

Determinants of interest in eNaira and financial inclusion information in Nigeria: role of FinTech, cryptocurrency and central bank digital currency

Peterson K. Ozili

Governors Department, Central Bank of Nigeria, Abuja, Nigeria

Abstract

Purpose – The eNaira is the central bank digital currency of Nigeria. People who are interested in the eNaira and financial inclusion will seek information about eNaira and financial inclusion. Their interest in information about eNaira and financial inclusion will make it easier for them to adopt the eNaira and embrace other financial inclusion innovations such as FinTech and cryptocurrency. This paper investigates the determinants of interest in eNaira and financial inclusion information.

Design/methodology/approach – The data were analyzed using descriptive statistics, correlation analysis and ordinary least squares (OLS) regression. The study also used the GMM and 2SLS regression methods for robustness.

Findings – Using interest over time data, the findings of this study reveal that interest in financial technology (FinTech) and eNaira information are significant positive determinants of interest in financial inclusion information. Also, interest in financial inclusion is a significant positive determinant of interest in eNaira information. Furthermore, interest in FinTech information has a positive and significant correlation with interest in financial inclusion information. There is also a significant positive correlation between interest in central bank digital currency information and interest in FinTech information. The implication of the findings is that interest in information about new financial innovations, such as FinTech and eNaira, can stimulate interest in information about financial inclusion.

Originality/value – The literature has not examined the determinants of interest in eNaira and financial inclusion information yet.

Keywords eNaira, Fintech, Financial inclusion, Central bank digital currency, Cryptocurrency, Information, Innovation, Innovation diffusion theory

Paper type Practitioner paper

1. Introduction

This paper investigates the determinants of interest in eNaira information and the determinants of interest in financial inclusion information. The eNaira, financial technology (FinTech) and cryptocurrency are modern financial innovations for financial inclusion. The eNaira is the central bank digital currency of Nigeria, while financial inclusion refers to access to basic financial services for all people (Ozili, 2021, 2022a). The Nigerian central bank issued the eNaira central bank digital currency and it also launched several innovations for financial inclusion in an attempt to increase access to formal financial services for the population.

Recent debates about modern financial innovation have focused on the benefits and consequences of financial innovation. There are arguments that financial innovation would



disrupt traditional financial systems in significant ways (Gomber, Kauffman, Parker, & Weber, 2018; Ozili, 2018). There is also the argument that financial innovation can improve financial inclusion by increasing access to financial services (Beck, Senbet, & Simbanegavi, 2015; Ozili, 2021). Notwithstanding, some scholars argue that the risks embedded in specific financial innovation might be a setback for financial inclusion for the underserved population (see, for example, Ozili, 2020; Yawe & Prabhu, 2015). While these arguments are important in improving our understanding of the benefits and consequences of modern financial innovations, the current discourse in the literature have not examined the role of available information in encouraging the adoption of digital financial innovation such as the eNaira and other financial inclusion innovation.

Available information plays an important role in educating people about the benefits of innovations (Akcigit & Liu, 2016). But information availability alone is not enough to make people adopt specific innovations. People need to be interested in being informed about these innovations. Their interest in information about specific innovations should lead them to search for information about these innovations, and the outcome of their search for information can make them willing to adopt these innovations. Interest in Internet information about innovation is an essential determinant of innovation adoption. But this area has received little attention in the literature. The literature has not examined what motivates people to search for information about the eNaira and financial inclusion. The literature has also not examined the determinants of interest in eNaira and financial inclusion information.

This paper is the first to investigate the determinants of interest in eNaira and financial inclusion information. It examined the role of interest in FinTech, cryptocurrency and central bank digital currency (CBDC) information in influencing interest in eNaira and financial inclusion information. Using interest over time data based on Internet search from Google Trends database, the findings reveal that interest in FinTech and eNaira information are significant positive determinants of interest in financial inclusion information. Also, interest in financial inclusion is a significant positive determinant of interest in eNaira information. Furthermore, interest in FinTech information has a positive and significant correlation with interest in financial inclusion information.

