

## **AN OVERVIEW OF FINANCIAL INCLUSION AND POLICY SOMERSAULTS IN NIGERIA**

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### **ABSTRACT**

The Nigerian government initiated a variety of focused programs to achieve financial inclusion and financial literacy which have consequence on sustainable development. The 2030 Sustainable Development Goals Agenda touches on financial inclusion within the financial system to lead to a sustainable economy. This paper sets out to evaluate the success or otherwise of the financial inclusion schemes. The study period begins in 2012 with the last major financial inclusion programme of the government. The approach involves a construction of an annual index of financial inclusion using expanded available indicators compared to previous studies. A two-stage principal component analysis is employed. The results reveal that overall financial inclusion position moved upwards but slowly compared to other developing countries. The constructed index is also positively correlated with Nigeria's human development index. The reasons for slow pace of financial inclusion may be related to several policy reversals of government and/or institutions within Nigeria.

**Keywords:** Financial inclusion, Economic growth, Sustainable development, Mobile money, Nigeria, Poverty reduction, Principal component analysis (PCA)

## **INTRODUCTION**

The financial economics literature is replete with evidence of the role of financial innovation on economic development. One rationale for the evidence relies on the argument that financially developed economies allocate investible funds more efficiently rather than the size of investments. Haber (2010) notes that the crucial factor responsible for economic stagnation in African countries is inadequacy of the financial system. Ndako (2010) provides evidence of the importance of financial development in motivating economic development. Cull, Demirguc-Kunt, & Lyman, (2012) and Chibba (2009) note that financial development can be pro-poor in one sense because its impact on economic growth can lift many households above the poverty line. In a relative sense, financial development can narrow income differentials. In this sense, a reduction in income inequality and consequent impact on poverty reduction are key ingredients of financial inclusion. Cull et al. (2012), also reveal that through field experiments, researchers can learn that access to formal financial services especially savings improves stability within households. Therefore, financial inclusion drives healthier households and small business sector with implications for macroeconomic stability and sustainability. Jia, Qiu & Yang (2021), note that financial inclusion is not explicitly inserted into the United Nations sustainable development goals, but it is critically needed to support sustainable development. The key question is how to define financial inclusion. Omar and Inaba (2020) argue that financial inclusion is a dynamic tool used to achieve macroeconomic stability. Camara & Tuesta (2014) view financial inclusion as the access to financial services as well as the maximization of usage of while minimizing involuntary financial exclusion.

In about 2006, there was a serious concern that African countries would be unable to meet the Millennium Development Goals (MDGs) by 2015 especially the part that relates to financial inclusion. To arrest the situation, the United Nations hosted a financial inclusion conference in Dakar, Senegal in June 2006. The World Bank also held a conference in 2007 in Washington DC on the theme, Banks' Access to Finance. The UK Department of International Development in collaboration with the World Bank also hosted a financial inclusion conference in June 2007 (Chibba, 2009; CGAP, 2011). The United Nations General Assembly met in September 2015 to adopt the 2030 Agenda for Sustainable Development by committing to pursue 17 Sustainable Development Goals (SDGs). All these are efforts made to help Africa chart a new course to achieve economic growth. Klapper, El-Zoghbi, & Hess (2016) note that although the SDGs do not explicitly target financial inclusion, the achievement of financial inclusion is implied in several of the goals. The relevant SDGs are not limited to ending poverty (SDG1), reducing hunger, and promoting food security (SDG2), achieving good health and well-being (SDG3), promoting gender equality (SDG5) and promoting shared economic growth (SDG8).

With the mandate from the G20 Group Leaders, the Financial Inclusion Experts Group (FIEG) began to work on a roadmap towards global development through financial inclusion. At the G20 Summit in Seoul, South Korea, the Global Partnership for Financial Inclusion (GPMI) was launched in December 2010. The GPMI is a body charged with helping countries to imbibe the G20 Financial Inclusion Action Plan (FIAP) as well as the G20 Principles of Innovative Financial Inclusion. The GPMI works in collaboration with the Alliance for Financial Inclusion (AFI), the Consultative Group to Assist the Poor (CGAP) and the International Finance Corporation (IFC). Since 2012, many more organizations including the World Bank, joined the GPMI as partners. Finally, financial inclusion is a critical part of the United Nation's 2030 Agenda for Sustainable Development.

According to Alexander (2021), financial inclusion is given prominence because of the role that the financial system plays in a movement toward a more sustainable economy.

