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WOMEN AND MOBILE PHONE CHARGING BUSINESS IN NIGERIA: A CAPABILITY PERSPECTIVE

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Copyright © 2022 The Author(s). This is an Open Access article distributed under the terms of Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0), which permits anyone to share, use, reproduce and redistribute in any medium, provided the original author and source are credited. **ABSTRACT:** *There is a growing adoption of solar home systems* to support sustainable development and address poor electricity supply in sub-Saharan Africa (SSA). This has resulted in the rise of solar mobile phone charging businesses, especially in off-grid communities. An area that remains under-researched that needs to be addressed is how these solar mobile phone charging businesses provide opportunities for women in rural communities in SSA. We employ the concept of Sen's Capability Approach to evaluate how the solar mobile phone charging businesses have improved the lives of women by focusing on opportunities provided for expanding their freedom to participate in social, economic, and political activities. Our analysis shows that women's involvement in solar mobile phone charging businesses has enhanced their individual and collective capabilities to participate in development activities; however, certain contextual factors hinder the generation of these capabilities. The paper concludes with some implications for theory and practice.

KEYWORDS: Solar mobile phone charging, women, capability approach, Nigeria.



INTRODUCTION

In Nigeria, eighty-five million people do not have access to grid energy (World Bank, 2021). This equates to 43 per cent of the country's population, making Nigeria the country with the world's most significant energy access gap. Over the last decade, there has been an increase in mobile phone penetration in sub-Saharan Africa (SSA). In 2020, 495 million people in SSA had signed up for mobile services, accounting for 46 per cent of the region's population (GSMA, 2021). However, while mobile phone penetration is high in urban cities, rural communities have had poor penetration due to lack of mobile infrastructure. Even in areas where mobile services are available, mobile phone users in off-grid communities have a significant problem in charging their phones because they must travel to nearby on-grid communities to charge their phones. The lack of available electricity for recharging a mobile phone restricts the usage of mobile phones (Wyche & Murphy, 2012). It denies many people in off-grid communities the opportunity to engage in society's social, political, and economic activities. The demand for phone charging appears to be one of the significant drivers for rural electrification (Collings, 2011). Communities can get by with traditional cooking fuels and kerosene lighting; however, mobile phones require electricity to operate. As such, there has been an increasing interest in the implementation of solar power solutions which include mobile phone charging options as a leapfrog technology for national economic growth (Munro et al., 2016).

The uptake in sustainable models for off-grid electrification, such as solar home systems, has seen an increase in mobile phone charging businesses in rural areas (Munro & Schiffer, 2019). Even though the solar energy sector is still young in SSA, there have been a few studies that have examined the role of solar electricity generation to support the development of ICTs (Paul & Uhomoibhi, 2014), models for designing and implementing solar mobile charging stations (Udayalakshmi & Mohammed, 2018) and practices of mobile phone charging (Munro & Schiffer, 2019). Although these studies are clustered around mainly economic assessment, adoption, design and implementation issues (Aarakit et al., 2021), very little is known on how these solar mobile phone charging businesses contribute to the lives of the poor in rural communities. Also, gender is usually neglected in the energy discourse in the global south. Yet, the growing body of literature shows that the use and access to sustainable innovations are significantly gendered (Ojongo, 2021). There is a call for the incorporation of gender research within the information and communication technologies for development (ICT4D) research (Walsham, 2017; Mohanty & Mishra, 2020).

In an attempt to answer this call, the study draws up a qualitative case study via in-depth interviews to examine how the mobile phone charging business contributes to the lives of women residing in an off-grid village in Nigeria. The paper's contributions are in two folds: Firstly, it extends our knowledge of how ICT led initiatives within the energy sector impact the lives of women in the global south. Secondly, it provides implications to practice that policymakers can use to further enhance the contribution of the mobile phone charging business to women's lives in rural Nigeria. The following section provides a literature review on ICTs and development. This is followed by a discussion on ICT4D and its impact on women. Next, Sen's Capability Approach is introduced as a theoretical lens. Next, the methodology is introduced. This is followed by the case study and analysis section. The final section presents the discussion and conclusion.



