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EFFECT OF DIGITAL FINANCIAL SERVICES AND FINANCIAL INCLUSION ON ECONOMIC DEVELOPMENT IN NIGERIA: OPPORTUNITIES, CHALLENGES AND POLICY IMPLICATIONS

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Abstract

The study examined the effect of digital financial services and financial inclusion on economic development in Nigeria: opportunities, challenges and policy implications. The specific objectives were to determine the effect of E-bills pay on financial inclusion and economic development in Nigeria; determine the effect of m-cash on financial inclusion and economic development in Nigeria. This research work will be anchored on the Technology Acceptance Theory (TAT). The study adopted expo facto research design. Data were generated from secondary sources. Ordinary Least Squared (OLS) method of data analysis was adopted because of its Best Linear Unbiased Estimators (BLUE) properties. The data for the variables used was sourced from Central Bank of Nigeria Statistical Bulletin. The variables used were E-bills pay, m-cash and economic development. The study found that E-bills pay has significant effect on the financial performance of commercial banks in Nigeria (t=7.794817 =0.000). M-cash has significant effect on the financial performance of commercial banks in Nigeria (t=3.269252, p=0.0022). The study concludes that digital banking platforms, particularly E-bills Pay and M-Cash, significantly improve the financial performance of commercial banks in Nigeria. The study recommends Banks should continuously improve the platform by making bill payment services faster, more reliable, user-friendly and accessible to customers. Banks should also expand the range of bills and services that customers can pay through the platform; Commercial banks should therefore strengthen their mobile banking infrastructure and introduce additional features that make mobile transactions convenient and secure.

Keywords: -bills pay, m-cash and economic development, digital financial services and financial inclusion.

1.1 Introduction

The emergence of digital financial services (DFS) has significantly transformed the delivery of financial services across the world. Digital financial services refer broadly to financial products and transactions delivered through digital technologies, including mobile banking, internet banking, electronic payments, mobile money, digital wallets, point-of-sale terminals, agency banking, digital lending and other technology-enabled financial services (Apoorva, 2021). The rapid diffusion of mobile phones, internet connectivity, digital platforms and electronic payment systems has reduced the dependence on conventional bank branches and created opportunities for previously underserved populations to participate in formal financial activities. Digital platforms can reduce transaction costs, increase accessibility and improve the speed and convenience with which financial services are delivered (Onyeogo, Ikeora, Nduka, & Ugorji, 2025).

The growth of digital payments represents one of the most visible dimensions of this transformation. Electronic transfers, mobile payments, payment cards, point-of-sale transactions and digital wallets have increasingly become part of everyday economic activities in Nigeria (Elegunde & Shotunde, 2020). The expansion of these channels has the potential to make financial transactions faster, more transparent and less costly while reducing the dependence on cash. For small and medium-sized enterprises, digital financial services can facilitate payments from customers, transfers to suppliers, record keeping and access to other financial services. For households, they can make it easier to receive income, remit money, save and make payments without travelling long distances to banking facilities (Onyia & Agu, 2026).

Beyond access, digital financial services may contribute to economic development through several mechanisms. First, increased access to formal financial services can encourage savings and channel financial resources toward productive investment (Onyeogo, Ikeora, Nduka, & Ugorji, 2025). Second, digital transaction records may improve the information available to financial institutions and potentially facilitate access

to credit, particularly for micro, small and medium-sized enterprises. Third, efficient digital payment systems can reduce transaction costs and support the growth of e-commerce and digital entrepreneurship. Fourth, digital financial services can facilitate the efficient distribution of government payments and social transfers (Ayoade, Isibor, & Akinrinola, 2025).

Consequently, the expansion of digital finance can contribute to employment creation, business growth, productivity and household economic resilience. The opportunities associated with digital financial services are, however, accompanied by significant challenges. Digital exclusion remains a major concern because access to mobile phones, smartphones, reliable internet connectivity and electricity is not evenly distributed across Nigeria (Enadeghe & Mohammed 2025). Rural communities and low-income groups may face greater barriers to digital financial participation. Similarly, differences in digital literacy and financial literacy can limit people's ability to use digital financial products safely and effectively. Another important challenge relates to cybersecurity, fraud and consumer protection (Hussain, 2024). The increasing volume of digital financial transactions creates opportunities for cybercriminals, fraudsters and other forms of digital financial misconduct. Concerns relating to identity theft, unauthorized transactions, phishing, account compromise, data privacy and digital scams can undermine public confidence in digital financial services. Where consumers lack adequate awareness of their rights or effective mechanisms for resolving complaints, negative experiences can discourage continued participation in the formal financial system (Olusanya & Eucharia, 2024).

