is to hold back the potential for economic growth"[4].*

There are several reasons for this link. For instance, women can play an instrumental role in lifting their families out of poverty through labor force participation. Women are also more likely to invest their earnings in their children, and assume critical, life sustaining responsibilities without which men and boys could not survive much less enjoy high levels of productivity. Thus, women's empowerment is important for determining a country's economic success and sustainability. The extent to which women and girls benefit from development policies and programs has a major impact on a country's overall development success and growth prospects [4] [5] [6].

In using the term "development", we borrow from the work of Sen [7], in which he argues that development is a process of expanding the real freedoms that people enjoy. This differs from theories of economic development, such as growth in gross national product (GNP), technological advances, and rise in personal incomes or social modernization. While GNP and personal income provide means to expand freedoms, Sen expands this notion by including determinants of freedoms, such as health care, education, political and civil rights. Development requires the eradication of sources of oppression, such as gender and racial discrimination, social and economic deprivation, neglect of public facilities, intolerance or over-activity of repressive states. Viewing development from this standpoint prepares us to consider the extent to which pre-existing gender inequalities are reflected in the ability of women to appropriate ICT.

Education is perhaps the primary enabler of women's ability to participate in the development and growth of nations, but education has not historically been accessible to women in Sub-Saharan Africa. Under colonial rule, for instance, access to education was restricted as African children were prepared for the roles deemed appropriate by the imperialist power brokers [8].

Sons of chiefs had privileged access to schooling, which served both religious and political motives that mainly benefited the imperialists. These practices set precedents that were subsequently followed by African families, thereby giving priority to the education of boys, leaving girls uneducated to later serve as housewives and child-bearing 'machines'. Prior to independence, few African children attended school beyond the primary education level [8][9]. By 1960, only 25% of primary-school-age children were in school, compared to twice that number in Latin America and Asia [8][9]. As a result, one of every two women in the region is illiterate. Even within the last decade, technical education necessary to gain computer and related ICT skills still remain elusive for many SSA women [7][10].

Women who do enroll in technology education programs are often prepared for lower paying careers as secretarial work, garment manufacturing, home economics, and hairdressing. For example, according to a UNESCO report [11], girls in Namibia account for only 11.8% of the total enrollment in secondary technical and vocational education institutions. Most are in the garment manufacturing and secretarial sectors. In Malawi, girls are hardly represented at all in primary and lower-secondary technical schools, making up an average of only 4.6% of such enrolments from 1989 to 1993. Men, however, are often trained in more economically productive fields such as mechanics as well as electrical and civil engineering.

In Kenya, the country of focus in this study, nearly 53% of the populace is under the age of 20. Demand for education by young adults is extremely high, but access is limited [12]. While education in Kenya has grown significantly since the colonial era, only 68% of children are enrolled in primary education programs. Enrollment in secondary education drops to 23.1% [12]. The percentage of secondary school graduates who attend college is 17.5%, with more men attending than women [13]. Despite Kenya's approximately 20 universities, a large number of high school graduates still cannot make it to the university due to insufficient space to accommodate them. This makes university admission very competitive. Although a great improvement from years past, adult literacy rates are still at about 70% [14]. The literacy gap between males and females in Kenya is, however, closing rapidly. In 2002, for instance, the adult literacy rate in Kenya was 90% for males and 79% for females [15].

## 3. RESEARCH APPROACH

In response to these historical patterns of gender differences in access to and participation in education programs, NGOs, donor organizations and private businesses are helping women to become active participants in the socio-economic development agenda of their countries. This raises, for us, the empirical question of how women respond to and benefit from these programs?

To examine this question, we conducted interviews with women at a Kenyan university who are the intended benefactors of a technology education program. Using Cameron's [16] notion of "empowering research", we conducted interviews to solicit the views of the researched group about the phenomena under investigation. Women are part of the emerging digital environment, and it is, therefore, necessary to understand issues explaining how they are actually benefiting from and using ICT.

It is equally important to understand the obstacles faced by women. However, a particular danger associated with researching and writing about disadvantaged groups is that the researcher herself may contribute unwittingly to the oppression of the group by making statements which could be interpreted to support popular prejudices [17]. Accordingly, we are careful to avoid generalizations that could contribute to the popular stereotypes about women in developing countries. We also were cautious about romanticizing the technology and seeing only its positive and beneficial impacts.

We conducted structured interviews with 32 women enrolled in an ICT program at a university in Kenya. All of the women were in their 3<sup>rd</sup> or 4<sup>th</sup> year of study, and were enrolled in the “Social Impact of ICT” course. All the 32 women are of Kenyan nationality, recent graduates from secondary schools, and mostly single. The women were primarily fee paying students who are financing their education through work, loans and scholarships.

