THE IMPACT OF DIGITALIZATION ON PEOPLE WITH DISABILITIES' INCLUSION IN THE ECONOMY. A CASE STUDY OF NORTHWEST ZONE, NIGERIA.

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Abstract
Nigeria government recognised increase number of PWDs yearly, and they face numerous challenges which include among others lack of equal opportunities and poor access to modern technology, despite their talents and energetic skills that can be tapped in improving the economy. This study investigates the impact of digitalization on PWDs inclusion in the economy precisely in the Northwest zone. In this region, PWDs struggle with employment opportunities, the inability to afford the necessary equipment or assistance for their livelihood. The study employs samples of 120 PWD participants drawn through simple random sampling techniques. The States collected the data include Kano, Katsina and Jigawa States. Binary Logit regression model was used in estimation parameter in the analysis. The results indicate digitalization of the economy has positive impact on the PWDs life. It eases their financial transactions as it does not require much movement, and provides numerous opportunities to work as normal person do. The study found that majority of PWDs especially young and educated persons have shown their willingness to adopt digitalized aids devices such as visualized aids machine, reading aids machine and hearing aids equipment among others. The study recommends government, private organizations, philanthropists, individual and NGO's should embark on the provision of specific digital devices to PWDs at a subsidized rate, and provide expertise to train them on how to adopt them
Keywords: Afford, digital, disabilities, machineries, persons, people,

1. Introduction

The World Health Organization (WHO) (2023)report about 1.3 billion people globally experience substantial disabilities challenges, representing 16% of the world-wide population.The International Labour Organization (ILO) as reported by the Oyesola, (2024)many people with disabilities(PWDs) face challenges of higher unemployment rates, lower earnings and a tendency towards self-employment and world-of-work experience. Disability is a world-wide phenomenon that has no boundary and cuts across countries, sex, age, religion, race, social status, economic and political positions(Haruna, 2017). The author also, defined disabled persons as people who have certain peculiar qualities that are usually inborn. It is estimated that there are

more than 2 billion physically challenged people globally and majority are from developing countries (Haruna, 2017).

The United Nations (2019), reports that over 80 million Africans have disabilities, including mental health conditions, birth defects, and other physical impairments.In Nigeria, it was estimated that there are 35 million PWDs(Abdullahi, 2023). Apart from contracted diseases such as meningitis, tuberculosis, smallpox, polio. Also, recurrent and fatal road accidents that lead to stroke, paralysis, and mental illness as well as the continuous chronic diseases that include blindness, stroke, cardiovascular diseases, hypertension, diabetes and cancer are the major factors that lead to disability. PWDs face barriers at the basic level of obtaining and using appropriate equipment, such as standard computers and smartphones among other digital equipment(Scanlan, 2021).It is obvious that, by comparison with normal persons, PWDs live in extreme poverty, poor health and educational achievement as well as lesser legal protection. This situation mostly affects vulnerable and marginalized people(Haruna, 2017).The disability movement is a global trend as it is a critical stakeholder in both development and human rights processes. Nowadays, there is a well-known awareness of the fences faced by PWDs across regions. Permitting such kind of barrier may become a blockage to slogan of “Leaving no one behind” of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs) (Global Disability Inclusion, 2025).

Digitalisation is an advanced technologythatimproves human economic transaction effectively and efficiently. This made it to be playing diverse roles in numerous fields(Datti, 2025). In fact, the digital revolution includes the application of communication and information technologies and large-scale proliferation. The digital economy is contingent on the digital industrialisation, digital governance and availability of infrastructure through technological transformation(Han & Liu, 2022). The digital economy provides an essential function in nurturing high-quality in economic development, and achieves sustainable development (Su, Su, & Wang, 2021).Thus, digitalisation is instrumental to economic growth(Adeleye, N., & Eboagu, 2019). Technologies posture great potential for aiding the quality of life of PWDs (Makkonen & Inkinen, 2024). Moreover, according to International Telecommunication Union (ITU), (2022)for a technology to be successful it should be human-centred. Consequently, the digitalization of processes, products, and services must be carefully planned and implemented to address the needs of all persons, regardless of age, gender, ability, or location.