According to Jukan & Softic (2016), the definition of financial inclusion given by the Centre for Financial Inclusion (CFI) can be broken into: access to a full suite of financial services, quality of service, use of financial services by everyone, financial capability, and delivery through a diverse and competitive marketplace. Beck, Demirgüç-Kunt, & Levine (2007), Al-Smadi (2018) and Jukan & Softic (2016) argue that the impact of financial inclusion on economic growth and poverty reduction is of great interest to economic decision makers, social policy makers and researchers around the world. In view of the aforementioned, many central banks in countries of the world have put in place programmes in pursuit of financial inclusion promotion. These initiatives would require data collection to drive policy performance evaluation and allow comparisons among countries. Amidzic, Massara, & Mialou (2014) and Mialou, Amidzic, & Massara (2017) note that the financial inclusion debate has also captured the attention of academics who are exploring other ramifications of financial inclusion including poverty levels, women empowerment, income inequality, and sustainable development.

Chinoda & Kwenda (2019), construct an index of financial inclusion for 49 African countries from 2004 through 2016. The results show the existence of a wide distribution in terms of index of financial inclusion (IFI) validating a conclusion that Africa is characterized by a very high level of financial exclusion with consequence on poverty and sustainable development. The authors also report a shortage of information necessary to measure financial inclusion. The consequence of a lack of data has placed financial service providers as well as policy makers in a difficult position to locate opportunities. Mbutor and Uba (2013), present a model involving financial inclusion and monetary policy, and report that promoting financial inclusion, has a potential to enhance the effectiveness of monetary policy in Nigeria.

Demirgüç-Kunt & Klapper (2012a, b), provide a cursory overview of financial inclusion in Africa. The authors analyse the Global Financial Inclusion Indicators (GFII) database to reach a conclusion that less than 25% of adult Africans have accounts with formal financial institutions. They find that most adult Africans rely on informal sources of credit and savings. Furthermore, almost all small- and medium-sized enterprises are classified as unbanked. Zins and Weill (2016) unravel the determinants of financial inclusion in Africa in a recent study. They employ the econometric probit analysis on data from the 2014 Global Findex database on individuals from 37 African countries. The results reveal that the level of wealth, education, gender, and relative age favour financial inclusion. The most influential factors are male gender, advanced age, education level and high income which are associated with elevated financial inclusion. The existence of mobile banking is also reported as catalyst for promoting financial inclusion. The authors also argue that access to and use of financial services are required for accelerating economic growth and the stability of a financial system.

Several other studies including Allen, Carletti, Cull, Quian, Senbet, & Balenzuela (2014), Bozkurt, Karakuş, & Yildiz (2018), Daneji & Bayero (2014), Evans & Adeoye (2016), Ogochukwu (2019), Okoroafor, Adeniji, & Awe (2018), Reddy (2017), Rojas-Suarez & Amado (2014), Sarma (2008, 2010, 2012), Sarma & Pais (2011), Timbile & Kotey (2022), and Uddin, Chowdhury, & Islam (2017), have unearthed the determinants of financial inclusion especially in developing countries. The

determinants include GDP per capita, adult literacy, size of rural population, telephony and internet infrastructure, money supply, population density, income inequality and age dependency ratio. Financial inclusion has also been noted to have some potent impact on other features of the economy. More specifically, a study by Adeola and Evans (2017) explores the effect of financial development as well as financial inclusion on the diversification of the Nigerian economy. Their reported results show a positive effect of financial inclusion defined in terms of access and usage on economic diversification. They conclude that financial inclusion is a potent accelerator of economic diversification. While identifying the reasons for financial exclusion, Kempson, Atkinson, & Pilley (2004). list factors including, identity requirements, terms and conditions of bank accounts, level of bank charges, physical access to bank branches, psychological and cultural influences, and ease of use of bank charges. However, they note that the extent of financial exclusion varies from country to country.

Nguyen (2020) employs a two-stage principal component analysis (PCA) to measure financial inclusion index (IFI) for 41 developing countries including Nigeria from 2012 through 2018. The author's estimates of IFI are based on three dimensions, namely, access, availability, and usage. The access indicators are the number of deposit accounts with commercial banks, credit unions and credit cooperatives per 1,000 adults and the number of registered mobile money accounts per 1,000 adults. The availability indicators represent the number of commercial banks, credit unions, credit cooperatives plus all branches of microfinance institutions per 100,000 adults, the number of ATMs per 100,000 adults and the number of registered mobile money agent outlets per 100,000 adults. Finally, the usage indicators are outstanding deposits with commercial banks, credit unions and credit cooperatives (% of GDP), outstanding loans from commercial banks, credit unions, credit cooperatives and all microfinance institutions (% of GDP), and value of mobile money transactions (% of GDP). The estimates of financial inclusion indices reported are comparable with previous studies but less comprehensive than in this study.