We constructed an interview guide used in a study of African American women taking courses in a community technology center in the US [14]. In this paper, we present the Kenyan women’s responses to three themes from the interview guide: (1) motivations for enrolling in an ICT program, (2) expectations about the leveraging their education in the workforce, and (3) challenges they faced when entering the workforce. During the interviews, each woman was instructed to reply to the questions by anonymously writing her response in a booklet. The booklets were, then, sent to researchers in the US. This interview process resulted in an average of 4 pages of hand written responses for each interviewee (approximately 128 pages of interview texts). Thus, the interviews were highly structured with each woman receiving exactly the same questions in the same order. We employed traditional techniques for analyzing qualitative texts by finding illustrative themes which emerge across interviews [19] [20].

## 4. FINDINGS

### 4.1 Motivations

Nearly one-third (10) of the women who participated in the ICT educational program did so because they perceived the field as new and exciting. Some like Ndila were simply “*participating since it seems like a very marketable course*”. Others like Marjani were drawn from a “*curiosity of IT [information technology] which is a new field in Kenya and a very dynamic field which affects all aspects globally*”.

Women also believed that there were substantial employment opportunities upon graduation because there were few ICT professionals competing for jobs. For instance, Dalila remarked, “*IT is a fairly new industry in the country thus when [the university] designed the program, it was well respected in the country. The main motivation for me as a woman was due to the opportunities it would open for me in the future. By the time I was joining this program, there were very few IT positions in the country but this is gradually changing.*”

Thirteen women stated that they wanted to be more competitive in the job market. Aza believed, “*Women participate in the program in order to gain IT skills that will be able to use in the outside world. IT tools are becoming a necessity in the business world and thus by taking this program, women will be able to gain more*

*skills that is applicable in the job market.*” Some women were more entrepreneurial, and saw ICT as a way to start their own business. According to Arusi, “*I want to be a business person in the future. I want to own my own business in Kenya so I need business and management skills. However, I also realize the role of IT in today’s society. I wanted to know how to link the two – business and IT – and how I can use the two to develop my ideas of a business I hope to start*”.

However, the majority of the women (23) were motivated to attend the ICT programs by gender equality. For instance, Badu reflected, “*Since the initiation of gender equality, women have been able to overcome all sorts of challenges and exploit their potential to the fullest. As a result of this there has been more of women participation*”. For them, ICT offered an opportunity for overcoming oppression and competing head on with men. Neema stated, “*Gone are the days when there were specific jobs/careers for men and women. Women now want the challenge.*” Similarly, Saada believed, “*Women want to be able to compete equally in this profession that has been considered a man’s profession for a long time.*” ICT represented a vehicle which would enable women to engage in a profession which has been historically perceived as a male domain. Chanya observed, “*The reason for participating in this program is to broaden the job skill and not stick to the stereotype that certain jobs are for women. IT has impacted many areas and even women realize that there are job opportunities that come with this vast growth. They therefore want to be part of it.*”

Women also appeared to be strongly influenced by national policies and public discussions which promote gender equity. There was the belief held by women such as Adhiambo that “*women have a better understanding of the technological world so that when we begin our career we will be able to successfully represent other women in our country*”. The desire to represent Kenyan women was also salient in Eshé’s reflections on changing societal norms on parenting girls. “*Due to empowerment of women in recent years, more and more parents are becoming interested in the girl child and encouraging the girl child to become active in society. More and more women want to play an active role in their society and in the world, and this being the information age, women want to be involved in the ICT sector (not to be left behind their male counterpart).*”

### 4.2 Expectations for Leveraging ICT Education

All of the women that we interviewed held beliefs about the training which centered on very practical and production oriented uses of ICT. Theory was greatly devalued while practical experience was prized. Ndila lamented, “*I expected a more practical course and more in depth coverage in areas such as programming, systems development, web design, etc.*” Dalila reiterated this view:

*The training failed to meet those expectations as I am in my fourth year but I still don’t think I have the required technical skills that the market is demanding. My business unit was well taught but my IT classes lacked to impart the knowledge that I had hoped to acquire. I learnt about networks, databases, websites but it was too theoretical. I cannot immediately apply this knowledge I proved*

*when I went for my attachment. We are hired to be managers but nobody will employ us directly into management positions we have to start as techies then climb the ladder. I feel we lack the technical skills.*

The women desired a strong technical competency in a wide variety of skills. Anyango noted, *“I expected to emerge as an IT expert with knowledge of the foundations and development of technology. I expected to be up-to-date on the technology trend and be able to manage information systems, develop them, code, implement, manage, and have ICT at my fingertips”*.