LITERATURE REVIEW

ICT and Development

The ICT4D literature contains several areas of development, but little is known on what development means and how ICTs play a key role in these processes (Zheng et al., 2018). Early ICT4D research claims that ICTs will ultimately lead to rapid development. These studies tend to implicitly follow the modernization approach to development that perpetuates western values and suggest the facilitation of market mechanisms such as privatization, deregulations, etc., as a means to economic development in the global south (Pieterse, 2010; Avgerou, 2003). Many donor agencies have promoted ICT4D interventions with this economic reasoning and tend to measure the contribution of ICT in terms of economic growth and market-based innovation. However, many of these ICT4D interventions become problematic in the long run due to the lack of consideration of the contextual factors that shaped the implementation and use of these initiatives in the global south (Sein & Harindranath, 2004). Research following this western approach to development have focused on ICT readiness (Nhamo, Nhemachena & Nhamo, 2020), access and the digital divide (Ohemeng & Ofosu-Adarkwa, 2014) and how ICTs can support economic growth (Appiah-Otoo & Song, 2021).

However, there has been a shift from this dominant approach to development that focuses on economic growth to alternative methods that emphasise on human development. The Amartya Sen's capability approach has been widely used within the ICT4D literature to examine development outcomes in terms of capabilities, wellbeing, choices and agency of individuals to actualize available opportunities (Andersson, Grönlund & Wicander, 2012; Hoque, 2020; Zheng, 2009). At the same time, there is a paucity of studies examining the contribution of ICT4D interventions on rural women's capabilities to attain development outcomes in SSA (Alao, Chigona & Brink, 2021). Within the context of Nigeria, the majority of the studies have either focused on the adoption of ICTs by women (Olejede et al., 2017), access and use of ICTs for agriculture by women (Agwu & Ogbonnah, 2015) and gender and digital divide (Danjuma, Onimode & Onche, 2015). Very few studies in Nigeria have evaluated the human development outcomes of women in terms of empowerment and agency (Abubakar & Dasuki, 2018; Dasuki & Zamani, 2019). In light of this, our study draws up Sen's capability to examine the contribution of ICT4D interventions in expanding the capabilities of women to live a valuable life in Nigeria. We focus on the voices of women who currently run a solar mobile phone charging business and its contribution to their lives. The following section provides a review of literature on the impact of ICT4D on the lives of women in the global south.

ICT4D and its Impact on Women

A growing number of studies have looked at the relationship between ICTs and women empowerment in the global south. For example, a study by Abubakar and Dasuki (2014) in Nigeria showed that WhatsApp had empowered women by concentrating on the opportunities provided for expanding their freedom to participate in social, economic, and political activities. Similarly, a capabilities analysis of a health intervention for pregnant women in Malawi indicated that participants developed informational, economic, and self-development capabilities in addition to the health-related outcomes that the programme was designed to achieve (Nyemba-Mudenda & Chigona, 2017). Focusing on agency, Alhayek (2016) examines how ICT is utilised by women activists in Jordan to advance their reform efforts and better the lives of women (Alhayek, 2016). Similarly, studies by Shirazi (2012) found women's digital



activities to be an effective tool for engaging in communicative discourse and rallying Iran's female population in their fight for a just and equitable society. Despite the growing number of studies that intersect gender and ICT4D, there is still a paucity of studies (Trauth, 2013; Alao, Chigona & Brink, 2021). There is a call by Walsham (2017) for more gender based studies to understand the contributions of ICTs to development. In an attempt to answer this call, the study examines how the solar mobile charging business contributes to the lives of women in a rural village in Nigeria. Drawing up the Sen's capability approach as a theoretical lens, the study examines the contributions of the solar mobile charging business to the freedom of women to participate in social, economic and political activities. The next introduces the Sen's capability approach which serves as a theoretical lens for this study.

Sen's Capability Approach

The capability approach (CA) is a broad normative framework for assessing changes in society in terms of the enhancement of individual wellbeing (Sen, 1999). The approach critiques the dominant approaches to development that focus on economic growth and opulence and emphasizes *"human freedom"*, which means the effective opportunities available to an individual to live a valuable life. The CA consists of two distinct features: capabilities, which refers to freedoms—individuals have to achieve a set of functions—while functionings are beings and doings that people value.

Robeyns (2005) argues that the difference between capabilities and functionings is between the freedoms on the one hand and achievements on the other. Alkire (2005) noted that it is crucial to focus more on capabilities than functionings because individuals value choices of capabilities from which they can choose. Nevertheless, the realization of functionings is further determined by social, personal and environmental factors. However, CA has been criticized for being individualistic and not taking account of social structures and groups (Corbridge, 2002; Devereux, 2001; Navarro, 2000). Others have called it an incomplete and infeasible framework (Robeyns, 2005), noting that it is problematic to unravel the balance between its conceptual richness and its potential to be operational in practice, research, and development (Kleine, 2010).

