IS WOMEN'S LABOUR FORCE PARTICIPATION POTENTIALLY ENHANCED BY DIGITAL FINANCIAL INCLUSION? EVIDENCE FROM AFRICA

Benedict Azu[1], Ph.D, Adjeke Taiwo Queen[2] and Agbobu Shedrack Onyeka[3]

[1,3]Department of Economics, University of Delta, Agbor.

[2]Department of Education Management and Foundations, Delta State University, Abraka.

+2348037847512, +23408033800208

benedict.azu@unidel.edu.ng &
shedrack.agbobu@unidel.edu.ng

Abstract

This research delves into the correlation between women's labour force participation and digital financial inclusion, while also elucidating the obstacles that impede women's access to digital finance. Our database is derived from the Global Findex database, 2021 edition, and we have mobilised a microeconomic database covering 14,281 African women. based on polls conducted in 29 African nations that are nationally representative. The empirical findings are analysed using the Probit model estimate methodology. According to our research, women's engagement in the labour market is favourably correlated with financial inclusion through digital channels more so than through traditional ones. It was discovered that formal financial services channels had a major and advantageous effect on women's labour market involvement. According to our research, women encounter a number of barriers when attempting to obtain financial services via digital and traditional channels. Non-voluntary impediments in the conventional financial inclusion channels are among these barriers. Nonetheless, these obstacles become less severe as a woman's income rises. Women frequently encounter particular challenges when it comes to digital financial inclusion, including the high cost of mobile financial services, a lack of funds, and restricted access to cellphones. By examining the effect of digital financial inclusion on women's labour force participation in African nations and identifying obstacles to women's digital financial inclusion based on individual-level data, the study adds to the body of existing work. It recommends that in order to boost women's engagement in the labour market, African governments should increase financial inclusion for women through digital channels.

Keywords: Women, Labour Force Participation, Digital Financial Inclusion, Africa

1. Introduction

Gender inequality is well acknowledged to have deep roots everywhere in the world. Women encounter more obstacles when trying to obtain higher education, get better job chances, and hold prominent positions of authority in their organisations and possessing less financial clout than men Ibourk & Elouaourti, (2023) Globally, there is a growing chorus of women demanding gender equality and staging protests in support of it. The fifth Sustainable Development Goal (SDG) is

gender equality and the empowerment of all women; it cannot be achieved until all barriers based on gender, including societal,

legal, and economic ones, are eliminated. Gender inequality is now a priority for global development policies.

While certain regions, such as Scandinavia and the Nordic countries, have made significant strides towards gender equality and women's opportunities, other regions, such as parts of Asia, the Middle East, and Africa, still severely discriminate against women and provide significant barriers to their success. Schulstol & wikstrand (2020). When it comes to employment and formal sector employment abroad, women are less likely than men to be employed. The difference is more pronounced in low- and middle-income countries. According to projections from the International Labour Organisation (ILO), there was a 25% global gender gap in labour force participation in 2022, with men making up 72% of the work force and women 47%. The difference is far larger in some regions, such as the Arab States, South Asia, and Africa, where it occasionally approaches 50%. Women also often earn less for doing the same work as men and are underrepresented in leadership positions. Another ILO survey indicates that women are more likely than men to work in low-paying or precarious occupations, like temporary or part-time positions. In 2022, the income gap between men and women will be 20%. As per the World Economic Forum's Global Gender Gap Report (2021), there is a notable gender disparity in economic participation and opportunities around the globe, and women are disproportionately underrepresented in leadership roles, accounting for only 27% of managerial jobs.

The COVID-19 pandemic has disproportionately impacted women, particularly in terms of their participation in the job market. Many women have been forced to leave the workforce in order to care for their children or other family members as a result of school closures and other disturbances. In addition, women are more likely to work in industries that have been badly hit by the pandemic, such as retail and hospitality. Because of this, women have lost a great deal of their jobs, and it's expected that they will take longer than men to return to the workforce. According to Thompson (2022) Gender parity will take longer to achieve than expected. The analysis predicts that because of the COVID-19 pandemic's lingering effects, the window of opportunity for closing the gender gap has been extended by a whole generation, from 99.5 years to 135.6 years.

The economies and rates of education in most African countries have improved significantly in the last ten years. However, this improvement has not kept up with women's active participation in the economy. The lowest participation rates in the globe are still declining dramatically. Moreover, women work in more low-paying and unstable professions, and they suffered disproportionately from unemployment and job stagnation during the COVID-19 pandemic. Due to health risks, rising unemployment, falling wages, and difficult working conditions, working women have been disproportionately impacted by this issue Neetha (2021). The COVID-19 crisis had a severe impact on women from the vulnerable segment of society, according to research by Casale & Posel (2021), who used survey data from 7074 South African adults aged 18 and older to analyse the initial effects of the crisis and the COVID-19 lockdown on the country's female and male workers in the paid and unpaid economy. Due to school closures, women employees lost two thirds of their net jobs and assumed greater responsibility for childcare.