Inclusion is a fundamental human right which means ensuring that all individuals, regardless of their background,circumstances or abilities, are recognized, respected

and afforded equitable access to resources and opportunities(Global Disability Inclusion, 2025), as such, even though, digital inclusion was previously regarded as an accessing information and communication technologies (ICTs) through internet regardless of the human nature or status. Though, the 17 UN Sustainable Development Goals (SDGs) do not regard digital inclusion directly in their document. However, they promote inclusion directly means marginalized persons and communities while also championing for ICT to be an enabler of the SDGs(UNU-EGOV., 2019). The National Digital Inclusion Alliance (NDIA, 2022) emphasizes that digital inclusion should have activities necessary to ensure all persons and communities including the most disadvantaged have access to and use of ICTs(Nyamweya, Muchelule, & Mwalili, 2024). Overtime, the fundamental question is on the equity in participation and accessibility of the digital apparatus. This means finding the ways in which people with learning disabilities engage in digital spaces and places, how they interact with ICT and how ICT is involved and embedded, or not, in their everyday lives. Despite PWDsincessant population precisely in low- and middle-income countries, their untapped and low utilisation of human resources potentials leads to a loss of up to 7 per cent of gross domestic product (GDP) worldwide.Even though, the recent technological digital economy has provided a great chance of creating job opportunities, easing accessibilities and other human activities. However, the digital revolution comes up with a digital divide which is worsening current inequalities. For instance, technological innovation particularly with the expansion of artificial intelligence (AI) is presently replacing critical human interaction and automation. This affects PWDs' employment, accessibility, privacy and safety, and issues of bias (Global Disability Inclusion, 2025). Malik, Elbatal, and Khan, (2024) emphasize that technology can overcome barriers and enable people, especially those with disabilities, to achieve a better socio-economic lifestyle by supporting access to information, knowledge, and technology, which are basic rights of citizens. Technological access facilitates better integration into the community through support for learning and communication within educational, personal, and administrative environments. Modern applications such as mobile, internet, software, apps, beneficial websites, and social apps have revolutionized education, healthcare, and the professional world, creating digital spaces of accessibility and inclusion.

Although, Nigerian government embarked on different strategies and programme to empower PWDs. It has recognised that PWDs faces real-life challenges and adverse socio-economic outcomes such as lower levels of employment, less education, higher poverty rates and poorer health outcomes in PWDs act 2018 which mandated public organisations in Nigeria must reserve 5% of job positions for PWDs to improve their employability, productivity and welfare.Yet, many PWDs lack of equal opportunities and poor access to modern technology, and more than 8 in 10 of the PWDs cannot

afford to get medical glasses and at least 9 in 10 of the PWDs cannot afford a hearing aid and walking or climbing equipment assistance, respectively (Africa Polling Institute (API), 2022). Further, their number keeps increasing yearly, and the challenges face are well-known and increasing despite their talents and energetic skills that can be tapped and utilized in improving the economy since there are many resourceful and able persons that can be fitted in any given industry.

The North West geopolitical zone confronts notable challenges and disparities, especially among persons with disabilities (PWDs), predominantly in rural areas where high poverty levels and limited access to essential services like healthcare, education, and employment are prevalent. PWDs in this region struggle with employment opportunities, with more than 33% unable to secure jobs. Additionally, 62% lack access to reliable transportation and proper road signage, while 97% cannot afford the necessary equipment or assistance for walking or climbing (API, 2022). These challenges often result in many PWDs begging on the streets or remaining with their families, without significant improvements in their lives, which can adversely impact society and the nation. This paper aims to explore the impact of digitalisation on the PWDs inclusion in the economy.