The practical orientation extended beyond the notion of skills. Overall, a dozen women stated that they expected to easily gain employment upon completion of their training. Issa simply stated, *“It will guarantee an instant job.”* Most were more conservative like Loiyan who states, *“My expectations were to gain IT knowledge and skills that will prepare me for the job market and enable me to get a well paying and fulfilling job.”* Technical skills were seen as mandatory in the job market and in everyday life. Deka declared, *“IT is becoming a basic need for people in their various careers and day to day life. Not having some knowledge of IT means difficulty in even accomplishing simple tasks such as using and ATM. Not having the basics of IT could close doors to jobs that are not essentially about IT”*. Seventeen of the 32 women mentioned severe employment consequences for those without technical skills. Dalila noted:

*Every employer is currently demanding that you have basic IT skills. And as many more people study IT this demand is created and its no longer surprising to be asked to have additional networking skills even for us graduates (to be). Employers are asking for additional professional qualifications, e.g. Oracle, Cisco, etc. Thus currently it is actually a requirement to possess IT skills in any meaningful job that you apply for. So its either you learn IT or risk your future.*

Nearly every woman used terms like “expert”, “competence”, and “competitiveness”, which reflect the practical business orientation of the education that they are receiving. Dalila captured these themes in her response:

*When I enrolled I hoped that by the time I would be graduating I would be a competent IT professional able to integrate my IT knowledge into a business environment. That I would be able to streamline an organization’s process effectively with IT so as to increase their competitive advantage. In short, I hoped that I could be an IT expert with sufficient business knowledge. I also expected to be more competitive than other students who are pursuing computer science as I would have all the knowledge that they had plus business knowledge thus I could be more marketable than them.*

### **4.3 Challenges and Barriers**

The women mentioned a number of challenges and barriers which they believed limited their ability to translate their classroom learning into paid employment. Wanabui, for instance, suggested the lack of specialization and depth as potential barriers. *“[The] challenges we face is that we are equipped with skills of all areas of IT but not experts in those areas while other people in the field from other universities specialized in an area of which they are good at and are employed for.”* Neema made a similar point

when she noted *“To a certain extent it did meet my expectations as it gave me an insight but on the other hand it is so wide that it only gave basics of the IT world which proved to be disastrous out in the field. We have very basic knowledge of some IT skills.”* Anyago added, *“Unfortunately, I think the training is too theoretical and application of it in an actual working environment is difficult”*.

The women also acknowledged several structural barriers that limited their ability to realize their goals. These barriers occurred at three levels: policy, societal, and organizational. At the policy level, three women remarked that unclear government regulations resulted from policy-makers’ lack of appreciation for ICT. These unclear regulations were believed to stymie growth in the IT sector. For instance, Makena affirmed:

*The government regulation of IT issues is not clear therefore making it difficult for IT growth in Kenya. This makes it costly to apply IT knowledge in the field. The lack of appreciation of IT for policy makers creates a roadblock as the policies in place do not adequately give IT professionals a fair ground to work as bureaucracy is still in place. The IT roles are not defined in the ministries therefore ICT management in the country doesn’t give a good basis for policy makers to make decisions.*

Aza also asserted, *“The major challenge would be lack of technical skills due to the lack of practical training and also the government regulations on IT may limit the growth of IT in the market.”*

Nearly every woman discussed issues related to the societal context. The most common response was that many people in Kenya still don’t understand ICT. Zalika lamented, *“The main challenges are that in Kenya, IT has not gained as much popularity as the Western countries. To educate the population first is one big roadblock”*. Similarly, Fola observed, *“A major challenge I face is lack of the IT awareness among other people. Most people who do not undertake the IT training have no idea what it’s all about. It is therefore hard on people in this field since not many people are conversant with it.”*

Finally, at the organizational level, women used the metaphor of a pioneer to describe their experience in labor market. *“Since we are pioneers of this course, most organizations and companies out there really don’t understand what this course entails and according to them they don’t know what positions we can hold in their companies.”* Zahara believed *“most organizations in Kenya do not fully appreciate the value of good IT in managing business processes”*. Eleven women echoed this pessimistic stance on employment opportunities based largely on companies lacking the wherewithal to take advantage of the skills that these women possessed. *“Not many companies in Kenya see the need for people who can mix IT with management of business, they are still expecting technical people, so my experiences are going to be hard to get.”* Makena expressed similar sentiments. *“IT popularity is growing at a slow rate and most organizations are at early stages of developing their IT department. Thus part of the knowledge gained in this training may not be useful as organizations may not be willing to invest fully in IT...”* Eshe sensed that organizations have a limited understanding of the role that computers and technology professionals play in organizations. *“People in this country do not know much of IT.*