African women are demanding gender balance in the labour since they are the most suffering. Apart from giving unpaid care to their kids, aged parents, and sick family members, women could decide to work outside the home for compensation or might be forced to. Numerous factors could influence their involvement in the work market. Rodriguez & Corona (2019). There are two primary differences that stand out: factors that are medium- and short-term (family structure, prospective earnings for women, and the social and occupational standing of the husbands) as well as long-term (education, fertility, culture, and gender norms). Within this backdrop, there exists a comparatively unexplored field of study that delves into the influence of financial inclusion, particularly digital financial inclusion, on women's labour force participation rates.

Beyond the relationship between finance and economic growth, financial inclusion has created a new field of study on the role of finance in reducing poverty and inequality. It also helps to empower individuals by enhancing their capabilities and giving them access to reasonably priced, needs-based financial services. The goal of financial inclusion is to draw women and other underprivileged groups into the established financial system Ajide, (2021). Women's financial inclusion is the concept of giving more women access to financial resources and services in order to support their economic empowerment and growth. Increasing access to credit and other financial services is one of the most important tactics for fostering female financial inclusion. Ezzahid & Elouaorti (2021), providing financial education and training for women, and addressing cultural and social barriers that may prevent women from participating fully in the economy Ahmad, (2011). Financial inclusion can enable women to participate in the economy by giving them the means to accumulate wealth, generate income, manage financial risks, and engage in economic activities (International Labour Organisation, ILO 2017).

Recent research indicates that women's empowerment can rise with digital financial inclusion. It significantly affects the likelihood of entrepreneurship for low-income, vulnerable women who live in communities with persistently high levels of gender inequality and lack financial autonomy Yang, (2022). The results of a study conducted by Morsy (2020) made the claim that women are more likely to be excluded from the financial sector using data from the World Bank's Global Findex for 141 different countries. It is hardly unexpected that women in Africa have restricted access to formal financial services given the gender disparities that permeate practically every industry Ajide (2021). The COVID-19 crisis revolutionised the use and accessibility of financial services, in contrast to other industries. In developing economies, only 42% of persons had a bank account in 2021, but now 71% do. This is according to the Global Findex poll. 78% of males and 74% of women worldwide have an account. Still, there is a strong correlation between gender and the use of financial services. Gender disparities in financial service use were found to be substantial in a study titled Financial Inclusion and Legal Discrimination against Women: Evidence from Developing Countries. The study's data came from individual Global Findex records from 98 developing nations (Demirguc-Kunt, 2013)

Despite the significance of women's digital financial inclusion, there is still a dearth of research on the connection between women's engagement in the labour force and digital

financial inclusion. In this paper, we first examine the effect of digital financial inclusion on women's labour force participation in African nations, which contributes to our knowledge of the relationship between financial inclusion and women's economic engagement. The second is the identification of obstacles that keep women from having a financial voice on par with males.

This paper contributes to the body of literature in two ways. Initially, it advances our understanding by examining the correlation between financial inclusion and women's involvement in the labour market in African nations that have the lowest global participation rates. Second, using a sizable individual-level database, it is the first study in the literature to pinpoint obstacles to women's digital financial inclusion.

Essentially, our research will direct African policymakers and international organisations that aim to improve women's labour market participation via digital financial inclusion while also pinpointing major obstacles that prevent African women from achieving digital financial inclusion. From a research perspective, our study closes a gap in the literature by investigating the barriers to women's digital financial inclusion for the first time. Most previous studies have focused only on financial inclusion through traditional channels.

2. Literature Review

As women make up half of the population, they play a big role in any nation's economic development and have a big impact on the economy as a whole. Falling female participation rates are a reflection of the inadequate inclusion of women brought on by their low level of labour market integration. The paradox surrounding the drop in women's labour force participation Desai & Joshi (2019), Several works have provided an explanation, even throughout the period of economic expansion. As nations grow, the percentage of women in the labour force drops at first and then rises, forming a U. The transfer of household production from the family farm and small company and sharing their productivity between household items and childcare to the bigger market is the primary cause of the first fall in women's labour force involvement in low-income nations. As society moves towards industrialization, more chances for employment that are friendly to women are opening up. A recent investigation Altuzarra, (2019) was carried out in 28 nations within the European Union to look into the possibility of a connection between women's engagement in the labour market and economic growth between 1990 and 2016. The World Bank and Eurostat provided the data. There was use of both dynamic (generalised moments model) and static (fixed effects) models. The findings for every European nation supported the theory that the participation of women in the labour force and economic development follow a U-shaped pattern.

