IoT-Driven Solutions for Empowering Widows and Safeguarding Women's Rights in Southern Nigeria

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Abstract: The empowerment of women and their autonomy in the areas of social, economic, political, and health is highly necessary. However, some categories of women, like the widows, have been neglected over time when policies that has to do with socio-economic development is being considered in any level of government. Based on this, the study examined how the Rights of women and especially widows are protected. Also, the study further examined the impact of the adoption of Internet of Things technology in ensuring adequate empowerment of women as well of their Rights protection. The findings revealed that training and evaluation of the vulnerable women in this category is important. Also, it was suggested that there must be adequate monitoring of the IoT technology to ensure that is acceptable. More so, training of the widows is very important to ensure their understanding and subsequent improvement in the area of sustainable economy.

Keywords: IoT, Widows, Rights Protection, Technology, Empowerment

1. INTRODUCTION

Currently, the advent of the internet has been advancing progressively with great influence on all aspects of life [1]. Several research have revealed that there are complex challenges in trying to uncover the optimum level of the utilization of the internet [2]. The term "internet" involves "things," which gave rise to the Internet of Things (IOT). The name implies that different objects are interconnected via different technologies like radio-frequency identification, Bluetooth, wireless network, long-term evolution, 4G, 5G as well as other advanced communication systems [3-4]. Thus, the term IoT can be referred to as the interconnection of many things using internet facilities, which helps to transfer information obtained from different devices to a particular destination online [5]. Internet of Things (IoT) is the reigning technology that is greatly used in the fourth industrial revolution as well as the Industry 4.0. it involves different devices which give room for large data sensing, collection, processing and stored for subsequent processing [6-7]. In recent study, it was established that data is processed using a cloud-based system known to be a centralized server. Some of these servers are powered using sophisticated techniques to achieve adequate performance. This include mobile edge computing, cloud computing, as cellular networks. The result obtained is then deployed into decision making, which help in facilitating the

needed interaction between various sectors, supply chain partners. Thus, IoT is proficient in transportation, healthcare, energy manufacturing and supply chain [8]. Despite the coverage of IoT, especially in advancing technology, it was established that IoT is yet to realized its full potential. For instances, some of the limitations could be as a result of problem of communication, required hardware and software, security and privacy, policy regulations as well as culture [9-10]. When it comes to the generation of empowerment solutions for women, a lot of challenges are encountered. According to a study by Widiastuti et al. [11] gender variation is one major issue that usually impede resources distribution across sectors like employment, education, health of which widows are not left out. Based on this, the study first addressed this issue by deploying a quantitative approach integrated with a Modified Penta Helix as well as the Delphi analytical approach to understand the problems as well as the strategic approach towards empowering women. The two approaches were further made to focus of different strategies such that a renewal between economic, education and socio-cultural and training was established using the Modified Penta Helix approach while the Delphi analytical network method was developed for the focused group as indicator. From the result, it was established that a major problem of empowering women is in eight dimensions off course not in a particular order. These dimensions include; education and training, support from government, association, socio-cultural, economic, support from private sector, media support. To this end, education was found to be the most critical issue problem that usually impede women empowerment. Thus, adequate collaboration between the community, business, government and media would help in facilitating the empowerment of women. In this study, an overview of IoT would be established linking its proficiency to solving the challenges associated with women empowerment with emphasis on widows within the Southern Nigeria.

2. IMPORTANCE OF INTERNET OF THINGS (IOT)

The advancement in technology has led to the deployment of IoT in every facet of life. In fact, adequate technology has been deployed in many areas of life especially pertaining to human life and existence. Many people are gradually appreciating the importance of computer application as they can obviously see the ease it brought to their daily activities [12]. It was established that IoT has really improved productivity and lives of not just the human but the industries, thus boosting the economy and inclusiveness at all time. This recent technology has proven that mechanical devices has the capacity to store and process information, meet the needs of people, very easy to install and creates connection between the products that need to be connected [13-14].