Despite these criticisms, there has been a wide range of applications of the framework within ICT4D studies (Bass, Nicholson & Subhramanian, 2013; Kleine, 2010; Grunfeld, Hak & Pin, 2011; Hatakka & Lagsten, 2012). Very few studies have applied the framework to study gender within ICT4D (Masiero, 2022; Walsham, 2017). According to Sen, "extensive reach of women's agency is one of the more neglected areas of development studies, and most urgently in need of correction." He emphasizes "an adequate recognition of political, economic, and social participation and leadership of women to be a crucial aspect of the capability approach" (Sen, 1999, p. 203). In this paper, we examine the freedoms and opportunities that have been provided to women involved in the solar mobile charging business. The following section introduces a discussion on the methodology.

Methodology

Our empirical findings are based on qualitative interviews conducted with women to examine the developmental opportunities associated with their involvement in the solar mobile charging business. A single case study was adopted due to the scarcity of information on gender within



the energy sector. The fieldwork was conducted in November 2021 and involved 16 women from Shimankar village in Nigeria involved in solar mobile charging businesses.

Shimankar village is located in Shendam Local Government Area, Plateau State. There is no electricity in the village because it is fully off the grid. The community becomes silent after sunset as work and daily routines cease due to darkness. This has had a particularly negative influence on women and girls who spend the majority of their days doing household tasks. The majority of Shimankar village residents utilise kerosene lanterns and traditional cooking fuels to light their homes.

Through the support of the Rural Electrification Agency, the authors were able to identify the recipients of the solar home system who were involved in the solar mobile phone charging business. To be eligible to participate in this study, women needed to: (a) be eighteen years or older, and (b) own a solar mobile phone charging business. Before the data collection process, the participants were provided with an information sheet and a consent form to sign, and the author also explained the contents to those who lacked the literacy skills to understand the documents. Pseudonyms were used for the participants in order to preserve confidentiality and anonymity. Interview questions were designed using the concepts of Sen's Capability Approach.

During the data collection process, a short survey was administered to gather information on participants' demographics and their ownership of the business. The participants' ages ranged from 30 to 53. Among the respondents, four were in their 50s, five were in their 40s, and seven were in their 30s. All the selected women participated in a face-to-face interview at mostly their place of business. Three of the authors have extensive knowledge of Nigeria and are fluent in the Hausa language used when conducting the interviews, which were all audio-recorded. The interview sessions lasted anything from thirty minutes to an hour, depending on the amount of information required. The data saturation principle was used; after interviewing sixteen women, the process was stopped because no new information could be revealed from additional questioning. The summary of the findings were shared with the participants by the authors and the participants agreed with the findings. This was to provide transparency, ensure the findings were accurate, and to validify the honesty and integrity of the researchers.

A total of 8 hours of interviews with the participants were done. The authors organised, translated, and transcribed 19 pages of interviews. Thematic analysis principles were utilised to evaluate qualitative data. The first step in this approach was to carefully read and re-read the transcribed data in order to find recurring topics discussed by the participants. Following that, transcript data was coded, and the various coded extracts were then grouped into themes. After completing the coding exercises and reviewing the themes by the authors, we produced our report as presented in the case study context and analysis section.



Case Study Context

Shimankar Community and the Mobile Phone Charging Women Entrepreneurs

Women in Shimankar complained, in a town hall meeting with their political representatives, about the negative impact of lack of electricity on women's empowerment, specifically how it affects the work of traditional birth attendants who assist women in giving birth, as well as how it prevents women from carrying out their daily chores and business activities, which end abruptly due to darkness. In response to community complaints, their political representatives began donating solar home systems to nearly 1900 households in partnership with the Rural Electrification Agency. The rural electricity initiative began in December 2020 with the delivery of solar home systems to selected women in the Shimankar community, with the prospect of expansion and a mini-grid. The chosen women, who were typically farmers, raised maize, tomatoes, and potatoes with the help of their husbands and children. The chosen women were taught how to use solar household systems and start their own businesses. The selected women were trained on how to use solar home systems and how to become entrepreneurs. This includes managing funds, earning a profit, advertising, and keeping track of each transaction. The solar home kit consists of a 50Wp solar PV panel and a 17Ah battery. Following the installation of the SHS, several of the women chose to start phone charging businesses to augment their little farming revenue. In the following section, we used the concepts of Sen's capability approach as pillars for the case study analysis to understand the developmental opportunities associated with the solar mobile phone charging business and its contribution to the lives of the women in the village.