Bayero (2015) concludes that a search of the financial economics literature reveals a shortage of comprehensive study of financial inclusion in Nigeria. Therefore, the objective of this paper is to contribute to the debate on financial inclusion measurement by undertaking a country study of Nigeria. Given the growing number of initiatives directed at promoting financial inclusion in recent times, it is logical to explore the effectiveness of the initiatives to drive policy response. To do this, annual data from the World Bank, and the Central Bank of Nigeria from 2012 through 2018 are employed. A two-stage PCA methodology is used to address the issue of assigning weights to indicators as well as dimensions. This study is different from previous studies because more indicators of financial inclusion are employed based on specific programmes undertaken in Nigeria. This is important because according to Camara and Tuesta (2014), each country is unique, and the construction of index of financial inclusion is heavily affected by the choice of indicators. This study, unlike many of the existing studies captures e-money in the construction of an index. More significantly, this study will throw more light on the policies instituted since the National Financial Inclusion Strategy (NFIS) of 2012. Furthermore, the index of financial inclusion derived from this study is also compared with estimates from existing studies and the association between financial inclusion index and human development index (HDI) is explored.

## **EVOLUTION OF FINANCIAL INCLUSION STRATEGIES IN NIGERIA**

The Nigerian economy was largely cash-based with a significant narrow money stock outside of the banking system. Kama & Adigun (2013), identify the existence of financial exclusion in Nigeria in terms of the bulk of money in the economy that is outside of the banking system. The Nigerian government in collaboration with the Central Bank of Nigeria (CBN) have introduced a variety of programmes to deepen the financial system and achieve financial inclusion. In 1977, the CBN introduced a two-phase rural banking scheme. Under the scheme, Nigerian banks were required to establish rural branches to make financial services available to rural communities. The scheme targets were not met due to shortage of human, financial and infrastructural resources (details in Kama & Adigun, 2013). The modest gains under the rural banking scheme were quickly eroded by widespread distress in the banking industry leading to closure of rural branches (Ayadi, Hyman, & Williams 2008).

Following the rural banking scheme, the CBN introduced guidelines involving required minimum levels of lending to small-scale enterprises as well as lending to rural customers. Fines were imposed on defaulting banking institutions. In addition to the aforementioned, the government established the People's Bank and facilitated the establishment of community banks. The motivation for the establishment of these institutions was to promote savings mobilisation culture, and banking habit within the rural communities. According to Kama and Adigun (2013), the activities of these financial institutions were destabilised by government bureaucracy. Ayadi et al. (2008), report that a CBN officer once remarked that the host communities where community banks mobilise deposits do not benefit from credit disbursements. Other initiatives of government to promote financial inclusion include the establishment of the National Economic Reconstruction Fund (NERFUND) and the Family Economic Advancement Programme (FEAP). NERFUND was to source local and foreign funds for small and medium-size enterprises while FEAP was to assist rural women to grow their businesses. These programmes were beset with many challenges arising from lack of foresight on the part of the movers of the programmes (Adejumo & Olaoye, 2012).

In 2005, the Nigerian government launched the National Microfinance Policy to facilitate the growth of privately-owned microfinance institutions. According to Vanguard Online (2010), the CBN promoted microfinance banks as solutions to the problems of community banks. By 2010, the CBN had shut down 224 of the 820 microfinance banks found to have mismanaged depositors' funds. Like community banks, microfinance institutions were not effectively regulated by the CBN beyond granting operational licenses. Many of the microfinance institutions invested their depositors' funds in unsustainable overheads. Yaaba, Shaba, & Ibrahim (2017), report the unsavoury role of the CBN in monitoring financial institutions. The CBN was said to be lax in monitoring and regulatory oversight as well as failure to provide information to the public.

In a renewed effort to promote financial inclusion, the CBN granted licences to 14 mobile money providers in 2011. Following the support for mobile money, the National Financial Inclusion Strategy (NFIS) of 2012 which is the most significant effort to address financial inclusion in Nigeria was instituted. The NFIS is a blueprint designed to guide the activities of several stakeholders toward a financially inclusive economy. The NFIS is developed on four critical signposts of agency banking, mobile banking/mobile payments, linkage models and client empowerment. The goals of the original 2012 NFIS are to:

1. reduce the percentage of 'financially excluded' adults to 20% by 2020 from its 2010 level of 46.3%;
2. increase to 70% the percentage of adults with access to payment services by 2020;

3. increase to 60% the percentage of adults with access to savings by 2020;
4. set target rates for the number of bank branches, ATM units, mobile agents and microfinance banks per 100,000 adults in Nigeria;
5. increase the percentage to 40% of adults with access to credit, insurance, and pensions by 2020; and
6. implementation of a tiered know-your-customer (KYC) requirements.