This paper contributes to the literature in the following ways. This paper contributes to the innovation and information literature. The study shows that interest in information about financial innovation can stimulate interest in related financial innovation. This study also contributes to the financial inclusion literature by identifying the determinants of interest in financial inclusion information – an area that has not been examined in the financial inclusion literature. This study also contributes to the limited literature about the eNaira central bank digital currency.

The rest of the paper is organized as follows. Section 2 presents the theory and literature review. Section 3 presents the research methodology. Section 4 presents the empirical results. Section 5 presents the results.

2. Theory and literature review

2.1 Theory

The diffusion of innovation theory was developed by Roger in 2003. The theory describes the pattern and speed at which information about new innovations spread through a population. The theory explores the factors that influence an individual to adopt an innovation or a new technology (Md Nor, Pearson, & Ahmad, 2010). The theory suggests five key beliefs that influence the adoption of any innovation. The beliefs are relative advantage, complexity, compatibility, trial-ability and observability (Md Nor *et al.*, 2010). The theory also argues that information about new innovations are diffused or communicated through certain channels to members of a social system or the population (Roger, 2003). The theory argues that the channel

through which information about a new innovation is communicated can greatly influence how people respond to the innovation; and their response to information about the new innovation would give rise to early adopters, early majority adopters, late majority adopters and laggards (Roger, 2003). The implication of the diffusion of innovation theory for this study relates to the channel through which new innovations are communicated to members of the population. The study identifies the Internet as the main channel through which people learn about new innovations. Existing studies show that information can be diffused through word-of-mouth (Chevalier & Mayzlin, 2006) or opinion leaders (Valente & Davis, 1999). In contrast, this study focused on the “internet” as the major channel through which information about the eNaira, cryptocurrency, FinTech and financial inclusion is communicated to members of the population. This theoretical paradigm allows us to assess the pattern of “interest over time in Internet information” about the eNaira, cryptocurrency, FinTech and financial inclusion.

2.2 Literature review

This study draws insights from the innovation diffusion literature. The literature show that innovation diffusion has to do with the acceptance over time of innovation by individuals and groups that have access to information about the innovation (Katz, Levin, & Hamilton, 1963). This definition fits well with the case of the eNaira and financial inclusion innovations because it points to the acceptance of the eNaira and financial inclusion innovations over time. Regarding the channels for spreading information about innovations, Van Eck, Jager, and Leeftang (2011) show that opinion leaders may possess more accurate knowledge about an innovation, and they increase the speed of information diffusion and the adoption of the innovation. Zanello, Fu, Mohnen, and Ventresca (2016) show that innovation in developing countries is about creating or adopting new ideas and technologies but the capacity for innovation is embedded in and constituted by institutional, geographical, socio-economic, political and legal factors.

MacVaugh and Schiavone (2010) also argue that innovation diffusion is affected by technological, social and learning conditions in the individual, community or market/industry environment. Liu and Li (2010) focused on mobile Internet usage as an innovation. They assessed the diffusion process of mobile Internet usage in China. They find that there are significant differences in users’ perceptions of mobile Internet usage during its different innovation diffusion stages. Xu, Watts, and Reed (2019) examine whether access to Internet promote innovation in the US broadband industry. They analyze a specific county in the US. They find a positive relationship between access to the Internet and the number of patents filed in the county. They also find that access to the Internet lowers information disseminating costs and encourages more patents filed in the county. The results also indicate that access to the Internet matters more than faster Internet speed for innovation.

Regarding central bank digital currency adoption, Kasemrat and Kraiwaniit (2022) investigate the factors that affect the acceptance of a retail central bank digital currency in Thailand. They find that two factors encourage the adoption of Thai retail central bank digital currency, namely, the media and experience of using e-money. They found that greater use of the media and e-money increase the likelihood of retail central bank digital currency adoption in Thailand.