Analysis

Economic and Political Capabilities

Due to a lack of electricity in the community, residents normally pay to charge their phones at these women's homes or shops. A single solar household system can charge up to four phones at once, and the women charge 50 naira for 30 minutes and 100 naira for an hour. The findings of the study showed that the phone charging businesses have provided the women with the freedom to earn money and expand their existing small businesses. Many of the participants said that they had grown their businesses as a result of the money they had made, as shown in the remark below:

"In addition to the farming that I do, I've been able to make more money, which I've used to expand the business. I now sell recharge cards as well, and I'm considering purchasing additional SHS to expand the amount of phones I can charge."

Furthermore, the findings show that apart from economic opportunities, engaging in the business also resulted in political freedoms in terms of participating in political activities of determining who should represent and govern them. The women formed an association of mobile phone charging business owners where they determine the price of charging, and they also make a monthly contribution to the association where they are able to support members with loans to purchase SHS. During the fieldwork, the women had just conducted an election to elect new executives within the association. Setting up the association and being members

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have enabled the women not only economic but also political benefit as mentioned by one of the participants:

"Since the formation of this association, we have supported more than 20 women to purchase the solar home system through loans and also due to the status of this organisation and its ability to mobilise women, we have a lot of politicians and stakeholders within the village always reaching out to us with regards to issues that affect women in the village."

Social Capabilities

The findings of the study showed that women phone charging businesses gained the freedom to learn and education. Also, the ladies were given instruction on by representatives from REon how to become entrepreneurs, who taught them marketing strategies for promoting their businesses, such as placing a written sign in front of their homes. Many of the women believed that the sign post was more essential than word of mouth in terms of advertising because passers-by could easily see and read it. As seen in the quote below, the women also learned about record keeping, which was critical to the success of their business.:

"As a farmer, sometimes we sell our farm produce in the market without any record keeping; however, with the training we received when provided with the SHS, I have now learnt how to make note of all my business transactions for the day and also the expenditure and income, I have used this knowledge also for my farming business."

The women noted that their ability to keep records of their business transactions helps them ensure they do not spend more than they earn and helps them keep track of their profit. Some of the women used profit they made for their business to expand their business by ordering my SHS while others supported family members as shown in the quote below:

"With my little earnings, I use some of the money to support my daughter who is unemployed, and a widow with two kids. I bought her the SHS and she now makes some money to help herself and my grandchildren. I don't have to worry about sending money to her all the time as she is now independent."

Also stated was obtaining some understanding about mobile phones by the participants. Because of the nature of the job, many of them had learned about various phone brands, charger types, and even how to operate them, specifically how to turn on and off customers' phones. One of the participants stated this:

"Since I started my phone charging business, I've become familiar with a variety of phone brands, including Itel, Nokia, Infinix, Techno, and others. One client even brought the smartphone (iPhone) of his uncle who came visiting from abroad to charge. I didn't even have the charger for the phone because it's not a popular phone, but the client brought their charger and taught me how to plug it in and turn it off."

Women's clients were also affected by the mobile phone charging business. The fact that they occasionally enabled their clients whom they knew well to charge their phones on credit demonstrates the importance of maintaining and creating strong community relationships, hence enhancing their freedoms of social relationships. Although another participant declined requests from friends to charge their phones on credit which on the other hand severed the



relationship between them. Furthermore, the village's mobile phone charging business has prevented many neighbors without power from having to travel to neighboring communities to charge their phones. Travelling to this communities is usually expensive and comes with a high risk of being kidnapped and raped due to the volatile situation in the area, which has recently been attacked by bandits as shown in the quote below:

"In the past, most families have to travel at least an hour to the next village to charge their phone and you know that road is very dangerous due to Fulani bandits that have recently started terrorizing commutes on the main road. But with this business now, everyone just pays a little money to charge their phones, which saves them money and risk of kidnappers and also our children, especially the girls, can always be at home to support us after school."

Conversion Factors

Environmental Factors

Technical

The mobile phone charging business was not without its difficulties for the women. Majority of the participants reported that their SHS was frequently plagued with technical issues, particularly with the battery water and, on rare occasions, the controller, preventing them from charging as many phones as feasible. The battery frequently died quickly after a year of usage, and there were few resources available, such as a technically trained person to repair the defective SHS, as one of the participants explained it:

"The problem we have is that the few electricians we have in the village have been unable to repair some of the malfunctioning SHS, and most of the time they tell us to go back to the main supplier. If you go to any electrician's workshop here, at least one of two SHS will be laying around."

Many of the women claim that they went out of business as a result of the inability to repair their faulty SHS, and that they were unable to afford another SHS, while others had to default on the loan repayment they had taken out with the association. The women's association, on the other hand, has sought to contact the SHS suppliers, but, due to the village's proximity, it usually takes months for the suppliers to send a representative to fetch the SHS in order to repair or replace them. Also, several of the women voiced concern about the high cost of replacing the batteries and noted that they would have preferred to be told of the necessity to start saving for a battery replacement from the start of the project; battery problems were a big concern for SHS from the outset.