2. Literature Review

A study conducted by Moyo (2024)reviewed adequate laws and regulations, recognised challenges to ICT availability and utilisation, and suggested targeted supports to ensure digital inclusivity for the handicap sector in South Africa. Moyo categorized these barriers into several types: infrastructural, financial, technological, socio-cultural, educational, implementation, and enforcement barriers. Okon (2018)conducted a study on the path to inclusive growth with or without PWDs in Nigeria. According to the study, since inclusive growth is the growth that generates employment chances and decreases the rate of poverty. However, PWDs in many instances deprived job opportunities in Nigeria. The paper argues that Nigeria cannot have inclusive growth without PWDs is made an essential part of country's economic growth.World Bank Group (2020)examined a rapid assessment of Nigeria's PWDs inclusion. The study gathered a mapping of services, desk review of published and old literature, and an online questionnaire-based assessment and used key informant interviews and focus group discussions. The findings indicate the inadequate access to basic services by PWDs in Nigeria, and deeply entrenched and wide spread attitudinal socioeconomic status barriers across the country.

Iliya and Ononiwu (2021)examines the use of mobile phones in the daily activities of PWDs in sub-Saharan Africa. Data was collected through interviews and focus group sessions from the participants. A purposeful sampling technique was adopted and samples of Twenty-four interviews and two sets of focus group sessions were conducted. The study adopts Thapa and Omland's (2018) critical realism-based methodology. The study contends that mobile phone use empowerseconomic facilities, political freedom,enable social opportunities, transparency guarantees and protective security to PWDs in Nigeria. Makkonen and Inkinen (2024)investigate how the smart city development improved PWDs. The study demands technological answers that can address the various dimensions of discrimination to improve the inclusion of PWDs. The study acknowledged that technologies stance great potential for helping the quality of life of PWDs. Nevertheless, a more profound technological policy changes are needed. Haruna (2017)examines the challenges of PWDs in Nigeria. The study source data from the library, internet and the personal collections. The study indicates that PWDs face numerous hurdles and discrimination by the government and other members of the society. The study argued that the absence of effective laws and promotion of PWDs rights creel proper and suitable funding of disabled organizations.

Efayena & Ichoku (2024)examines the employment discrimination among PWD in Nigeria. The study employs logistic models. Data for the analysis was extracted from the fourth wave of the General Household Survey.The results indicates that there is a significant employment gaps associated with disabilities. The discrimination exists due tohuge factor in the employment gap which is functional difficulties. Kolotouchkina, Llorente, Luis, & Manfredi, (2022) provides a full explanation on the emergent best practices in the field of PWDs inclusive in digital governance of the four worldwide cities. The study concludes that as technology endures to be a substantialfence to gaining access to the digital city for many PWDs. To address this challenge, PWDs should be included at the heart of smart initiatives, and principles of equity through the standardization of digital access, nurturing digital inclusion and developing shared, multi-faceted stakeholder commitment, and transmuting regulatory urban performance, can aid transform cities into places that are more caring, livable, and inspirational.
Nyamweya et al. (2024)examine the effect of digital inclusion practices on technology accessibility performance for PWDin tertiary institutions in Nairobi. Both secondary and primary data were used. The study employs 100 participants of samples drawn throughpurposive sampling technique and collectedmultiple regressions and descriptive statistics tools such as measures of central tendency, and measures of variability were in analysing the data. The study found that efforts in ensuring equal access to digital technologies and services for PWDs are springy positive results.

Otsupius (2024) analyzes on enhancing inclusive digital-enabled literacy for physically challenging special needs in children's education, Edo State, Nigeria. The study is a participatory which utilized 200 copies of the questionnaire were administered to the respondents at their different centers and locations. The findings from this research demonstrate that digital technologies allow physically challenged children a platform to increase their confidence, express themselves and communicate with others and that digital storytelling platforms give them a method of expressing their opinions. (Zhu & Wang, 2021)

Wang'ang, 2024 explores the multifaceted challenges PWDs face in accessing ICT in Africa, and poverty, education, infrastructure, and policy. It investigates the financial constraints that make assistive technologies and Internet services unaffordable. The study indicatesthat Africa requires comprehensive, inclusive policy measures that target their unique challenges.It is disturbing to continue observing increase number of PWDs who are becoming dependents on the normal persons' income and feeding just because of their respective deformity challenges.