The choice to join the workforce is influenced by a number of factors pertaining to women's traits and the institutional, social, and economic environments in each nation. Education is usually one of these drivers, and increases in educational attainment have a beneficial impact on women's labour market participation. A decline in fertility has the same result. The discouraged worker effect arises from high unemployment rates and life expectancy. Enacting laws that address women's issues and give them more access to childcare, extended maternity leave, and increased organisational flexibility can all help

women into the workforce. Tansel & Ozerkek, (2013). According to certain recent studies, finances seem to be yet another significant factor influencing women's engagement in the labour force.

Reducing economic inequality can be greatly aided by financial inclusion, which is the availability and use of financial products and services. This is due to the fact that financial inclusion makes it possible for people to have access to credit, savings accounts, insurance, and other financial services that can aid in money management, future investment, and wealth accumulation. Gender inequality may decrease if more people, especially women, have access to these services. As well as the disparity between the wealthy and the poor, and encourage more economic equality Burgess & Pande, (2005). A number of beneficial effects, including enhanced economic growth, encouraged economic development, decreased poverty and income disparity, and better living conditions for women and their families, can result from raising the financial inclusion of women. Yeyouomo & Asongu, (2022). Using a study, the authors Cabeza- Garcia, (2019) used data from the Global Findex (2015) database and the World Bank to examine 91 nations, comprising both developed and developing nations. The analysis's findings indicated that women's financial inclusion and economic development are positively correlated. In particular, the study discovered that increased access to credit cards and bank accounts for women has a favourable impact on economic growth. This implies that encouraging women's financial inclusion may be a useful strategy for accelerating economic development and growth.

Additionally, social and physical welfare might benefit from financial inclusion. A recent study looked into the relationship between financial inclusion and poverty as well as Ghanaian households' susceptibility to poverty. Koomson , (2020) The Ghana Living Standards Survey's seventh round, conducted in 2016–17, provided the data used in this study, which indicated that financial inclusion reduces household poverty. First, there is a 27% reduction in the probability of impoverished households associated with it. Secondly, it lowers household exposure to future poverty by 28%. According to the study, when female-headed families have access to financial services and are integrated into the financial system, they have a better chance of seeing a higher decrease in poverty and their susceptibility to it than do male-headed households. This is probably due to the fact that, in many countries, women face more obstacles when trying to use financial services and have less control over their financial resources. As a result, when they are given the chance to do so, the benefits to their economic prosperity can be larger. Furthermore, studies have demonstrated that women who are in charge of their finances are more inclined to make investments in their communities and families, which results in a more equitable distribution of resources and a decline in poverty.

Furthermore, women's empowerment and increased employment engagement can result in greater gender equality and improved economic results for families and communities when financial inclusion is implemented. Asongu & Odhiambo (2018) employed data from the World Bank and International Labour Organisation (World Development Indicators, Financial Development and Structure Database (FDSD), World

Governance Indicators) to perform study on 48 African nations between 2004 and 2014. The study's findings highlight the significance of financial inclusion in fostering and advancing women's involvement in the formal economy and labour market. Information and communication technology (ICT) is most crucial in limiting women's access to financial services. Similarly, a study by Ajide (2021) analyses the connection between women's engagement in the labour market and financial inclusion in twelve African nations between 2005 and 2016. utilising generalised least-squares estimators, random effects, and fixed effects on information gathered from the IMF International Financial Statistics and the World Bank Development Database. The author's findings demonstrate that increasing financial inclusion up to a particular point would increase women's involvement in economic activity in Africa.

In an investigation on the effects of care requirements, financial inclusion, and social capital on women's labour market participation, Lopez Rodriguez & Corona (2019) Probit model was used to estimate data from Mexican surveys at the individual and municipal levels. They discovered that women are more likely to work when they are included financially. Hendriks (2019) determined that improving women's economic empowerment and gender equality depends in large part on financial inclusion. Women's living conditions and the ability of their families to escape poverty can both be improved by promoting their access to and usage of digital financial services. A study employing the difference-in-difference method investigates the impact of microfinance on Pakistani rural women entrepreneurs. The study's findings demonstrate that when women borrowers' incomes and consumption rise and they achieve financial stability, new opportunities arise for the whole society Khan, (2020).

All things considered, encouraging digital financial inclusion may help women's economic prospects and advance gender equality in the workforce. It is a significant step in the direction of advancing economic growth and enhancing the welfare of people as individuals, families, and communities.

3.1. Methodology

Our database, which includes 14,281 African women, is taken from the World Bank Global FINDEX database 2021 edition. Information regarding the utilisation of digital financial services and personal traits can be found in the 2021 version.