Security and Cultural Issues

The issue of security was also brought up by the participants. All of the interviewees stated that they run from their homes or shops. To prevent theft, individuals who ran their businesses from home had their equipment installed in their rooms, while those who ran them from their shops had their equipment installed behind their counters. Despite these safeguards, one of the women stated that there had been multiple attempts at theft, either in their homes or at their business centres, to steal phones or equipment, as shown in the following quote:



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"Two weeks after I had started this business, some men came to the house posing as customers who had dropped their phones and were unable to pick their phones during the day. Luckily enough for me that day, I had no customers who left their phones for overnight charging and when they noticed the voice of my husband who immediately asked why they were here in the middle of night, they immediately ran away".

Another participant who was not lucky enough stated:

"In my situation, a customer's phone was taken after two women entered my shop, one of whom distracted my sales girl, and while she was attempting to attend to her, the other lady crept in and snatched nearly three phones off the charging station."

Because of the high rate of theft, many of the participants stated that they do not accept overnight charging and have taken efforts not to allow more than one person to come for phone collection. Finally, some women report incidents where their husbands have prohibited their wives from continuing the solar phone charging business due to their additional source of income, which allows them to earn more than their husbands and therefore become the family's breadwinners. According to one of the participants, she stated:

"My husband has requested that I cease operations as soon as the debt I received from the association has been repaid. He is envious since I now make more than him and support more of the household chores...he feels humiliated by them, especially because he believes the children will no longer respect him because I am now wealthier."





DISCUSSION AND CONCLUSION

In this paper, the study examined the development opportunities provided to women due to their involvement in the solar mobile phone charging business. The study was informed by Sen's Capability Approach to development, which shows how the solar mobile phone charging businesses provided rural women with opportunities in social, economic, and political activities of the society. The findings showed that income generation and expansion of business are economic capabilities. This reflects the findings of other studies in ICT4D that show that ICT4D and its ancillary services empower women economically (Murphy & Priebe, 2011; Divall et al., 2021). Also, the study's findings showed that the solar mobile phone charging business provided women with the opportunities to gain education benefits. Many of the women learned how to run a business and become entrepreneurs and new knowledge of mobile phones. This is similar to the other studies on ICT4D conducted by women (Crittenden, Crittenden & Ajjan, 2019; Hashim, Razak & Amir, 2011). Lastly, the presence of the solar mobile phone charging business opportunities for safety and social connections. In particular, the business helped women build and maintain existing relationships with other villagers who also served as customers.

Interestingly, the findings of our study found evidence of collective capabilities. We identified the opportunities to participate in political activities. The findings showed that the women were able to set up an association for the women running solar mobile phone charging business in which they held elections to select their leaders and were also able to push for the agenda of women in the political space of the community. Developing these collective capabilities necessitates the exercise of individual liberty in pursuit of these objectives and involvement in a collectivity (Ibrahim, 2006).

However, the findings of our study further showed that the ability of women to utilize the opportunities offered by the solar phone mobile charging business was contingent on primarily environmental factors, namely technical and security issues. Firstly, technical challenges, cost of maintenance, and lack of support for the solar home systems hindered the women in successfully running the business. The results are consistent with other studies that showed that poor quality solar home systems, technical capability and affordability hinder users from attaining the benefits of solar home systems (Mondal & Klein, 2011). Also, patriarchy and criminal activities, such as theft, impede the developmental opportunities associated with the mobile phone charging business. This is common in some African societies where men dominate women and the high rate of poverty and employment in Nigeria, which has resulted in the rise of criminal activities within the country (Dasuki & Effah, 2021).

In sum, we have shown that women were able to generate both individual and collective capabilities to improve their lives as a result of their involvement in the solar mobile phone charging business. However, the generation of these capabilities was dependent on conversion factors. The study contributes to theory by extending the application of CA from solely focusing on individual capabilities to including collective capabilities. The findings also have some implications for practice. The solar mobile phone charging business does have the potential to contribute to the lives of women in Nigeria; however, in order to make most of it, the policy makers and donors should ensure high-quality SHS are provided and appropriate support service is required to ensure their sustained functionality which in turn contributes to supporting women involved in the solar mobile charging business.



In suggesting the potential for future research, the limitation of this study is recognized. The study was limited in that only a single focused case study was undertaken under severe time limitations. There is a scope for a longitudinal study with a bigger sample size. The findings of the study cannot be generalised; however, the concepts can be developed further and explored in similar research settings.

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