Internet of things has an important aspect known as cloud computing which is responsible for the foundation of IoT. IoT technology involves a platform of cloud computing where data is collected, organized, processed via the application layer for processed data to be exchanged, hence managing an entire system. Also, it consists of an embedded system of technology where software and hardware are organized into an independent working device. This technology is widely deployed in life and work. The things in IoT must contain certain properties that will enable the scope of IoT to work. These properties contain data transmission route or path, storage capacity, processing capacity, there must be management and system control [15-16]. The established communication standard of the IoT with unique identification number must be known.

There must be an understanding of information of IoT, which forms the foundation of the technology. The information must be large having different layers. Thus, different sensors and types of sensors are very important. This is because the sensors are responsible for data collation in real-time with evidence of perception layer changing rapidly. In addition to this, the sensor should have the capacity to update especially when constant data is being received. Thus, such environment will make people to access information, both virtual and the physical world. Since information formed the foundation of information services which provide a platform for the human support like decision making [17-19].

Secondly, another important aspect of the characteristics is that the foundation of IoT technology remains the internet and after data collation on the internet, the understanding procedure, data and the information must be processed via the combination of IoT with the transmission layer. There must be layers of technology that can deliver the data collected in real time and it must be adequate [20-22]. It is important to understand that the main reason for the development of IoT technology is to be able to achieve global intelligence, this require sophisticated equipment and devices.

Thus, cloud computing issues will be solved effectively and hence allowing information to be shared and exchanged. Users are characterized by different needs; thus, special solution must be developed for the specific problem and visualization which can be done in cloud computing must be achieved. Thus, global smart devices and cross-industry can be achieved via IoT [23]. In addition to this, IoT has a very dynamic architecture especially in business application. It covers the areas of IT industry. Based on business classification IoT is classified into perceptual layer which is responsible for the control, network layer which serve as the transport layer and the application program. Figure 1 shows the process of IoT technology.

Thus, it is fundamental to know that integrating technologies in IoT will cause a shift in the improvement of the human environment. The structure as well as the infrastructures of the IoT has shown that the main aim of IoT is to manage the internet resources for information management that have direct improvement in the resource utilization. However, management of information involve many characteristics among which include unpredictability. This is very important as the world changes in a random manner at all times, the information from the perception layer must be in real-time, thus making the layer to several unforeseen events. Thus, IoT should possess the ability to process important information or data, which are relevant. In addition, managing data operation is of the intelligent goals of the IoT. The intelligent processing gives its level of performance and functions to ensure that the IoT is completed successfully. Another important

characteristic of IoT is that there are various changes recurring in the perception layer indicating its multi-dimensional behavior, thus, the system must possess the ability to respond to such changes [24-26].
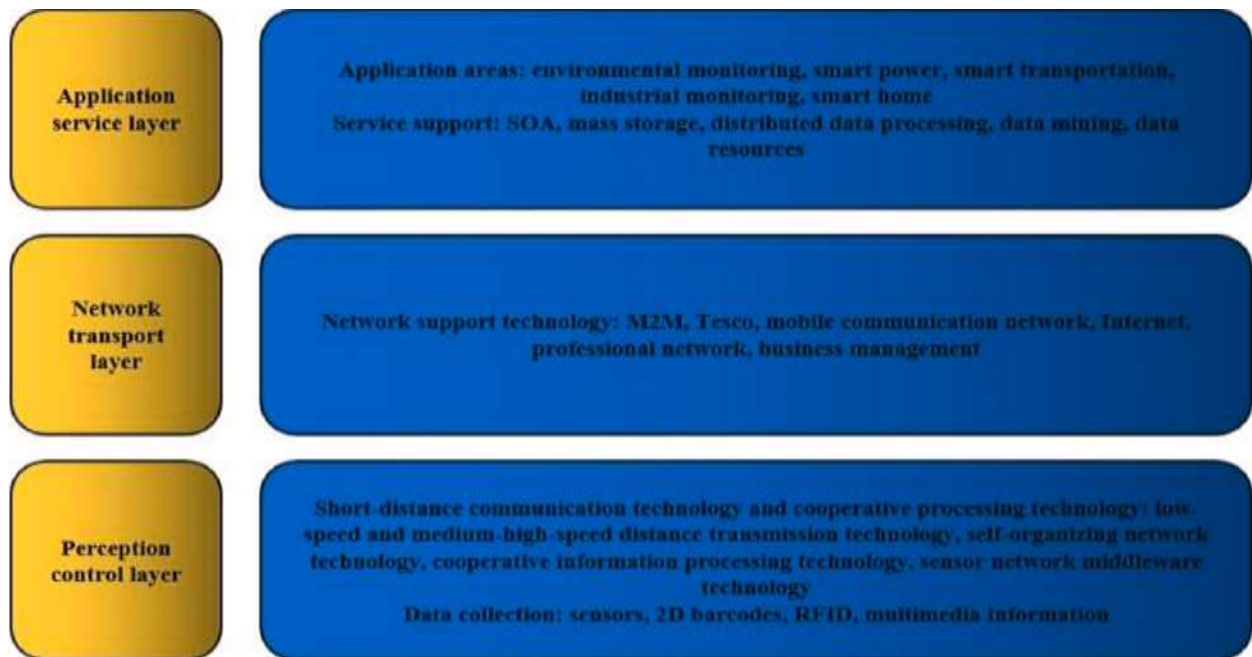