The CBN introduced Agent Banking guidelines in 2013 and in collaboration with banks launched the biometric Bank Verification Number (BVN) in 2014. In 2018, the NFIS was revised. According to Baliga (2020), the NFIS was revised in 2018 by giving attention to: a) creation of an enabling environment for digital financial services expansion; (b) promotion of a rapidly growing environment for agent networks for financial services delivery; (c) harmonization of know-your-customer requirements; (d) creation of a conducive environment to serve financially excluded groups; and (e) providing incentives for the adoption of cashless payment channels.

An overview of financial inclusion performance in Nigeria from 2008 through 2018 is presented in Table 1. The percentage of adults who have access to or use the services and products of deposit money banks rose slowly from 21.1 in 2008 to about 40 in 2018. The proportion of adults who have access to or use other formal institutions rose slightly and peaked in 2014 but, began to decline in 2016 and 2018. The proportion of adults without access to formal banking or formal other products decline steadily except in 2018 when it rose to 14.6 percent. Finally, the percentage of adults who are financially excluded declined slowly between 2008 and 2014 but rose in 2016 before declining again in 2018.

McCrocklin (2019a, 2019b), views financial exclusion as barriers placed by government or institutional entities such that people as well as businesses do not have access to affordable and basic financial services. This creates some form of inequality which impacts the socio-economic mobility of the people with a consequent implication on the level of poverty in a country. The author concludes that the rate of financial exclusion in Nigeria has remained unchanged for many years. Some of the reasons why many Nigerians are financially excluded are: lack of funds, lack of required documentation for account ownership, inadequate financial literacy, lack of proximity to financial institutions and high service fees charged by financial institutions. Baliga (2020), concludes that the deadline of 2020 set for achievement of a higher level of financial inclusion is indeed an unsettling task. The latest (2018) EFINA survey reveals that the current level of financial exclusion is driven by irregular income, large distance to nearest bank branches, high transaction costs, absence of regular employment and preference for cash. Other reasons are lack of availability of required documents and illiteracy.

**Table 1: An Overview of Financial Inclusion in Nigeria**

Year	Banked (%)	Formal (%)	Other (%)	Informal (%)	Only (%)	Financially Excluded (%)	Adult Population (million)
2008	21.10	2.50		23.90		52.50	86.60
2010	30.00	6.30		17.40		46.30	84.70
2012	32.50	10.50		17.30		39.70	87.90
2014	36.30	12.30		11.90		39.50	93.50
2016	38.30	10.30		9.80		41.60	96.40
2018	39.60	9.00		14.60		36.80	99.60

**Notes:** **Banked:** refers to all adults who have access to or use deposit money banks in addition to currently using any of the following products: ATM/Debit card, credit card, savings account, current account, fixed deposit account, mortgage, overdraft, loan from a bank, Islamic loan or Islamic financing investment. **Formal other:** refers to all adults who have access to or use other formal institutions such as insurance companies and microfinance/community banks, in addition to using the following products: pension schemes or shares. **Informal only:** refers to all adults who do not have any of the banked or formal other products but have access to or use only informal services and products such as: savings clubs/pools, esusu, ajo or moneylenders. **Financially excluded:** refers to all adults not in the banked, formal other, or informal categories, even though the person may be using or have access to any of the following: loan/gift from friends or family and loan from employers.

**Source:** EFINA Access to Financial Services in Nigeria 2018 survey

### COMPUTATION OF INDEX OF FINANCIAL INCLUSION

Camara & Tuesta (2014), note that financial inclusion index is a latent variable whose measurement is not determined in a direct way. Several researchers including Sarma (2012), employ a two-stage principal component analysis (PCA) methodology in the same way that the United Nations Development Programme (UNDP) uses the methodology to construct several notable indices (OECD/JRC, 2008). According to Jolliffe and Cadima (2016), PCA is generally employed as a descriptive rather than inferential tool. As an inferential tool, a multivariate Gaussian distribution of the data series is usually assumed. However, no distributional assumptions are needed when PCA is employed as a descriptive tool. The approach adopted in this paper is like Sarma (2008), Amidzic et al. (2014), and Park and Mercado (2018). The PCA approach is a three-step procedure involving variable normalization, estimation of dimensional sub-indices and the aggregation of the sub-indices to obtain the final index. According to Camara and Tuesta (2014), two critical issues come into play in estimating a latent variable such as the composite index of financial inclusion. These include the selection of indicators (relevant causal variables) and estimation of the weights of parameters. The authors report that the last ten countries ranked at the bottom of their financial inclusion chart are African countries. The also authors report that the ranking could improve for the countries if e-money outlets are included in the indicators. This underscores the conclusion that the index of financial inclusion is heavily affected by the choice of indicators. It also confirms that each country is unique. They note that weight assignment is germane to the maximization of the information derived from the indicator variables when PCA is employed.