3.2. Empirical Model

We mobilise an econometric specification based on binary models of logit type to study the relationship between financial inclusion and women's labour market involvement in African nations as well as the obstacles that stand in the way of women's digital financial inclusion. The following is the empirical specification of our models using microeconomic data:

$$wwft_t = \beta_1 + \beta_2\, dfi_t + \beta_3 age_t + \beta_4\, age^1{}_t\, \beta_5 y_t + \beta_6\, edu_t + \beta_7\, lc_t + \boldsymbol{\mu}_t \text{ ----------1}$$

$$bdfi_t = \beta_1 + \beta_2 age_t + \beta_3\, age^1{}_t\, \beta_4 y_t + \beta_5\, edu_t + \beta_6\, lc_t + \boldsymbol{\mu}_t \text{ ----------2}$$

where;

wwft = women’s workfore

dfi = digital function inclusion

y = income

edu = education

lc = location

bdfi = barriers to digital function inclusion

3.3. Variables

We use two models: the first uses variables on digital financial inclusion and individual characteristics to control the model, and its dependent variable measures women's engagement in the labour force. This model aims to investigate how women's engagement in the labour market is affected by their digital financial inclusion.

Table 1. Descriptive statistics.

Variables	N	Mean
Dependant variable		
Women's participation in the labor market	14,281	0.636
Individuals characteristics		
Age[1]	14,281	34.40
Education		
Completed primary or less	14,079	0.487
Secondary	14,079	0.460
Completed tertiary or more	14,079	0.0535
Income level		
Poorest	14,281	0.188
Second2	14,281	0.178
Middle2	14,281	0.196
Fourth2	14,281	0.206
Richest	14,281	0.232
Location (urban = 1)	12,322	0.475
Digital financial inclusion access dimension		
Account at a financial institution	14,281	0.335
Account at a mobile banking	14,732	0.343
Barriers to financial inclusion	10,397	0.271
If does not have account: b/c too far away	9915	0.329
If does not have account: b/c too expensive	10,367	0.343
If does not have account: b/c lack documentation	10,272	0.201
If does not have account: b/c lack trust	10,406	0.0861
If does not have account: b/c religious reasons	10,515	0.791
If does not have account: b/c lack of money	10,301	0.147
If does not have account: b/c family member already has one	10,340	0.239
If does not have account: b/c no need for financial services	10,397	0.271
Barriers to digital financial inclusion		
Reason for not have a mobile money account: too far	7083	0.276
Reason for not have a mobile money account: too expensive	6845	0.297
Reason for not have a mobile money account: lack of documentation	7124	0.334
Reason for not have a mobile money account: lack of money	7209	0.636
Reason for not have a mobile money account: use agent	7159	0.205
Reason for not have a mobile money account: no mobile phone	7256	0.397
Financial inclusion: use dimension		
Saved in past 12 months: for old age	14,082	0.126
Saved in past 12 months: using an account at a financial institution	14,074	0.123
Saved in past 12 months: using a mobile money account	6048	0.320
Saved in past 12 months: using an informal savings club	14,096	0.261
Borrowed in past 12 months: for medical purposes	14,147	0.197
Borrowed in past 12 months: from a financial institution	14,105	0.0739
Borrowed in past 12 months: from family or friends	14,124	0.362
Borrowed in past 12 months: from an informal savings club	3924	0.380
Mobile owner		

Finding obstacles to women's digital financial inclusion is the goal of the second model. All variables are binary, equal to one if women are financially included or participate in the labour

market, and equal to zero otherwise (the age variable is the only continuous variable). A number of exogenous variables are included in our model to shed light on the individual's features. For example, "Age" represents the individual's age, and "Age[1]" is included to check for any potential nonlinear relationships between age and the endogenous variables. T The "Income" variable determines a person's income level by separating out four quantiles (the poor, second, third, and fourth quantiles). These are binary variables that have a value of one when a person's income level falls into a given quantile and zero otherwise. The binary variable that is left out is the fifth quantile, "rich." The "Education" variable is a binary variable that is equal to one if the individual falls inside the specified education level and zero otherwise. It measures the individual's degree of education using three levels: primary or less, secondary, and tertiary or more.

4. Empirical Results and Discussion

More so than with the traditional route, financial inclusion through the digital channel positively connected with women's engagement in the labour market. Table 2. Women's engagement in the labour market is positively correlated with having a bank account by 14.5%, and mobile banking increases it by 17.3%. These findings are significant at the 1% level.

Table 2. Association between women's financial inclusion and participation in the labor market in relation to the access dimension.