Keister and Monnet (2021) focus on the information aspects of digital payment technologies. They argue that a central bank digital currency that allows users’ identity to be hidden could help improve outcomes by giving users control over their data. They also emphasize that the central bank digital currency would help to preserve financial stability by providing useful aggregated payment information for central banks. Ozili (2022a) shows that the eNaira central bank digital currency in Nigeria can improve the conduct of monetary policy, increase convenience, lead to efficient payments and increase financial inclusion, but it also comes with risks such as digital illiteracy, increased propensity for cyber-attacks, data theft and the changing role of banks in a full-fledged central bank digital currency economy. Bijlsma, van der Cruysen, Jonker, and Reijerink (2021) examine what triggers consumer adoption of central bank

digital currency in Netherlands. They used survey data and show that the usage of central bank digital currency for payments and saving are important determinants of the success of central bank digital currency. They also find that central bank digital currency adoption is positively related to users' knowledge of central bank digital currency, trust in banks and trust in the central bank. They also show that the amount that users want to deposit in the central bank digital currency savings account depends on the interest rate offered.

Söilen and Benhayoun (2021) investigate household acceptance of a central bank digital currency. They find that social recommendations, institutional efforts and the existence of facilitating conditions encourage the adoption of central bank digital currency by households. Maryaningsih, Nazara, Kacaribu, and Juhro (2022) show that wholesale central bank digital currency is more common in advanced countries with developed financial markets and greater cross-border transactions while retail central bank digital currency is more common in countries with lower financial inclusion and a large informal economy. Regarding the determinants of financial inclusion, Lotto (2018) states that banks introduced Internet banking to change the way people access their bank accounts anytime and anywhere, giving them both time and locational freedom. Evans (2018) shows that Internet usage has a significant positive relationship with financial inclusion, meaning that rising levels of Internet usage is associated with higher levels of financial inclusion. Sanderson, Mutandwa, and Le Roux (2018) show that Internet connectivity is positively related to financial inclusion.

Empirical studies such as Kanga, Oughton, Harris, and Murinde (2022) analyze the diffusion of financial technology FinTech and its interaction with financial inclusion and living standards (GDP per capita) for 137 countries from 1991 to 2015. They find that FinTech diffusion and financial inclusion have long-run effects on living standards or GDP per capita. Hu, Zhao, and Yang (2022) show that FinTech development reduces the risk-taking of large commercial banks. Adhami, Giudici, and Martinazzi (2018) analyze the reason why businesses adopt initial coin offering (ICO). They analyze the determinants of the success of ICOs from 253 surveys and find that the probability of an ICO's success is higher if the code source is available and when tokens allow contributors to access a specific service or to share profits. Hu, Ding, Li, Chen, and Yang (2019) examine the factors influencing the intention to adopt FinTech Services among bank users. They use questionnaires and collected 387 responses. They analyze the data using SEM and find that users' trust in FinTech services has a significant influence on users' attitudes for FinTech adoption. They also find that the perceived ease of use and perceived risk do not affect users' attitudes toward adopting FinTech services. Carlin, Olafsson, and Pagel (2017) analyze how better access to FinTech influence the use of consumer credit and affects financial fitness. They analyze the introduction of a smartphone application for personal financial management as a source of exogenous variation. They find that FinTech adoption reduces financial fee payments and penalties. They find that, after adopting the new technology, millennials and members of Generation X incur fewer financial fees and penalties, whereas Baby Boomers do not benefit from the FinTech development. Millennials and Generation X members save fees by using their credit cards rather than overdrafts to manage short-term liabilities. They also find that millennials shift some of their spending to discretionary entertainment, whereas members of Generation X remain more austere. Ozili (2022b) analyzes the global interest in embedded finance information and compares it with interest in FinTech information. The author used Granger causality test and two-stage least squares (2SLS) regression and find that interest in embedded finance or FinTech information increased significantly during the COVID-19 pandemic. It was also found that interest in embedded finance information is a significant determinant of interest in FinTech information. Also, interest in embedded finance information is significantly correlated with interest in FinTech information.