In computing the index of financial inclusion, two dimensions of access and usage ( $Y_t^a, Y_t^u$ ) are computed in the first stage of the PCA approach as:

$$Y_t^a = \alpha_1 access1 + \alpha_2 access2 + \alpha_3 access3 + \alpha_4 access4 + \dots + \alpha_8 access8 + \varepsilon_t \quad (1)$$

$$Y_t^u = \beta_1 use1 + \beta_2 use2 + \beta_3 use3 + \beta_4 use4 + \beta_5 use5 + \dots + \beta_{11} use11 + v_t \quad (2)$$

The variables in Equations (1) and (2) are described in Table 2. The relative weights of the indicators in each dimension are  $\alpha_i$  and  $\beta_i$ . The relative weights are based on eigenvalues and eigenvectors of the correlation matrix as discussed in Camara &

Tuesta (2014). As illustrated by Amidzic et al. (2014), Hanivan & Nasrudin (2019), and Nguyen (2020), the weights are based on the proportion of the variance explained by the corresponding factors within each dimension. Note that the goal in using PCA is to compute IFI that captures all the information from all relevant indicators rather than data reduction.

The importance of a multidimensional measure of index of financial inclusion based on many indicators is highlighted by Iyer (2015). The author notes that the 2014 World Bank’s Global Financial Development Report reveals that only 11 percent of people who have bank accounts do save and, only 8 percent of them, took bank loans. Therefore, it is unreliable to base financial inclusion on the number of opened bank accounts. More importantly, Iyer (2015), also notes that the surveys conducted by CGAP show that 80 percent to 96 percent of the accounts in rural areas are dormant. The author concludes that multi-indicators of access and use are required to construct an index of financial inclusion. Therefore, in the second stage PCA, the overall financial index is computed as:

$$IFI_t = w1Y_t^a + w2Y_t^u \quad (3)$$

Where  $IFI_t$  is the composite index of financial inclusion in time  $t$ ,  $w1$  and  $w2$  are the relative weights of each dimension.  $Y_t^a, Y_t^u$  are access and usage dimensions respectively at time  $t$ . The weighting scheme adopted in the second stage PCA is as discussed above being derived from eigenvalues and eigenvectors of the correlation matrix.

The data series normalization in this study uses the mean and standard deviation to guarantee that the sub-indices as well as the final IFI index lie between  $-\infty$  and  $+\infty$ . Mishra, Verma, & Bose (2015), show that when the mean is employed in the normalization of the data, some observations may lie below the mean. Therefore, the index will lie between  $-\infty$  and  $+\infty$ . The negative index so generated should simply be interpreted as a low value rather than the usual interpretation given to negative numbers.



**Table 2: Description of Indicators**

Variable Code	Dimension: Indicator Name
Access 1	Access: Number of ATMs per 1,000 km <sup>2</sup>
Access 2	Access: Number of Branches of Commercial banks
Access 3	Access: Number of commercial bank branches per 100,000 adults
Access 4	Access: Number of commercial bank branches per 1,000 km <sup>2</sup>
Access 5	Access: Number of insurance corporations per 100, 000 adults
Access 6	Access: Number of registered mobile money agent outlets
Access 7	Access: Number of registered mobile money agent outlets per 100,000 adults
Access 8	Access: Number of registered mobile money agent outlets per 1,000 km <sup>2</sup>
Use 1	Usage: Number of depositors with commercial banks per 1,000 adults
Use 2	Usage: Outstanding Deposits, Commercial banks, Domestic Currency
Use 3	Usage: Outstanding Deposits, Other deposit takers, Domestic Currency
Use 4	Usage: Outstanding Deposits, Deposit-taking microfinance institutions, Domestic Currency
Use 5	Usage: Mobile Money, Number of registered mobile money accounts
Use 6	Usage: Number of registered mobile money accounts per 1,000 adults
Use 7	Usage: Value of mobile money transactions (during the year), Domestic Currency
Use 8	Usage: Number of borrowers from commercial banks per 1,000 adults
Use 9	Usage: Outstanding Loans, Commercial banks, Domestic Currency
Use 10	Usage: Outstanding Loans, Commercial banks, of which: SME loans, Domestic Currency
Use 11	Usage: Outstanding Loans, Deposit-taking microfinance institutions, Domestic Currency

**Note:** The 8 access variables represent the Access Dimension while the 11 Use variables represent the Usage Dimension

**Source:** Author's Construction

## RESULTS

The estimation based on a two-stage PCA of dimension indices and the overall index of financial inclusion (IFI) are presented in this section. Table 3 shows the results of the first stage PCA for the access dimension. Only four of the eight access indicators are retained with three principal components whose eigenvalues are 3.72858, 0.26739 and 0.00403 respectively. The computed weights of the indicators in the access dimension are also reported in Table 3. All the principal components are employed in estimating the dimension index based on the variance accounted for by each component as reported in Table 5. Within the access dimension, the three definitions of the number of commercial bank branches (Access2, Access3, and Access4) have about the same impact on the dimension at 45, 44 and 44 percent respectively. The number of ATMs per 1,000 km<sup>2</sup> has a negative impact on the access dimension.