Variables	*Women's Labor Force Participation*	
Account at financial institution	0.145 ***	
	(0.00962)	
Digital financial inclusion (Mobile money account)		0.173 ***
		(0.00890)
Age	0.0139 ***	0.0140 ***
	(0.000902)	(0.000888)
AgeÂ²	−0.000285 ***	−0.000276 ***
	(1.62e−05)	(1.60e−05)
Location (Urban = 1)	−0.0540 ***	−0.0529 ***
	(0.00861)	(0.00858)
Secondary	−0.00866	−0.0133
	(0.00921)	(0.00914)
Completed tertiary or more	−0.00457	0.0279
	(0.0246)	(0.0241)
Poorest	−0.0406 ***	−0.0310 **
	(0.0130)	(0.0129)
Second2	−0.00118	0.00281
	(0.0133)	(0.0133)
Middle2	0.0124	0.0135
	(0.0129)	(0.0129)
Fourth2	0.00346	−0.000820
	(0.0126)	(0.0126)
Observations	13,204	13,204

The nonlinear relationship seen in the negative value of the Age[1] variable indicates that age has a considerable beneficial impact on women's labour market participation in Africa, but only up to a certain age. When it comes to place of residence, women from urban areas are less likely to participate in the labour market. This is likely due to the nature of tasks that are performed in metropolitan areas as opposed to rural areas, where women are more actively involved in the primary industries (farming, agriculture, etc.).

Furthermore, women's labour market involvement is negatively impacted by education level, however this effect is not statistically significant. Women in the lowest income

quantiles are less likely to join in the labour force, and as income rises, so does women's participation.

The use of financial services and its effects on women's labour force participation demonstrated that this component considerably and favourably influences the level of women's labour force participation through many variables Table 3. The sources of borrowing and the purposes for which savings are used, however, differ. The likelihood that a woman will engage in the labour market rises by 15% when she uses informal savings clubs and by 19% when she uses financial institutions. The findings suggest that formal financial services channels have a more notable and favourable influence on women's labour market involvement than informal channels. The likelihood that a woman will participate in the labour market is doubled when she borrows through formal channels (17.8% of the total borrowed came from financial institutions, 8% from relatives and family, and 6% from informal clubs). All things considered, this shows that having access to official financial services can be quite helpful in raising women's participation rates in the workforce.

Table 3. The association between women's financial inclusion and workforce participation in relation to the usage dimension.

Variables						
Saved financial institution	0.195 ***					
	(0.0153)					
Saved used mobile banking		0.0846 ***				
		(0.0130)				
Saved using informal club			0.150 ***			
			(0.00954)			
Borrowed financial institution				0.178 ***		
				(0.0180)		
Borrowed family and friends					0.0897 ***	
					(0.00861)	
Borrowed informal saving club						0.0625 ***
Age	0.0145 ***	0.0137 ***	0.0138 ***	0.0149 ***	0.0148 ***	0.0112 ***
	(0.000900)	(0.00146)	(0.000901)	(0.000904)	(0.000904)	(0.00172)
AgeÂ²	−0.000290 ***	−0.000259 ***	−0.000276 ***	−0.000297 ***	−0.000292 ***	−0.000237 ***
	(1.62e−05)	(2.77e−05)	(1.62e−05)	(1.63e−05)	(1.63e−05)	(3.16e−05)
Location (Urban = 1)	−0.0506 ***	−0.0160	−0.0446 ***	−0.0482 ***	−0.0464 ***	−0.0194
	(0.00864)	(0.0122)	(0.00864)	(0.00866)	(0.00867)	(0.0149)
Secondary	0.00117	−0.0352 ***	0.0149 *	0.0161 *	0.0140	−0.0166
	(0.00912)	(0.0133)	(0.00902)	(0.00906)	(0.00908)	(0.0154)
Completed tertiary or more	0.0106	0.00920	0.0708 ***	0.0476 *	0.0616 **	−0.0498
	(0.0246)	(0.0300)	(0.0241)	(0.0243)	(0.0242)	(0.0388)
Poorest	−0.0422 ***	−0.0522 ***	−0.0401 ***	−0.0528 ***	−0.0545 ***	−0.0391 *
	(0.0130)	(0.0191)	(0.0130)	(0.0130)	(0.0130)	(0.0232)

Second2	−0.00476	−0.0139	−0.00869	−0.0128	−0.0182	−0.0145
	(0.0134)	(0.0193)	(0.0133)	(0.0134)	(0.0134)	(0.0226)
Middle2	0.00989	−0.00895	0.00468	0.00302	−0.00308	0.00723
	(0.0130)	(0.0177)	(0.0129)	(0.0130)	(0.0130)	(0.0215)
Fourth2	0.00111	0.00108	−0.00327	−0.00806	−0.00984	0.000565
	(0.0127)	(0.0166)	(0.0126)	(0.0127)	(0.0127)	(0.0206)
Observations						

These findings offer policymakers a useful framework for thinking through the following implication: promoting the use of formal financial services, like banks and credit unions, for borrowing and saving can significantly increase the participation of women in the labour market.

Women's chance of using formal financial services can be increased by offering them programmes that raise their understanding of the advantages and hazards associated with using these services. To give women easier access to credit and savings opportunities, governments and the private sector may also think about investing in financial institutions like microfinance institutions. Governments have the ability to examine and modify laws, rules, and policies that could impede women's access to formal financial services. Collaborations between financial institutions and groups that assist and support women—for example, by offering networking opportunities and mentorship—may help to increase the number of women entering the workforce.