Overall, the above studies have not examined the determinants of interest of eNaira and financial inclusion information. This paper fills this gap in the literature.

3. Methodology

Weekly data for Nigeria were extracted from Google Trends database. The description of the data is shown in [Table 1](#). The Google Trends data measures the interest over time or the popularity of specific keywords on the Internet at a specific location and over a time period. The sample period for this study covers a 42-week period beginning from 25th October 2021 to 15th August 2022. The sample period spans from the day the eNaira central bank digital currency was launched (25th October 2021) until mid-August in 2022. Interest over time data for Nigeria were extracted for five variables from Google Trends database. To obtain the data, I inserted the keywords “*eNaira*”, “*financial inclusion*”, “*Fintech*”, “*CBDC*” and “*cryptocurrency*” into the search box in the Google Trends database one at a time, and the resulting data are the EN, FN, FINTECH, CBDC and CRYPTO variables, respectively. The first variable is the “EN” variable which measures the interest in Internet information about the eNaira. The second variable is the “FN” variable which measures the interest in Internet information about financial inclusion. The third variable is the “FINTECH” variable which measures the interest in Internet information about FinTech. The fourth variable is the “CBDC” variable which measures the interest in Internet information about central bank digital currency. The fifth variable is the “CRYPTO” variable which measures the interest in Internet information about cryptocurrency. The data output from the Google Trends database are numbers, also known as popularity count, ranging from 0 to 100. These numbers represent interest in a keyword relative to the highest point on the scale for the given location, region and time. The numbers capture the relative popularity of a keyword. A count of 50 means that interest in the keyword is half as popular. A count of 100 means that interest in the keyword was highly popular and reached the peak popularity for the term. A score of 0 means that there was not enough data for the search term. The data were analyzed using descriptive statistics, correlation analysis, ordinary least squares (OLS) regression, the generalized methods of moments (GMM) regression and the two-stage least squares (2SLS) regression methods.

4. Empirical results

4.1 Descriptive statistics and correlation

[Table 2](#) reports the descriptive statistics. The descriptive statistics in [Table 2](#) shows that interest in financial inclusion information (with a score of 24) was higher than interest in eNaira information (with a score of 16.6) during the period. However, interest in cryptocurrency information was higher than interest in financial inclusion and eNaira

Variable	Variable description	Source	Trend period
FN	Interest in Internet information about the eNaira by Nigerians	Google Trends database Location: Nigeria	October 25, 2021 to August 15, 2022
EN	Interest in Internet information about financial inclusion by Nigerians	Google Trends database Location: Nigeria	October 25, 2021 to August 15, 2022
FINTECH	Interest in Internet information about FinTech by Nigerians	Google Trends database Location: Nigeria	October 25, 2021 to August 15, 2022
CBDC	Interest in Internet information about central bank digital currency by Nigerians	Google Trends database Location: Nigeria	October 25, 2021 to August 15, 2022
CRYPTO	Interest in Internet information about cryptocurrency by Nigerians	Google Trends database Location: Nigeria	October 25, 2021 to August 15, 2022

Table 1.
Data and variable description

information. Notwithstanding, interest in FinTech information was higher than interest in eNaira, cryptocurrency and financial inclusion information during the period.

The Pearson correlation result is reported in Table 3. The correlation result shows that there is a significant positive correlation between the FINTECH variable and the FN variable. This suggests that interest in FinTech information is correlated with interest in financial inclusion information. Also, there is a significant positive correlation between the EN and CBDC variables and between the EN and CRYPTO variables. The two results suggest that interest in eNaira information is significant and positively correlated with interest in central bank digital currency and FinTech information. Finally, the values of the correlation coefficients are low which suggests that multi-collinearity is not a problem in the analysis. Also, the Augmented Dicky–Fuller (ADF) unit root test result reported in Appendix 1 shows that the EN, FN, CBDC and FINTECH variables are all stationary while the CRYPTO variable is nonstationary.