**Table 3: First Stage Principal Components Estimates for Access Dimension**

Variable	PC1	PC2	PC3	Weight
Access 1	-0.4647	0.8534	0.2362	-0.3398719
Access 2	0.5083	0.3674	-0.3154	0.45033695
Access 3	0.5170	0.0449	0.8547	0.43924264
Access 4	0.5083	0.3670	-0.3379	0.45029227
Eigenvalue	3.72858	0.26739	0.00403	

**Source:** Author's Calculation

Table 4 shows the results of the first stage PCA application to the usage dimension. Only six of the eleven usage indicators are retained with six principal components whose eigenvalues are 3.84843, 1.92936, 0.15289, 0.06129, 0.00781 and 0.00022 respectively. All the principal components are employed in estimating the dimension index based on the variance accounted for by each component as reported in Table 5. This underscores Hanivan & Nasrudin (2019), who remark that the goal in using PCA to compute an index is to capture all information from the relevant indicators. Within the usage dimension, the number of registered mobile money accounts (Use 5) and the number of registered mobile money accounts per 1,000 adults (Use 6) are the most important indicators accounting for about 30% and 28% respectively. The outstanding deposits in deposit-taking microfinance institutions in domestic currency (Use 4) accounts for about 27 percent of the usage dimension followed by outstanding deposits in commercial banks in domestic currency (Use 2) with about 22 percent weight. The outstanding deposits with other deposit takers in domestic currency (Use 3) exerts a negative impact on the usage dimension.

**Table 4: First Stage Principal Components Estimates for Usage Dimension**

Variable	PC1	PC2	PC3	PC4	PC5	PC6	Weight
Use 1	0.4150	-0.3983	0.1245	0.6664	0.4197	0.1827	0.12093339
Use 2	0.4896	-0.1265	0.3203	-0.6987	0.3887	0.0493	0.22365003
Use 3	-0.4709	0.1345	0.8506	0.1192	0.1494	0.0053	-0.1917679
Use 4	0.5021	-0.0178	0.3971	0.1118	-0.7461	-0.1440	0.26573238
Use 5	0.2674	0.6116	-0.0249	0.1895	0.3061	-0.6513	0.30091567
Use 6	0.2067	0.6579	-0.0030	0.0716	-0.0065	0.7206	0.28053647
<b>Eigenvalue</b>	3.84843	1.92936	0.15289	0.06129	0.00781	0.00022	

Source: Author's Calculation

**Table 5: Cumulative Variance Explained by Components at First Stage PCA**

Component	Variance Explained (%)	Cumulative Variance (%)
Panel A: Access		
PC 1	93.21	93.21
PC 2	6.68	99.90
PC 3	0.10	100
PC 4	0.00	100
Panel B: Usage		
PC 1	64.14	64.14
PC 2	32.16	96.30
PC 3	2.55	98.84
PC 4	1.02	99.87
PC 5	0.13	100
PC 6	0.00	100

Source: Author's Calculation

Table 6 shows the results of the second stage PCA applied to the two-dimension indices. Only the access index dimension and usage index dimension employed with two principal components whose eigenvalues are 1.71399 and 0.286012 respectively. The usage index dominates in terms of empirical importance of the index on the final financial inclusion index with a weight of 349.64 percent while the access index enters with a negative weight of 249.64 percent. Note that Table 7 reveals that first principal component accounts for 85.7 percent of total variation while the second component accounts for 14.3 percent.

**Table 6: Second Stage Principal Components Estimates**

Variable	PC1	PC2	Weight
Access Index	-0.7071	0.7071	-2.49636
Usage Index	0.7071	0.7071	3.49636
Eigenvalue	1.71399	0.286012	

Source: Author's Calculation

**Table 7: Cumulative Variance Explained by Components at Second Stage PCA**

Component	Variance Explained (%)	Cumulative Variance (%)
PC 1	85.70	85.70
PC 2	14.30	100

Source: Author's Calculation

Table 8 presents the access and usage sub-indices and the final index of financial inclusion. The access sub-index increased from 1.03487 in 2012 to 1.87944 in 2013, took a nosedive for the remainder of the sample period. On the other hand, the usage sub-index increases from 2012 through 2014 but declines in 2015 before taking an increasing trend through the end of the sample period. The overall effect on the index of financial inclusion is an increasing trend throughout the sample period. However, it should be noted that the IFI records an annual growth rate of 21 percent between 2012 and 2013. The growth rate peaked at 44033 percent in 2016 and then nosedived to an annual rate of 66 percent in 2018. As noted earlier, the negative sign is because of the normalization method employed in this study which is consistent with Huong (2018), Lenka & Bairwa (2016), Lenka & Sharma (2017), and Singh & Mahlawat (2016).