Figure 1: Structure of internet of things [12]

3. WOMEN EMPOWERMENT

Women empowerment is known to be an important factor for a sustainable economic development and this has a potential contribution in education, health and the other sectors in any economy. While several studies have explored the impact of women's empowerment in different fields, there are gaps, which have failed to address the issues with poverty among widows, especially in Southern Nigeria. According to a study by [27] women empowerment is being mitigated by energy poverty and inequality. The study deployed panel regression approach and mediation analysis to assess the effect of women empowerment on outcome of energy via financial and human development.

The outcome of the study showed that women empowerment reduced energy poverty as well as inequality among different income groups. Also, it was observed that women empowerment can be improved in low-income countries and in some regions of sub-Saharan Africa including Asia. In addition to this, the result of mediation analysis shows the role played by financial development as well as human development in linking the relationship between empowerment and energy outcomes. Thus, the study highlighted that critical policies that can promote gender equality, improve financial stress, and provide educational opportunities for women will help in achieving sustainable women empowerment, thus improving sustainable development.

According to a study by Tesafa et al. [28], it was established that Agriculture represents a key factor for improving food security, however, the evidence on gender linkage to agriculture in terms of food security is still very scarce. Thus, the study investigated the efficiency of women's empowerment in agriculture and the efficiency in providing food security for families and individuals. Data were collected cross-sectionally from two-hundred and forty-five (245) women, eighty children (80) and two-hundred and fifty (250) households across the Libokemem district in Ethiopia. The study further deployed a model known as the Stochastic frontier model to evaluate the determinants of the performance as well as the structural equation modelling to be able to determine empowerment efficiency and food security. The findings showed that about 33%, 44%, and 28% of the household, women and children experienced insecurity in food while about 64% had adequate women empowerment, making them to have 65.2% efficiency in the farming of crop. Thus, farmers increased their crop production with 35% based on the input supplied. However, the findings equally revealed that women were not empowered in about two major areas which include decisions regarding voice production as well as heavy workload. This caused a drop in the market level with a disempowerment of 48 and 22% respectively in those two areas. The empowerment of women was observed to have improved diversity in dietary and there was food security for the household, children and women. Thus, the provision of interaction route enabled the enhancement of food diversification as well as adequate market orientation of farms, hence encouraging the outcomes to improve the groups mentioned. The study concluded by establishing that women empowerment in agriculture brought about encouragement in market orientation of farmers. It also helps to improve the food security in households and the individuals. The areas that experienced disempowerment need intervention so as to improve their empowerment in order to boost agricultural production. Figure 2 showed the structural model for the empowerment as observed from the study. Despite the commitment to establish

women empowerment programs, the best method of or measure of comparing the various parameters involved remain an issue. Some studies established that there appeared to be a mix feeling on the actual role of women empowerment on both the women and the children. Especially in the aspect of nutrition and the outcome from health care across different regions of Africa [29]. Vincent et al. [30] suggested that focusing on policies on women empowerment as well as promotion of energy related information using the social networks can improve every household capability. In fact, deploying a qualitative approach and panel involvement to target the urban areas, outskirts, slums will help in exploring the challenges faced with women empowerment, especially in Nigeria.