4.2 Determinants of interest in financial inclusion information

The result for the determinants of interest in financial inclusion information is reported in Table 4. The FINTECH coefficient is positive and statistically significant at the 1% level in columns 1, 2 and 3. The positive significance of the FINTECH coefficient indicates that interest in FinTech information leads to a significant increase in interest in financial inclusion information. The implication is that the search for FinTech information is a significant determinant of the search for financial inclusion information in Nigeria. The EN coefficient is also positive and statistically significant at the 1% level in column 1. This result indicates that interest in eNaira information leads to a significant increase in interest in financial inclusion information. The implication is that people who are interested in eNaira information are also interested in financial inclusion information in Nigeria. In contrast, the CBDC coefficient is not statistically significant. This result indicates that interest in CBDC information did not have a significant effect on interest in financial inclusion information. Regarding the cryptocurrency

Statistic	FN	EN	CBDC	CRYPTO	FINTECH
Mean	24.1	16.6	17.27	60.7	63.1
Median	20.5	10	0	61	66
Maximum	100	100	100	100	100
Minimum	0.00	0.00	0	40	14
Standard deviation	22.76	19.19	25.76	13.84	21.7
Observations	40	40	40	40	40

Table 2.
Descriptive statistics for the variables

Variable	FN	EN	CBDC	CRYPTO	FINTECH
FN	1.000				
EN	0.074 (0.65)	1.000			
CBDC	-0.051 (0.75)	0.307* (0.05)	1.000		
CRYPTO	-0.059 (0.72)	0.505*** (0.00)	0.175 (0.27)	1.000	
FINTECH	0.322** (0.04)	-0.515*** (0.00)	-0.283* (0.07)	-0.169 (0.29)	1.000

Note(s): *p*-values are in parenthesis. *, ** and *** represent statistical significance at 10%, 5% and 1% levels

Table 3.
Pearson correlation matrix for FN, EN, CBDC, CRYPTO and FINTECH variables

variable, the CRYPTO coefficient is negative and statistically insignificant. This result indicates that interest in cryptocurrency information did not have a significant impact on interest in financial inclusion information. Regarding the two interaction variables, the EN*CRYPTO and EN*CBDC coefficients are statistically insignificant in columns 2 and 3 of Table 4. Overall, the result in Table 4 indicates that interest in FinTech and eNaira information are significant positive determinants of interest in financial inclusion information.

4.3 Determinants of interest in eNaira information

The result for the determinants of interest in eNaira information is reported in Table 5.

The FINTECH coefficient is negative and statistically significant at the 1% level in columns 1 and 2. The negative significance of the FINTECH coefficient indicates that interest in FinTech information leads to a significant decrease in interest in eNaira information. The implication is that people who are more interested in FinTech information are less interested in information about the eNaira in Nigeria.

The FN coefficient is positive and statistically significant in columns 1, 2 and 3. This result indicates that interest in financial inclusion information leads to a significant increase in interest in eNaira information. The implication of the findings is that the search for financial inclusion information led to greater search for information about eNaira information in Nigeria.