**Table 8: Dimension Indices and Composite Index of Financial Inclusion**

Year	Access Index	Usage Index	Index of Fin Inclusion
2012	1.03487	-1.62347	-1.66542
2013	1.87944	-0.532565	-1.316341
2014	1.36821	0.042589	-0.6540195
2015	-0.402479	-0.28284	0.0012501
2016	-0.815504	0.203552	0.551701
2017	-1.51005	0.57031	1.158322
2018	-1.5545	1.62242	1.924506

Source: Author's Calculation

The overall financial inclusion indices estimated in this study are comparable with the estimates for Nigeria reported by Nguyen (2020), with a correlation coefficient of 0.8647 even though the approaches used to generate the estimates are slightly different. The correlation coefficient with estimates from Chinoda & Kwenda (2019), is 0.76. Note that the study by Chinoda & Kwenda terminates in 2016. The IFI from this study exhibits a positive correlation coefficient of 0.8630 with Nigeria's human development index (HDI) for the same time. Thus, a higher IFI is associated with a higher HDI. This is consistent with the observation made by Peng & Zhang (2022) that the United Nations relies on the HDI to measure sustainable development. Consequently, financial inclusion is tied to sustainable development.

## **DISCUSSION, CONCLUSION AND POLICY RECOMMENDATIONS**

The importance of financial inclusion in any emerging economy cannot be overemphasized. McDougal, Klugman, Dehingia, Trivedi, & Raj (2019), report that financial inclusion is an appropriate programme to address women economic autonomy. The authors report a negative association between the degree of financial inclusion and the level of intimate partner violence. Dupas & Robinson (2013), lend support to the report by concluding that women market vendors in Kenya benefit from access to savings account. In another study, Prina (2015), finds results which indicate that female household heads with savings accounts cope better with income shocks. Demirguc-Kunt, Klapper, & Singer (2017), also confirm that the biggest financial inclusion effect on poverty reduction and income inequality is from use of savings accounts and digital payments. In view of the significance of financial inclusion, it is imperative to explore an appropriate and targeted measure which can serve policy makers in making decisions.

This paper employs principal component analysis to measure yearly index of financial inclusion for Nigeria from 2012 through 2018 using a much broader demand for and supply of financial services targeted indicators. The previous attempts to construct a financial inclusion index for Nigeria employ fewer indicators. This is important because according to Camara & Tuesta (2014), each country is unique, and the construction of index of financial inclusion is heavily affected by the choice of indicators. This study, unlike many of the existing studies captures e-money in the construction of an index. The IFI from this study expands the horizon of policy makers in identifying relevant information to drive policy actions. The overall financial inclusion index is based on a set of access and usage indicators. The reported IFI from this study increased throughout the sample period indicating a positive achievement in financial inclusion in Nigeria from 2012 through 2018. The reported financial inclusion index from this study has a positive relationship with Nigeria's human development index. It should be noted that previous reports on financial inclusion in Nigeria reveal a lack of significant improvement compared with other developing countries of the world (EFInA, 2014 & 2017; Nguyen, 2020). Therefore, a lack of major improvement in financial inclusion achievement in Nigeria can be traced to several government and institutional policy conflicts over time.

Ondiege (2015), provides a conclusive report that the success of mobile financial services depends on creating an open and level playing field which allows non-bank providers to operate. The regulatory environment in Nigeria has not given room for competition in the provision of mobile financial services. An increased availability and access to cell phones by unbanked consumers is the most cost-effective and efficient way to promote financial inclusion. Ondiege argues that the role of government is to develop supportive regulatory frameworks, build an appropriate financial infrastructure and encourage financial literacy.

Onukwue (2020), opines that interoperable financial services environment allows peer-to-peer transactions without resorting to cash. According to the author, most people will be banked or have formal financial accounts if markets are highly interoperable. Unfortunately, the author argues that the Nigerian ecosystem leans heavily on cash because consumers seek to avoid bank charges. More importantly, the underlying technological infrastructure required to allow modern financial transactions are absent. In many parts of Nigeria, the available technology sits on an archaic 2G network.