The biggest obstacle to inclusion for older women is a lack of funds. The phrases "No need for financial institution" and "Family members has one" may suggest that these women may not see the value in using formal financial services themselves or may rely on the financial services of their family members. Women who live in urban areas and those with higher educational levels face similar barriers to their inclusion. This could be explained by the fact that these women may see less of a need for formal financial services since they may have access to alternative financial resources or are earning more money. Furthermore, it's possible that these women are unaware of or do not comprehend the advantages that formal financial services might offer, such access to credit and savings alternatives. Another factor for why these women could depend on their family members' financial assistance is that they may be subject to cultural or societal norms that place a higher priority on the financial requirements of male family members. The latter is in line with what are known as social norms, which are socially prescribed guidelines that specify how people should behave based on their gender.

Furthermore, income level indicates that women have comparable involuntary barriers to formal financial services regardless of their social position. These obstacles include things like the expense of using these services, the distance to financial institutions, the lack of documents, the mistrust of financial institutions, financial institution aversion, lack of funds, and religious beliefs. However, as the woman's wage level rises, these barriers become less intense Table 4. This can be explained by the fact that women who earn more money typically have greater access to resources, including financial and transportation resources, which can facilitate their use of official financial services. Furthermore, women who earn more may have more discretionary income, which might help them pay for the expenses related to using formal financial services. An additional rationale could be that women who earn more might have more social and economic mobility, which would enable

them to get financial services in different places or get past obstacles like a lack of documents.

Table 4. Barriers to financial inclusion (traditional channel).

Variables	To Far Away	Too Expensive	Lack of Documentation	Lack of Trust	Religious Reasons	Lack of Money	Family Members Has One	No Need for Financial Institution
Age	4.81e−05	−0.00029 7	−0.00892 ***	0.000685	−0.00125 **	0.00378 ***	−0.00199 ***	−0.000880
	(0.000940)	(0.00102)	(0.000986)	(0.000872)	(0.000572)	(0.000832)	(0.000736)	(0.000895)
Age²	−1.52e−05	2.01e−06	8.80e−05 ***	−1.91e−05	1.08e−05	−5.34e−05 ***	2.82e−05 **	1.92e−05
	(1.64e−05)	(1.76e−05)	(1.74e−05)	(1.54e−05)	(1.00e−05)	(1.44e−05)	(1.30e−05)	(1.55e−05)
Location (Urban = 1)	−0.170 ***	−0.0561 ***	−0.0756 ***	−0.00636	0.00398	−0.0126	0.0444 ***	0.0508 ***
	(0.00948)	(0.0104)	(0.0102)	(0.00875)	(0.00594)	(0.00862)	(0.00738)	(0.00910)
Secondary	−0.0563 ***	−0.0532 ***	−0.0812 ***	−0.0238 ***	−0.0474 ***	−0.00682	0.0326 ***	0.00435
	(0.0101)	(0.0109)	(0.0106)	(0.00919)	(0.00673)	(0.00901)	(0.00766)	(0.00960)
Completed tertiary or more	−0.114 **	−0.0642	−0.274 ***	−0.00377	−0.0147	0.00446	0.0604 **	0.0594 *
	(0.0489)	(0.0459)	(0.0581)	(0.0362)	(0.0249)	(0.0355)	(0.0259)	(0.0346)
Poorest	0.0855 ***	0.0727 ***	0.0675 ***	0.0551 ***	0.0293 ***	0.0500 ***	−0.0315 ***	−0.0119
	(0.0150)	(0.0160)	(0.0157)	(0.0134)	(0.00910)	(0.0129)	(0.0114)	(0.0140)
Second2	0.0460 ***	0.0559 ***	0.0351 **	0.0319 **	0.0167 *	0.0606 ***	−0.00911	0.00351
	(0.0155)	(0.0163)	(0.0160)	(0.0139)	(0.00950)	(0.0133)	(0.0112)	(0.0141)
Middle2	0.0674 ***	0.0320 **	0.0254	0.0226	0.0129	0.0495 ***	−0.0226 **	−0.00399
	(0.0152)	(0.0163)	(0.0159)	(0.0138)	(0.00947)	(0.0129)	(0.0112)	(0.0139)
Fourth2	0.0394 **	0.0147	0.00824	0.0148	−0.00928	0.0325 ***	−0.00235	−0.00681
	(0.0155)	(0.0164)	(0.0160)	(0.0138)	(0.0100)	(0.0126)	(0.0107)	(0.0138)
Observations								

Based on these findings, policymakers can take into account the following implications: removing non-voluntary barriers, such as cost, distance, lack of documentation, lack of trust, and religious beliefs, that prevent women from utilising formal financial services can raise the likelihood that they will do so and, consequently, increase their economic participation. The intensity of these barriers can be lessened by creating focused policies and programmes, such financial literacy initiatives, that especially meet the needs of low-income women. In order to improve access to financial services in isolated and rural areas, where access restrictions are more severe, the public and private sectors can fund financial inclusion policies and initiatives. To assist women in overcoming the barrier of mistrust and understanding the advantages of formal financial services, governments and the business sector should also make

investments in fostering trust and raising public awareness of financial services.