Table 4.
Determinants of
interest in financial
inclusion information
(FN): OLS regression
estimation

Variable	(1) Coefficient (<i>p</i> -value)	(2) Coefficient (<i>p</i> -value)	(3) Coefficient (<i>p</i> -value)
C	0.907 (0.96)	0.502 (0.98)	-9.534 (0.75)
EN	0.520** (0.04)	0.533 (0.14)	1.041 (0.36)
FINTECH	0.538*** (0.00)	0.539*** (0.00)	0.578*** (0.00)
CBDC	-0.006 (0.96)	0.005 (0.98)	-0.012 (0.93)
CRYPTO	-0.317 (0.28)	-0.315 (0.29)	-0.214 (-0.59)
EN*CBDC		-0.001 (0.96)	
EN*CRYPTO			-0.006 (0.64)
Adjusted <i>R</i> -square	11.95	9.37	9.96
<i>F</i> -statistic	2.32	1.81	1.86
Prob (<i>F</i> -statistic)	0.08	0.14	0.13
Durbin-Watson	2.14	2.14	2.08
No. of observations	40	40	40

Table 5.
Determinants of
interest in eNaira
information (EN): OLS
regression estimation

Variable	(1) Coefficient (<i>p</i> -value)	(2) Coefficient (<i>p</i> -value)	(3) Coefficient (<i>p</i> -value)
C	2.469 (0.85)	-0.127 (0.99)	-85.215 (0.00)
FN	0.224** (0.04)	0.228** (0.03)	0.174* (0.06)
FINTECH	-0.442*** (0.00)	-0.407*** (0.00)	1.127** (0.01)
CBDC	0.079 (0.87)	0.177 (0.47)	0.072 (0.37)
CRYPTO	0.579*** (0.00)	0.585*** (0.00)	2.092*** (0.00)
FINTECH*CBDC		-0.002 (0.67)	
FINTECH*CRYPTO			-0.027 (0.00)
Adjusted <i>R</i> -square	46.68	45.41	60.72
<i>F</i> -statistic	9.54	7.488	13.06
Prob (<i>F</i> -statistic)	0.000	0.000	0.000
Durbin-Watson	0.89	0.93	1.19
No. of observations	40	40	40

Variable	(1) GMM: FN Coefficient (β -value)	(2) GMM: FN Coefficient (β -value)	(3) GMM: FN Coefficient (β -value)	(4) 2SLS: FN Coefficient (β -value)	(5) 2SLS: FN Coefficient (β -value)	(6) 2SLS: FN Coefficient (β -value)
<i>c</i>	-3.883 (0.88)	-44.316 (0.46)	-25.557 (0.79)	0.907 (0.96)	0.502 (0.98)	-9.534 (0.75)
<i>EN</i>	1.315*** (0.00)	1.707** (0.02)	1.991 (0.53)	0.520** (0.04)	0.533 (0.14)	1.041 (0.36)
FINTECH	0.598** (0.02)	0.864* (0.06)	0.686 (0.19)	0.538*** (0.00)	0.533*** (0.00)	0.577*** (0.00)
CBDC	-0.248 (0.29)	0.332 (0.64)	-0.222 (0.37)	-0.006 (0.96)	0.005 (0.98)	-0.012 (0.93)
CRYPTO	-0.419 (0.25)	-0.176 (0.73)	-0.180 (-0.85)	-0.317 (0.28)	-0.315 (0.29)	-0.214 (0.56)
EN*CBDC		-0.016 (0.43)			-0.001 (0.96)	-0.006 (0.64)
EN*CRYPTO			-0.009 (0.81)			
<i>F</i> -statistic	0.42	0.01	0.37			
<i>F</i> / <i>T</i> -statistic	0.51	0.93	0.54			
Durbin-Watson	1.60	1.67	1.53	2.14	2.14	2.08
Adjusted <i>R</i> ²				11.95	9.36	9.96
<i>F</i> -statistics				2.32	1.81	1.86
No. of observations	39	39	39	40	40	40

Note(s): *, ** and *** denote statistical significance at the 10%, 5% and 1% level. The GMM instruments are the lag of all the variables. The explanatory variables are used as the 2SLS instruments

Table 6.
Determinants of interest in financial inclusion information (FN): GMM regression estimation

Table 7.
Determinants of
interest in eNaira
information (EN):
GMM and 2SLS
regression estimations