4. INTEGRATING IOT TECHNOLOGY IN EMPOWERING WIDOWS AND SAFEGUARDING THEIR RIGHTS

When it comes to Nigeria generally, the women are being discriminated in different ways. Although, the tide has started changing with many Nigerians gaining access to education, there is a re-orientation of the women right's protection. However, there is still gap as the existence of discrimination and laws practiced by diverse cultures. In 1999, when democracy was restored, several laws were promulgated so as to improve the right and status of women in the country. For instance, several states in Nigeria have put into laws against domestic violence against women. This was supported by the Federal and State government indication that there is a progression in safeguarding of women right. However, the effectiveness of such laws and policies still remain a major issue [31-33].
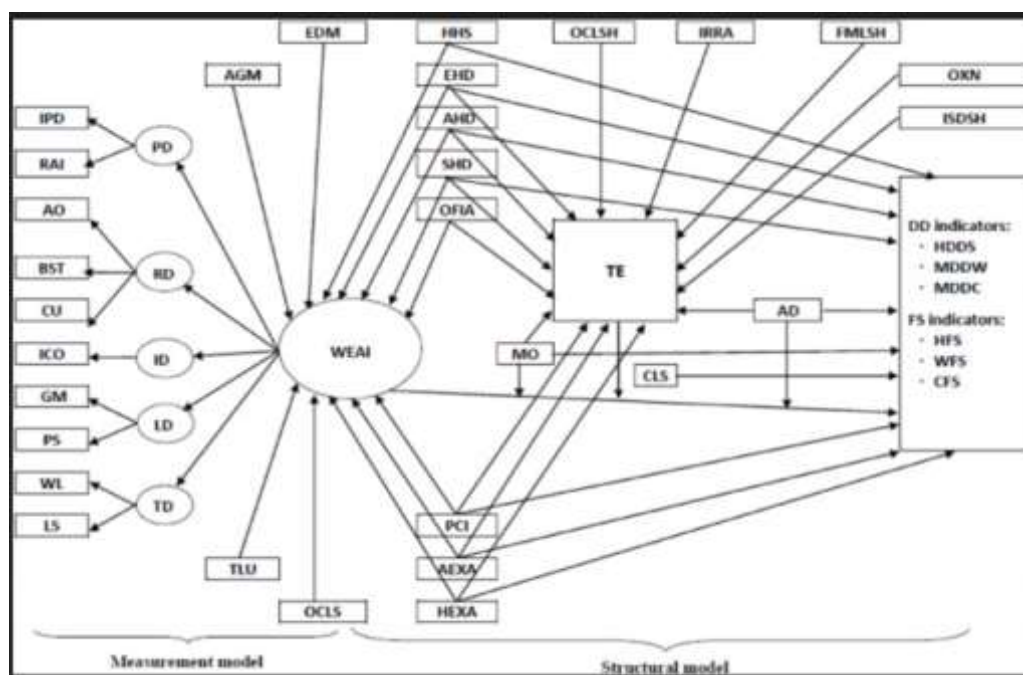

Figure 2: Structural framework showing the analysis of women empowerment [28]

In Nigeria, women suppression has been on the high side and this is traceable more to the religious, cultural as well as socio-economic values. There has been major progress in the political and educational trainings on women, despite this, women in the Southern Nigeria still face challenges that have limited their chances, protections and autonomy. The traditional roles are usually based on patriarchal norms, which give the primary responsibility for the giving of care as well as responsibilities of the women. Men are known to be the breadwinner in the family as well as decision makers, however, the roles have been modified by the cultural values like bride price and male inheritance. This have aided in the male dominating the subordination of the female gender. In fact, in many parts of the country especially the southern part, female genitals are mutilated, widowhood rites persistence. Despite several efforts made to eliminate them, female genital mutilation remains in existence having psychological, physical and social consequences for women and affected girls [34].