3. Methodology

The data of this study was collected from questionnaires administered to the participants around March- July, 2025. Also, Focus Group Discussion was employed to tap more information from the participants and their associations leaders as well as the community leaders. The participants include visual impairments, hearing impairments, physical impairments and sickle cell impairments. The study employs samples of 120 PWDs participants drawn through simple random sampling techniques. The States collected the data include Kano, Katsina and Jigawa States. Binary Logit regression model was used in estimation parameter in the analysis. Thelogistic regression is a powerful tool in analysis, particularly in epidemiologic studies due to its permission of multiple explanatory variables to be analysedsimultaneously. Logit distribution obliges the estimated probabilities to lie between 0 and 1(El-Habil, 2012). It is also, measures the relationship categorical dependent variable and one or more independent variables that are usually incessant by estimation probabilities. Thus, the multinomial logistic model was stated as follows:

$$\log Y_{ij} = \beta 0+\beta_1 X_1+ \beta_2 X_2 +\beta_3 X_3 + \beta_4 X_4 +\beta_5 X_5 + X_{6+} \varepsilon$$

$\log Y_{ij}$ = digitalisationimpact PWDs or NOT impactingPWDs which is dependent variable

$X_{1=}$ Computer usage, X_2 = Internet usage$X_{3=}$ Online banking, X_4 =Digitalized educational materialsaids, X_5 = Digitalized hearing and visualized equipment aids, X_6 =Digitalized assistance for walking or climbing

4. Results and Discussion

The results consist of two parts. Part one discusses the descriptive nature of the participants, and part two presents the results of the repression.

4.1 Descriptive statistics

Table 1 indicates the descriptive statistics of the respondents. The majority of the responses were from the category of PWDs'youth age (18-35). This is connected to the location of the data collection as well as their association participation in collecting information. Also, over 90% of the respondents are literate, able to write and read in either a secular or Arabic form. The surprising thing is some have postgraduate certificates (8%). Usually, the respondents are receiving financial support from their parents (33%), self (34%), relatives (11%) and some are sponsored of their friends (13%). Moreover, the participation of PWDs in community development is less as only 27% engage in community development. This is connected to their physical challenges, inadequacy of supportive devices, as well as societal failure to recognize their potential. The majority of the responses come from physical impairment (35%)followed by the sickle impairment (30%). This shows that they are the majority in the classification of PWDs. This may be connected to the location of the data collection. Majority of the responses are willing to adopt any new digital devices that can aids and address their challenges. However, major challenges are lack of opportunity to access the digital devices due to high prices.

Table1: Socio Demographic Profile of PWDs

Variable	Frequency	Percentage (%)
Age		
18-35	48	40
36- 53	34	26
54-71	27	23
72 and above	11	9
TOTAL	120	100
Gender		
Male	88	73
Female	32	27
TOTAL	120	100
Educational attainment		
Madrasa	13	11
Primary	38	32
Secondary	29	24
Diploma/ NCE	12	10
Degree /HND/	18	15
Masters	08	07
PhD	02	01
TOTAL	120	100
Types of support		

Parent	39	33
Relatives	13	11
Friend	16	13
Self	41	34
Others	11	09
TOTAL	120	100
Association membership		
Registered	89	74
TOTAL	31	26
Not registered	120	100
Community development participatory		
Partcipate	32	27
No participation	88	73
TOTAL	120	100
Category of People with Disabilities		
Visual impairments	22	18
Hearing impairments	13	11
Physical impairments	42	35
Sickle cell impairments.	36	30
More than one impairment challenges	07	06
TOTAL	120	100

Source: Author's Computation 2025

4.2 Binary Logit Regression and Marginal Effect Results

The results presented were firstly tested for multicollinearity. It is established that multicollinearity is not an issue in this study since the Variance Inflation Factor (VIF) results were all below five values (Daoud, 2018; Kim, 2019) as indicates in Table 2. This proved absent of high correlation among independent variables, thus, coefficient was not inflated at all.