Variable	(1) GMM: EN Coefficient (ρ -value)	(2) GMM: EN Coefficient (ρ -value)	(3) GMM: EN Coefficient (ρ -value)	(4) 2SLS: EN Coefficient (ρ -value)	(5) 2SLS: EN Coefficient (ρ -value)	(6) 2SLS: EN Coefficient (ρ -value)
<i>c</i>	-3.028 (0.87)	1.449 (0.96)	-32.777 (0.59)	2.469 (0.85)	-0.127 (0.99)	-85.215*** (0.00)
FINTECH	0.727*** (0.00)	0.671*** (0.00)	0.659** (0.02)	0.224** (0.04)	0.228** (0.04)	0.174* (0.06)
CBDC	-0.449*** (0.00)	-0.434 (0.14)	0.177 (0.87)	-0.442*** (0.00)	-0.407*** (0.00)	1.127*** (0.01)
CRYPTO	0.193 (0.18)	0.426 (0.48)	0.197 (0.14)	0.079 (0.39)	0.177 (0.47)	0.072 (0.37)
FINTECH*CBDC	0.322 (0.14)	0.399 (0.18)	0.942 (0.39)	0.579*** (0.00)	0.585*** (0.00)	2.092*** (0.00)
FINTECH*CRYPTO		-0.007 (0.59)	-0.011 (0.59)		-0.002 (0.67)	-0.027*** (0.00)
<i>J</i> -statistic	0.44	2.894	0.239			
<i>F</i> / <i>J</i> -statistic	0.51	0.089	0.62			
Durbin-Watson	1.59	1.80	1.45	0.89	0.93	1.19
Adjusted <i>R</i> ²				46.67	45.41	60.72
<i>F</i> -statistics				9.53	7.48	13.06
No of observations	39	39	39	40	40	40

Note(s): *, **, and *** denote statistical significance at the 10%, 5% and 1% level. The GMM instruments are the lag of all the variables. The explanatory variables are used as the 2SLS instruments

The CRYPTO coefficient is positive and statistically significant at the 1% level in column 1, 2 and 3. This result indicates that interest in cryptocurrency information leads to a significant increase in interest in eNaira information. The implication is that people who are interested in cryptocurrency information are also interested in eNaira information, indicating that Nigerians had a general interest in both the eNaira and cryptocurrency during the period.

Meanwhile, the FINTECH*CBDC and FINTECH*CRYPTO coefficients are negatively related to EN and are statistically insignificant in columns 2 and 3. Overall, the result in [Table 5](#) indicates that interest in financial inclusion, FinTech and cryptocurrency information are significant determinants of interest in eNaira information.

4.4 Robustness tests using GMM and 2SLS estimations

To check whether the results are sensitive to alternative estimation, I re-estimate the OLS regression results in [Tables 4 and 5](#) using the GMM regression estimation method and the 2SLS regression method.

The GMM and 2SLS estimations were applied because the OLS regression methodology does not address the problem of endogeneity in the data, and the independent variables may be correlated with the residuals, which gives rise to spurious regression. To address this problem and obtain reliable estimates, the GMM regression and the 2SLS regression methods are used to validate the OLS regression estimation result.

The GMM and 2SLS regression estimation results are consistent with the OLS regression results. Regarding the determinants of interest in financial inclusion information, the GMM result in [Table 6](#) shows that the FINTECH variable is significant and positively associated with the FN variable in columns 1 and 2. This is consistent with the earlier result in columns 1 and 2 of [Table 4](#). Similarly, the EN variable is positive and significantly associated with the FN variable in column 1, which is consistent with the earlier result in column 1 of [Table 4](#). The 2SLS result in [Table 6](#) also shows that the FINTECH variable is significant and positively associated with the FN variable in columns 4, 5 and 6. This is consistent with the earlier result reported in columns 1, 2 and 3 of [Table 4](#). Similarly, the EN variable is positive and significantly associated with the FN variable in the 2SLS estimation in column 4 of [Table 6](#) and is consistent with the earlier result in column 1 of [Table 4](#).