In addition, Table 5 explains the factors that cause obstacles to the incorporation of digital finance. Urban women might find banking institutions more convenient, secure, or accessible than digital channels, thus they might choose to use them instead. This can be the result of a lack of understanding or familiarity with digital financial services or a lack of faith in the system. However, women in the lowest income quantiles could find it difficult to use digital channels because they lack the resources—money or a mobile phone, for example—or cannot pay the high cost of mobile financial services. This can be because they are too poor or don't have access to credit to get a phone or pay for mobile financial services.

Table 5. Barriers to digital financial inclusion.

Variables	To Far	To Expensive	Lack of Documentation	Lack of Money	Use Agent	No Mobile Phone
Age	−0.000397	−0.000371	−0.00703***	−6.14e−05	0.000189	−0.0125 ***
	(0.00109)	(0.00114)	(0.00113)	(0.00116)	(0.00100)	(0.00113)
AgeÂ²	−8.69e−06	−6.63e−06	6.91e−05***	4.33e−06	−8.52e−06	0.000169 ***
	(1.87e−05)	(1.97e−05)	(1.96e−05)	(1.99e−05)	(1.74e−05)	(1.95e−05)
Location (Urban = 1)	−0.167***	−0.0711 ***	−0.0652***	−0.0295 **	0.0292***	−0.0699 ***
	(0.0124)	(0.0127)	(0.0128)	(0.0125)	(0.0108)	(0.0128)
Secondary	−0.0726 ***	−0.0589 ***	−0.0998***	−0.0706 ***	−0.00973	−0.165***
	(0.0128)	(0.0132)	(0.0132)	(0.0128)	(0.0113)	(0.0131)
Completed	−0.219***	0.00758	−0.229 ***	−0.283***	−0.109**	−0.336***
tertiary or more						
	(0.0735)	(0.0514)	(0.0667)	(0.0506)	(0.0517)	(0.0720)
Poorest	0.0256	0.0635***	0.0299	0.0599***	−0.0408 **	0.0507***
	(0.0179)	(0.0187)	(0.0188)	(0.0184)	(0.0160)	(0.0191)
Second2	0.0269	0.0528***	0.0295	0.0591***	−0.0240	0.0487**
	(0.0184)	(0.0193)	(0.0193)	(0.0189)	(0.0163)	(0.0196)
Middle2	−0.00412	0.0289	−0.00216	0.0593***	−0.00794	0.0450**
	(0.0187)	(0.0196)	(0.0196)	(0.0189)	(0.0161)	(0.0197)
Fourth2	−0.0224	−0.00857	−0.0101	0.00891	−0.0195	−0.00925
	(0.0194)	(0.0204)	(0.0201)	(0.0190)	(0.0165)	(0.0204)
Observations						

These findings imply that policymakers should take into account the costs associated with mobile financial services and phone access in order to reduce their accessibility and affordability. Possible strategies to do this include offering subsidies or forming alliances with financial institutions and mobile network operators, as well as expanding financial literacy and education initiatives aimed at assisting women in navigating and utilising digital financial services to help them get over obstacles that stand in the way of women's digital financial inclusion in urban and low-income areas. To guarantee women's digital financial inclusion and the security and privacy of their data, a regulatory framework should be developed. Financial institutions can be given incentives to reach out to more women and provide them with services, especially by using digital channels. In order to

increase women's participation in the labour market through digital financial inclusion, partnerships between the public and private sectors, as well as civil society organisations, should be formed. This includes the use of digital identification systems, as well as monitoring and assessing the implementation of these policies and programmes to make sure they are working.

By giving women more access to financial resources through digital channels and so enhancing their involvement in the labour market, these policy implications aim to advance gender equality in the workforce.

Women's financial inclusion reduces gender inequality, which contributes to women's empowerment Cabeza – Garcia, (2019). All things considered, our research determined how digital financial inclusion, in all of its forms, may support the involvement of African women. Furthermore, our research has determined that the primary obstacles preventing African women from participating in digital finance are involuntary hurdles stemming mostly from the exorbitant pricing of mobile financial services, insufficient funds, and restricted access to cellular phones. Our study's empirical findings support those of multiple other research. (Benvacoub 2021; Elouaurti & Ezzahid 2022).