Table 2: Multicollinearity test for Impact of Digitalization on People with Disabilities' Inclusion in Economy

Variables	VIF	1/VIF
Age	1.18	0.84
Educational attainment	1.26	0.79
Gender	1.05	0.95
Computer usage	1.30	0.77
Internet usage	1.13	0.88
Online banking activities	1.70	0.59
Digitalized educational materials aids	1.89	0.53
Digitalized hearing and visualized equipment aids	2.01	0.50
Digitalized assistance for walking or climbing	1.55	0.65
Mean VIF	1.61	

Source: Author's Computation 2025

The Logit regression result was presented in Table 3. The Digitalization is a dependent variable and the explanatory variables that include both demographic and Internet usage, on-line banking activities, digitalized educational materials aids,

digitalized hearing and visualized equipment aids and digitalized assistance for walking or climbing were estimated. The demographic factor was estimated in the first model. Other variables were estimated in the second model. The columns under each model shows both the coefficient variables, the standard error coefficient (in the bracket), and the astray indicate the level of significance of P-value. While the marginal effect (ME) column indicates both the changes, the coefficient, and the astray level of significance of P-value.

The demographic factors (model I)indicate that an increase of PWDs' age within the labour force may likely increase his chances of ability to utilize digitalized devices by 4%. Also, a percentage increase in the level of education of PWDs may likely increase his potential to use digitalized devicesby 3%. This was attributed to an educated PWDs is more familiar and understands of the digitalized devices. Also, percentage increase computer usage may likely increase digitalisationby 4%. Though, it depends on the category of disability needs of a person. Majority of educated visualized and physical impairments are willing to adopt digitalisation in for easing their activities. This is connected to the enjoyment and benefits of internet and online banking activities in accessing information and financial transactions respectively. Also, a percentage increase in digitalisation may likely influences adoption of educational materialsaids by PWDs with almost 3%. Moreover, a percentage increase in digitalisation will leads to an increase in hearing and visualized equipment aids and assistance for walking or climbing of PWDs by 5% and another 5% respectively. This is connected to the easing and impacts of the digitalized devices in aiding PWDs to act and perform actively like normal persons.

Table 3: Binary Logit Regression and Marginal Effect Results

Variable	Model I	ME	Model II	ME
Age	0.045*	0.007*	0.005	0.002
	(0.022)	(0.002)	(0.002)	(0.011)
Educational attainment	0.031**	0.005**	0.033	0.004
	(0.013)	(0.004)	(0.091)	(0.002) **
Computer usage	0.042*	0.003*		
	(0.026)	(0.001)		
Internet usage	0.040	0.089***		
	(0.033)	(0.031)		
Online banking activities			0.092**	0.005**
			(0.034)	(0.003)
Digitalized educational materialsaids			0.026***	0.003
			(0.012)	(0.001)
Digitalized hearing and visualized equipment aids			0.480***	0.279***
			(0.220	(0.074)

Digitalized assistance for walking or climbing		0.053*** (0.014	0.480*** (0.220)
Loglikelihood	-191.91	131.95	
Prob. Chi^{i2}	0.001	0.000	
Pseudo R^2	0.087	0.090	

ME – Marginal Effects Significance levels * p < 0.1, ** p < 0.05, *** p < 0.01, Standard errors in parentheses
Source: Author's Computation 2025

5 Conclusions and Recommendations

5.1 Conclusion

Nigerian government aims at PWDs' inclusion. However, people with learning disabilities many instances deprived of chances to contribute their quota in an economy due to poor access to digital devices and insufficient information on digital adoption. This study examines the impact of digitalization on the PWDs inclusion in the Nigeria's economy. The study found that adoption of digitalized devices has significant impact on PWDs. However, major challenges are lack of opportunity to access the digital devices due to high prices. As such, this paper argues that Nigeria cannot have inclusive growth without making PWDs access to digital devices as itis an essential part of country's economic growth.

5.2 Recommendation

The study recommends the following:

1. That philanthropists, individuals, government, and NGOs should embark on the provision of specific digital devices to PWDs at a subsidized rate.
2. Experts should be hired in order to train the PWD's on how to adopt them. This will help to curb their number on the roads begging, and it will help in exploring and tapping their potentials in the national development.

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