Regarding the determinants of interest in eNaira information, the GMM result in [Table 7](#) shows that the FINTECH variable is significant and positively associated with the EN variable in column 1, and is consistent with the result in column 1 of [Table 5](#). Similarly, the FN variable is positive and significantly associated with the EN variable in columns 1, 2 and 3, and is consistent with the earlier result in column 1 of [Table 5](#). The 2SLS results also show that the FINTECH variable is significant and positively associated with the EN variable in columns 4 and 5 of [Table 7](#), and are consistent with the earlier result in columns 1 and 2 of [Table 5](#). Similarly, the FN variable is positive and significantly associated with the EN variable in columns 4, 5 and 6 in the 2SLS estimation in [Table 7](#), and is consistent with the earlier result in column 1 of [Table 5](#).

5. Conclusion

Emerging innovations in finance have led to increased interest in information about Fintech innovation and digital currencies such as cryptocurrency and the eNaira central bank digital currency. This paper investigates the determinants of interest in eNaira and financial inclusion information using Google Trend data for Nigeria. The findings reveal that interest in FinTech information and interest in eNaira information are significant positive determinants of interest in financial inclusion information. Also, interest in financial inclusion information is a significant positive determinant of interest in eNaira information. Furthermore, interest in FinTech information has a positive and significant correlation with interest in financial inclusion

information. There is also a significant positive correlation between interest in central bank digital currency and FinTech information. The implication of the findings is that information about new financial innovations such as FinTech and eNaira can stimulate interest in information about financial inclusion. Policymakers should therefore encourage the dissemination of information about new financial innovations such as FinTech and eNaira as it can stimulate interest in financial inclusion among members of society. It might become necessary to launch a public information campaign across multiple media, both online and offline, to educate citizens and provide them with adequate information about FinTech and the eNaira. Such effort can make financial inclusion easier to achieve when people have full information about FinTech and the eNaira. There is also a need to increase Internet information about financial inclusion as it can help to increase people's interest in internet information about the eNaira. The limitation of this study is that the study used "interest over time" data which may be subject to seasonality bias. These data were used because real-time eNaira data are privately held by the central bank of Nigeria and is not publicly available to external researchers. Nonetheless, the "interest over time" data are insightful because they reveal how popular innovations have become on the Internet over time. Another limitation of the study is that the sample period is small. These limitations provide some fruitful areas for future research. Future studies can re-examine this topic using a large sample period in the context of Nigeria. Future studies can also extend this study by investigating the determinants of financial inclusion and the eNaira using economic data when such data becomes publicly available. Future studies can also examine the determinants of interest in cryptocurrency information in Nigeria.

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(The Appendix follows overleaf)

Appendix 1
Augmented Dickey–Fuller (ADF) unit-root test result for the variables

Variable	<i>t</i> -statistic	<i>p</i> -value	Remark
EN	−6.547	0.000	EN variable does not have a unit root. EN variable is therefore stationary as the <i>p</i> -value is less than 0.05
FN	−5.984	0.000	FN variable does not have a unit root. FN variable is therefore stationary as the <i>p</i> -value is less than 0.05
CBDC	−6.012	0.000	CBDC variable does not have a unit root. CBDC variable is therefore stationary as the <i>p</i> -value is less than 0.05
CRYPTO	−2.587	0.104	CRYPTO variable has a unit root. CRYPTO variable is therefore non-stationary as the <i>p</i> -value is greater than 0.05
FINTECH	−3.153	0.031	FINTECH variable does not have a unit root. FINTECH variable is therefore stationary as the <i>p</i> -value is less than 0.05

Corresponding authorPeterson K. Ozili can be contacted at: peteronkitakogelu@yahoo.com

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