According to Azuh (2020), Nigeria has 198 million active mobile lines and as of May 2020, only 41.5 million have been linked with new national identity cards. The National Identity Management Commission (NIMC) confirms that only 38% of Nigerians have any form of identification as at early 2020. The NIMC national identity registration began in 2007. The programme is faced with several problems to the extent that some people do not get their national identity cards within four years. Azuh (2020) questions why the National Communications Commission (NCC) now mandates all mobile phone numbers to be linked with national identity cards when Nigerians have other means of identification such as driver's license, voters' registration cards, international passports, birth certificates and bank verification numbers.

Balogun (2020), reports that the NIMC has been accused of corruption and unprofessionalism by a vast majority of individuals who tried to register at the NIMC data centres. Some individuals have been extorted in various ways including requests to provide electricity to get registered. The NIMC's mismanagement includes leaving sensitive database records of Nigerians in foreign hands due to inability to handle contracts associated with the national identity registration programme.

Adepetun & Uzoho (2019), and Uzoho (2020), note that the fifty naira (NGN 50) tiered stamp duty charges on electronic bank transfers under the 2020 Finance Act serve as impediment to financial inclusion. The authors report that more Nigerians are frustrated and moving away from Point-of-Sale (POS) transactions as well as any e-payment platform. The consumers prefer to use cash for transactions. Adepetun & Uzoho (2019), list other fees charged by money deposit institutions that are capable to throw water on financial inclusion efforts in Nigeria. The fees include:

- (1) ₦4 (NGN 4) short message service (SMS) alerts even for unsolicited SMS sent to customers on birthdays, SMS notifications on operational updates, national and international celebrations
- (2) ₦4,000 (NGN 4,000) fee for hardware tokens
- (3) ATM cards issuance and maintenance fees
- (4) ₦4 (NGN 4) for one-time-pin (OTP) SMS
- (5) ₦20 (NGN 20) per page of statement of accounts

The OECD/INFE (2008) supports financial education in schools to breed a generation of financially literate citizens. The organization reports that the global financial crisis of 2007-2008 was due to ill-informed decisions on mortgage loans. These decisions could have been avoided if the people were financially literate. A low level of financial education is found to be associated with a low standard of living, decreased psycho-physical well-being and a heavy reliance on government support. Egbu (2018), reports a positive association between financial literacy and spending habits of public service employees in Nigeria. This underscores the need for the Nigerian government to pursue an aggressive financial literacy right from the elementary schools. The previous approaches at financial literacy in Nigeria have not yielded desired fruits. This author agrees with Chikalipah (2017), that major required path to financial inclusion in Nigeria is through an effective financial literacy education.

The Centre for Global Development (CGD, 2016) recommends an appropriate and workable regulatory framework which meets simultaneously the objective of financial stability, financial integrity and financial inclusion based on: regulation by

function, following a risk-based approach, and maintaining ex-ante and ex-post regulatory balance. Regulation by function means that similar financial activities should be subject to similar regulations without regard to the institution which is charged with conducting the activity. The rationale is that technological advances and the current evolution of players and products in the provision of financial services is making it increasingly difficult to map a type of provider with a type of financial. Therefore, regulating by function rather than by institutions is a logical course of action because all providers of financial services will be operating within a competitive level-playing field.

It is common to find local regulation that assigns the same level of risk to small financial transactions by low-income customers and large transactions by well-endowed customers. In such an environment, banks use The Know Your Customer (KYC) regulations for fighting money laundering and terrorism to deny financial services to poor customers who lack adequate documents for identification. Balancing ex-ante and ex-post regulations is a way of mixing traditional and new bank regulation strategies in anticipation of new and evolving market products to meet the needs of the financially underserved population. Too much reliance on the traditional way of regulation may discourage innovation and inadequate traditional regulation can cause instability in the system. Therefore, it is necessary to use ex-post regulations which helps to promote innovation but balanced with ex-ante regulations to guide against instability of the system.

Finally, the results reported in this study shows that Nigeria is achieving a relatively slow forward movement in the financial inclusion journey. More needs to be done in regulation as noted earlier in this piece. An appropriate and workable regulatory environment that gives room for competition in the provision of mobile financial services should be pursued. This is because financial inclusion and sustainable development are intertwined (Kandpal, 2020). The government should move quickly to resolve the issue of identification under the Know Your Customer (KYC) programme. Nigerians have several means of biometric identification that can be used to meet the KYC requirement. An appropriate interoperable technological infrastructure should be provided by government in collaboration with financial institutions to minimise the frustration of bank customers. The issue of bank fees and charges places undue burden on the most vulnerable in the society. Financial institutions should be required to follow best practices in other developing countries in terms of the fees they charge. The Nigerian government should not raise revenue on the back of the poor through stamp duties. Any charge should reflect the value of the transactions involved.

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