Against this background, the study on “The Impact of Digital Financial Services on Financial Inclusion and Economic Development in Nigeria: Opportunities, Challenges and Policy Implications” is considered important. The study seeks to examine how digital financial services can broaden access to financial products and services, identify the opportunities they create for households and businesses, assess the challenges that may

limit their effectiveness, and consider the policy measures required to maximize their developmental benefits.

1.2 Objectives of the Study

The broad objective of the study was to analyze the effect of digital financial services and financial inclusion on economic development in Nigeria: opportunities, challenges and policy implications. The following specific objectives guided this study:

i. To determine the effect of E-bills pay on financial inclusion and economic development in Nigeria.

ii. To determine the effect of m-cash on financial inclusion and economic development in Nigeria.

Review of Related Literature

The related literature was reviewed under the following subheadings: conceptual review, theoretical exposition, theoretical framework and empirical study.

2.1 Conceptual Review

2.1.1. Digital Financial Services (DFS)

Digital Financial Services (DFS) refer to financial products and services delivered through digital channels such as mobile phones, internet platforms, point-of-sale devices, and fintech applications. DFS encompasses mobile banking, mobile money, electronic payments, and digital credit, all of which expand access to financial systems beyond traditional banking structures (Ozili, 2021). The conceptual foundation of DFS lies in its ability to reduce transaction costs, enhance efficiency, and broaden access to underserved populations. By leveraging technology, DFS facilitatses financial inclusion which is

widely recognized as a pathway to economic growth and inclusive development (Demirgüç-Kunt et al., 2020).

2.1.2 Digital financial inclusion

Digital financial inclusion has emerged as one of the most transformative innovations in modern economic development, reshaping how individuals, businesses, and governments access and utilize financial services across developing economies (Demirgüç-Kunt et al., 2018; World Bank, 2021). At its core, digital financial inclusion refers to the provision of affordable and accessible financial services such as payments, savings, credit, and insurance through digital channels including mobile phones, internet platforms, and digital payment systems (Sahay et al., 2015; O جوز ef et al., 2020).

2.1.3 Economic Growth (GDP per Capita)

Economic growth is traditionally measured by Gross Domestic Product (GDP) per capita, which reflects the average income of citizens and sometimes serves as a proxy for welfare improvement (Ogbebor et al., 2023). GDP per capita captures both the expansion of national income and its distribution across the population, making it a key indicator of inclusive development (World Bank, 2023). The conceptual link between DFS and GDP per capita lies in the mechanisms through which digital finance enhances productivity, facilitates investment, and stimulates consumption.

2.2 Theoretical Review

Technology Acceptance Theory (TAT)

Davis, Bagozzi, and Warshaw (1989) came up with the TAT model in a bid to explain the user's acceptance and intention in the use of technology. TAT looks at a technology perceived ease of use and usefulness. The perceived usefulness of a technology is the belief by the user that the technology will improve his or her on job performance. The perceived ease of use looks at how easily the user can learn to use the new system or the technology (Gefen et al.,2003). According to the model, if the new technology ease of use is achieved it is likely to positively lead to perceived usefulness. There are external variables like the environment that can affect the perceived ease of use and usefulness.

This theory is often used when researching on information technologies and its main emphasis is on the two perceptive factors. Liu and Arnett (2000) looked at the important factors affecting the developing of a website based on this model. Gefen et al. (2003) used both TAT and rust and came up with a more evolved model that could be used to explain the online behaviors of customers. Pavlou (2003) suggests the use of thee-commerce acceptance model on online customers that uses survey and experiment techniques. Horst, Kutts chreuter and Guttering (2007) did a follow up study that examined if it was prudent for the Netherlands government to use-government to serve its people like in other nations. The study considered TAT factors, faith, perceived risk and public experiences. The findings of the study showed that the public trusted the government and resonated with information technology. The empirical study further revealed that TAT is not only useful for examination of information technology but it also useful ion examining the acceptance of intention behavior related to information technology and further explains the behavior issues faced by online users of technology(Liu and Arnett, 2000; Gefen et al., 2003).

2.3 Empirical Studies

Onyia and Agu, (2026) investigated the impact of digital financial services innovations on the deposit money banks in Nigeria within the period of 2012 to 2024. Specifically, the study aims to examine the impact of the volume of Automated Teller Machine (VATM) digital financial services innovation on Return on Asset (ROA) in Nigeria; evaluate the impact of the volume of Point of Sales (VPOS) digital financial services innovation on Return on Assets (ROA) in Nigeria; investigate the impact of the volume of mobile-based (VMOB) digital financial services innovation on Return on Asset (ROA) in Nigeria; and assess the impact of the volume of web-based (VWBP) digital financial services innovation on Return on Asset (ROA) in Nigeria. This study, conducted for the period from 2012 to 2024, utilized the ordinary least squares regression method to investigate the impact of digital financial services innovation on the performance of deposit money banks in Nigeria. Secondary data were sourced from the Central Bank of Nigeria's Statistical Bulletin and Statistics and Economic Reports for various years. Empirical findings revealed that the volume of ATM, POS, mobile-based, and web-based digital financial services innovation had a favorable and critical impact on the deposit money banks in Nigeria. Consequently, the study concluded that digital financial services innovation contributes to enhancing deposit money banks in the country.