Furthermore, increasing the empowerment of women in Nigeria would help in the improvement of their power, increase in economic activities as well as their livelihood. It was established that the United Nation's sustainable goals 5 and 8 emphasised on the renewal of global commitment to the gender equality as well as women empowerment including the economic empowerment of women. But Africa women in general are excluded from financial and economic inclusion of African Women 2020-2030 progress on gender equality and women empowerment [35].

According to a study by Qiu et al. [36], the recent generation of information technologies and their use has brought about several opportunities in the economy. The digital economy represents a major driving force for a sustainable economic development in the world. However, little attention has been paid to the empowerment of women via the integration of IoT technology. Many have refused to recognize the fact that integration of IoT into women empowerment

can cause a sporadic acceleration in the digital transformation of the industry. Thus, empowerment via IoT is a key area for developing new opportunities and growth.

In a study by [37], it was established that empowerment via a computational means for made child interaction very effective. The areas include artificial, machine learning, augmented reality, virtual reality and internet of things. It was suggested that an interesting method of empowering people and most especially widows having psychological problems will have to be absolute participation in IoT training which will make it easy to design approaches for teaching as well as learning recent technologies. Also, there must be education procedures for integrating IoT and societal part of the current technology. In addition to this, digital devices or tools that can be used to engage women with special emphasis on widows for adequate reflection on current technologies must be established.

According to a study by Anand et al. [38], it observed that internet solutions were provided over coastal communities in almost every part of India. The government observed that these communities are subjected to several disasters as a result of the geographic location of which their occupation (fishing) contributes to the disasters around the ocean especially during the occupational voyage. It equally established in the study that a major problem that contributed to this inability to detect the disasters is the unavailability of digital access and communication in the areas where the ocean is deep. Thus, the inadequate access to digital capacity prevented them from exploring the benefits in the ocean. To resolve this problem an IoT integrated based solution having digital economic characteristics was proposed. Thereby, transforming the coastal community to a smart digital region.
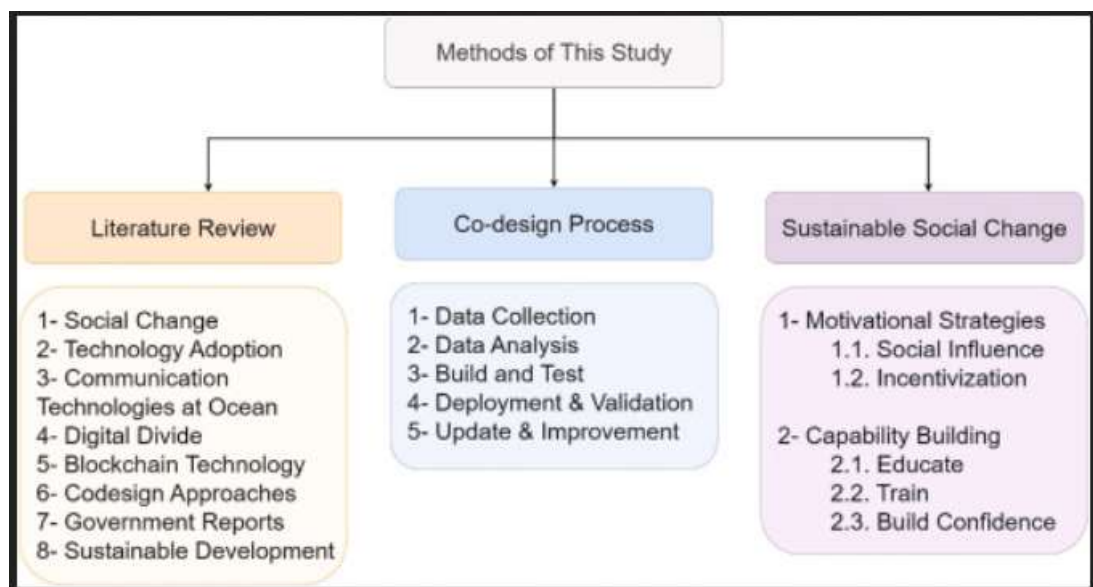