*When they see you are an IT person, they think that your job is to fix their computer whenever it crashes.” Dalila also noted that “there is a discrepancy between what we are taught and what the market wants. Thus the main challenge is to define what I am capable of in the market and still be able to fulfill the market’s requirements of an IT professional”. Deka expressed apprehension with “Taking IT where there has never been might be difficult. If I got hired in an organization that isn’t far advanced in IT, I could meet resistance.”*

Three women mentioned employers’ lack of trust in graduates with little experience. Loiyen reflected on limited experience from the perspective of the employer. *“People in the job market are not willing to take on students who lack experience in IT. Not many people are willing to give students a chance to gain the experience needed to enhance their IT skills”*. Ndila said, *“People (employers and others) are not willing to trust IT graduates who have no experience and also being quite young is a challenge to me.”* Deka talked about limited experience from the perspective of the job seeker. *“I have some experience but this could be insufficient to compete with those who have been in the industry longer. Hence, finding a job has bright prospects but might prove challenging.*

Desta was one of two women who expressed concerns regarding gender discrimination. *“As I move forward, the challenges that I foresee is that being female in a male dominated field, then it requires me to work hard and even have more qualifications.”* Sauda thought:

*I am uncertain about whether or not I will get a job in the field I have studied in. This is because unemployment is a large problem in Kenya. There is a problem that because I am a woman, employers may not think that they should give me a job working in IT, so I may never fully get to use all that I have learned to do, work that I want to do”.*

## 5. DISCUSSION

While the dissemination of Western technologies is often perceived as a necessity for the economic development of Sub-Saharan Africa, in this study we found that women’s ability to translate their ICT skills and training into well paying careers in the formal economy was limited. Improving the skills and awareness of individual women raises aspirations for social and economic advancement. However, these aspirations are necessary but insufficient for societal change that will enable women to move from their traditional domestic roles into the formal ICT workforce. There is a compelling need for complementary structural changes.

Hence, we caution the overly deterministic portrayal of ICT as a mechanism for improving gender equity. While ICT is being promoted as the paramount strategy for promoting labor market opportunities for women, there is a limited attempt to engage seriously with structural questions. These structural questions include macro-level questions regarding national IT policy and organizational policy. For instance, reading some of the literature produced by World Bank, the United Nations, and corporations in the West, one gets the strong impression that the ICT work sector is a vast and virtually boundless sphere for economic possibility. There are however limits to the employment capacity of organizations. Although many women believed that technical

skills would guarantee paid employment, the labor market is not infinitely elastic. The women in our study perceived barriers to entry including gender discrimination in hiring practices, the program’s inability to provide the specific technical competencies and credentials sought by employers, national ICT policies which did not support the growth in the technology sector, and the organizations’ inability to absorb the increasing number of qualified technology workers.

This suggests that structural change must come in the way of public policy, national infrastructure and education, and go beyond narrow definitions of ICT access and skills [21]. Some Sub-Saharan African countries have started to address this dilemma by granting tax relief for investors that establish businesses in rural areas. Other African countries such as Cameroon have enacted a duty-free policy on all computer imports, which has helped to improve the number of women who acquire and use ICTs. Further, special incentives are provided for women to establish public Internet cafés. In fact, in some African countries like Tanzania, most of the Internet Café owners are female [22].

There are also questions about societal change resulting from women’s participation in the formal workforce. For instance, how will this shift impact domestic relations, roles, and responsibilities? How will these changes impact local economies? These are important considerations because women in SSA have historically constituted a majority of the informal economies around agriculture, subcontracting, and personal services [5][6] and these informal economies are inextricably linked to the formal sector. Informal work provides low-cost products and services, and mediates formal sector firms looking to reduce costs for labor and products. Taking women out of informal sector work may therefore result in fewer lower priced goods and services for consumers of all incomes.

## 6. CONCLUSIONS

In this paper, we examined the integration of women in a Kenyan university technology program and in the formal workforce. Using interviews which captured the voices of women in Kenya, we illustrated that women were highly optimistic, embracing ICT as a practical mechanism for achieving entrée into the labor force. However, women still perceived significant structural barriers such as discriminatory hiring practices, ineffective government regulations, and lack of organizational experience in hiring and managing ICT. These findings suggest that, as countries within Sub-Saharan Africa continue to encourage ICT education for women, it is important that we continue to study ICT, gender equity and their relation to economic development.

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