Therefore, African policymakers should focus on improving the financial literacy of African women in order to enable their inclusion through digital channels. They should also work upstream by increasing access to phone and internet infrastructure, as this will enhance women's financial inclusion and increase their participation in the labour market.

African nations are characterised by male-dominated civilizations, sizable informal economies, and rigid gender norms that restrict the status of women. Perceived restrictions and societal expectations about how an individual should behave based on their gender make up gender norms. For instance, women in certain countries are limited to taking care of their families, which leaves them with less time for activities that generate cash. Some communities do not allow women to have financial intimacy with their husbands or parents, while in other countries women are prohibited from owning cell phones, which means they are unable to take advantage of mobile banking services." Elouaourti & Ezzahid (2022). Women's digital financial inclusion would be aided by dismantling these gender norms via education and increasing awareness of the contribution of women to development among various African society segments.

5. 1 Conclusions

This study examined the connection between women's labour force participation and digital financial inclusion. Furthermore, our paper clarified the obstacles preventing women from participating in digital finance. A microeconomic database encompassing 14, 281 African women has been mobilised. Our database was taken from the 2021 edition of the Global Findex database, which was based on nationally representative surveys conducted in 29 African nations. The methods for Probit model estimate was applied.

Research findings indicate that women's labour force participation is favourably correlated with financial inclusion

through digital channels, as opposed to traditional channels. The findings show that women's engagement in the labour market is greatly and favourably impacted by official financial services channels more so than by informal ones.

Women encounter nonvoluntary obstacles such as those relating to being "too faraway, too expensive, lacking documentation, lacking trust, religious reasons, and lacking money" while attempting to utilise the standard financial inclusion channel. However, when the woman's wealth rises, so does the degree of these restrictions.

On the factors that influence the impediments to digital financial inclusion. The preference of metropolitan women to employ bank agencies accounts for their lack of usage of the digital channel. Furthermore, because of the high cost of mobile financial services, their lack of resources, and their inability to use a mobile phone, women in the lowest income quantiles are unable to use the digital channel.

The literature has recognised digital financial inclusion as a mediating channel for women's economic involvement; nonetheless, there are a number of obstacles that African women must overcome in order to be included. Our research adds to the body of knowledge in two different ways. First, by examining the relationship between financial inclusion and women's engagement in the labour market in African nations, it extends the field beyond what is currently known. Second, using data at the person level, it is the first study in the literature to pinpoint the obstacles preventing women from participating in digital finance.

5.2 Policy implications

This study has two primary implications. Taking into account the influence of digital channels on women's engagement in the labour market, African policymakers had to take action to enhance women's financial inclusion in practise. Creating financial education and literacy initiatives for African women to assist them in utilising digital financial services and understanding them. Women's trust and confidence in formal financial services can be increased by developing targeted financial inclusion programmes and services, such as microfinance or other small-scale credit and savings options that are made to be more affordable and accessible; and by developing a regulatory framework that encourages transparency, security, and accessibility of financial service providers. Reducing the obstacles of cost and distance by making financial services more accessible in rural and remote places, for example, through mobile banking or other digital channels. The relationship between women's labour force participation and digital financial inclusion is examined in our study, which closes a gap in the literature. We also identify barriers to women's digital financial inclusion for the first time in the literature, and our understanding of these barriers will help shape public policies aimed at boosting women's labour market participation.

Although our study offers valuable insights, its primary shortcoming is that it concentrates on six distinct obstacles to digital financial inclusion as suggested by the Global Findex database. Due to this database constraint, additional possible obstacles to digital financial inclusion, such as concerns about privacy, security, or a lack of digital proficiency, cannot be

included in this study. To properly understand the impact of these additional impediments on women's labour market participation in African nations, more research is required. Notwithstanding this drawback, our research sheds light on the obstacles that prevent women from obtaining financial inclusion through the digital channel as well as the connections between women's labour market involvement and digital financial inclusion.

5.3 Recommendations

The findings provide fresh avenues for investigating how to increase African women's digital financial inclusion. Future studies might concentrate on a number of crucial topics, one of which would be a deeper comprehension of the obstacles and difficulties African women encounter when attempting to obtain and utilise digital financial services. Research on problems including limited access to technology, low digital literacy, and social or cultural constraints on women's ability to achieve financial independence could fall under this category. Future studies should also pay close attention to how digital financial inclusion affects African women's economic empowerment. Research on the impact of digital financial services on women's capacity to establish and expand enterprises, obtain credit, and enhance their overall financial well-being may fall under this category.

Furthermore, studies might be done to create and evaluate interventions meant to improve African women's access to digital finance. Initiatives to broaden access to technology, train and educate people on digital financial services, and remove social and cultural barriers that prevent women from participating fully in the financial system could all fall under this category. In general, further studies on digital financial inclusion for African women may have a big impact on enhancing the continent's women's overall well-being and economic empowerment.

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