Figure 3: Overview of the method as deployed in the study

Figure 4: Map of the area

A low system known as cost effective deep ocean communication solution, block chain e-commerce system and a social model technology was formed. Furthermore, it was ensured that there was adequate utilisation of the digital system hence, strengthening the resilience of the community to a natural disaster occurrence. The e-commerce platform improved their income and reduced the vulnerability via the provisions of relevant information. Figure 3-5 illustrates the design and methodology employed to attain such IoT solution for the coastal environment, the map of the area studied and the co-design process. Based on the co-design, it was observed that the initial focus of the study was primarily on information gathering from the coastal community and identification of the stakeholders to know their effective participation in every other stage. Thus, the stage was optimised using qualitative, structured, semi-structured involving face to face interview which represent the important tools for the engagement of the community
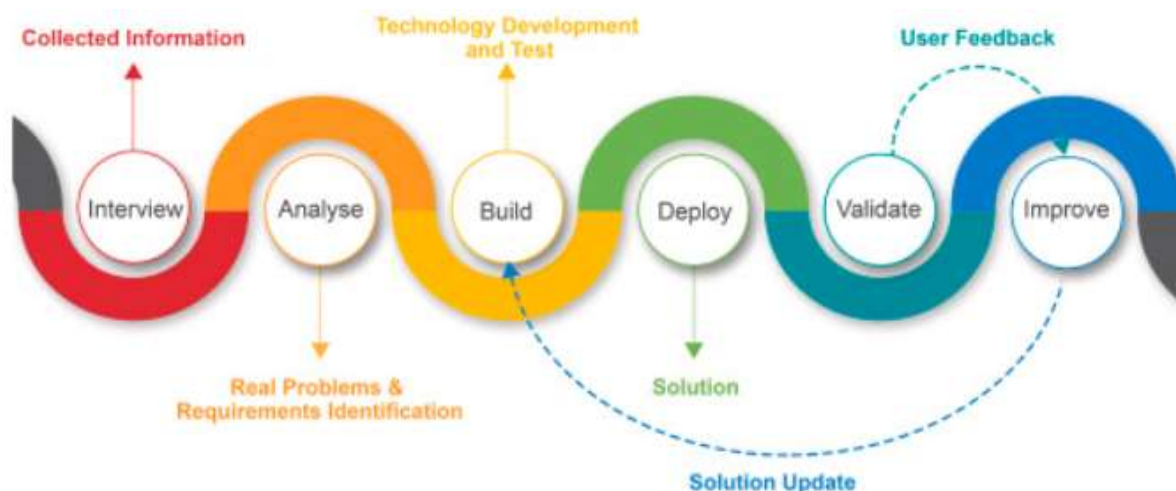

Figure 5: Co-design for a sustainable solution

5. CONCLUSION

A community or people is known to be developed if such individual has access to social, physical, and financial capacity to build resources as well as internet access. From the review, it is important to say that an effective way to provide IoT to widows and safeguard their protection in Southern Nigeria is to first create a foundation for the nature of people and the type of lives they live. Then, it is important to identify them, and probably understand their immediate IoT technology needs. Furthermore, it is important first to educate them on the importance of these systems, provide guidance on the application, and assist them by practical demonstration to establish effective understanding and connectivity. After numerous tests and demonstrations, the solution equipment can now be installed for them in the community and there must be a user adoption stage where proper monitoring is done to ensure that the technology is acceptable. More so, comprehensive training must be ensured to improve the understanding of the widows in the Southern part of the country. This is to ensure adequate social change as well as development in the area of sustainable economy.

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