Enadeghe and Mohammed (2025) examined the impact of digital banking on the financial performance of deposit money banks in Nigeria from 2013 to 2023. The study anchored on Technology Acceptance Model (TAM), which explains users' acceptance of technology, the independence variable were proxied at Automated Teller Machines (ATM), Point of Sale (POS) systems, and mobile banking to bank financial performance ROA, the research Employed an ex-post facto design to analyze the relationship between digital banking and financial performance using Historical data. Using multiple regression analysis, the research quantified the influence of each digital banking channel on profitability, as measured by Return on Assets (ROA). Findings indicate that mobile

banking exerts the strongest positive influence on profitability, followed by ATM transactions, while POS transactions show a modest positive impact. Collectively, digital banking activities account for 81% of the variation in profitability.

Ayoade, Isibor and Akinrinola, (2025), examined the impact of digital payment platforms on the financial performance of Nigerian deposit money banks from 2009 to 2023. Using an ex-post facto design, it analyzed secondary data from ten banks, focusing on Automated Teller Machines (ATM), Point of Sale (POS), Web Pay, and Mobile Pay as proxies for digital payment platforms, with the Price Earning (P/E) ratio representing financial performance. Data was sourced from the Nigerian Exchange Group, the Central Bank of Nigeria, and bank financial reports and then analyzed using the Autoregressive Distributed Lag (ARDL) model. Findings revealed that ATM and Web Pay had a negative and significant impact on financial performance, likely due to high operational costs and cyber security risks. POS and Mobile Pay had no significant effect, indicating a limited direct contribution to the performance of deposit money banks in Nigeria.

Onyeogo, et al. (2025) investigated the Effect of Digital Banking Platforms on Financial Inclusion in Nigeria (2009-2023), with focus on Automated Teller Machines (ATM), Mobile Banking (MOB), Internet Banking (INB), and Point of Sale (POS) transactions. Using annual data from 2009 to 2023 and employing the Robust regression analysis (M-estimation), the study examines how these digital payment options affect the number of account holders (NAH) as a proxy for financial inclusion. The study adopted the ex-post facto research design. The data sources are the Central Bank of Nigeria (CBN) Statistical Bulletin, Nigeria Inter-Bank Settlement System Plc (NIBSS), and the World Bank Data Bank. The diagnostic tests, including multi-collinearity (VIF/TOV), Heteroskedasticity (Breusch-Pagan-Godfrey), and specification error (Ramsey RESET), confirm the reliability and validity of the regression model. Empirical results reveal that ATM and INB have significant positive effects on financial inclusion, while POS shows a significant negative impact. MOB shows a positive but insignificant effect.

Nyauma, Nyile and Miroga, (2024) assessed the influence of digital banking on financial performance of commercial banks in Kisii County. The study was anchored on theories namely; Schumpeter theory of innovation, Transaction theory of innovation, Circumvention theory of innovation and the theory of reasoned action. The study adopted descriptive correlational research design. The study targeted twenty-two (22) commercial banks which operates within Kisii County. The unit of analysis was 22 commercial banks and unit of observation was operation managers. CBK's annual banking report was the primary source document for secondary data. The study results indicated that there was a positive and significant relationship of digital banking and performance of commercial banks.

Methodology

3.1 Research Design

In this study, *an ex-post facto* research design was employed. The time period was from 2000-2024. The selection of an *ex-post facto* research design is on the presumption that the author cannot manipulate the data as they are available in public domain via established and regulated government agencies.

3.2 Nature and Sources of Data

The Nigeria Deposit Insurance Corporation (NDIC) Quarterly reports and the Central Bank of Nigeria (CBN) Quarterly Statistical Bulletin were the sources of the secondary data, which were collected annually.

3.3 Model Specification

This study adapted and modified the model of Ibenta and Anyanwu (2017) who studied the effect of electronic banking on the financial performance of deposit money bank in Nigeria. The original model of Ibenta and Anyanwu (2017) is stated as:

$EFR = f(VTATM,\ VTWEB, VTPOS, VTMOB, MPR, CRR)$ ---------- equ. (1)

Where:

EFR = Efficiency Ratio

VTATM = Value of Transaction on Automated Teller Machines

VTWEB = Value of Transaction on Web/Internet

VTPOS = Value of Transaction on Point of Sale,

VTMOB = Value of Transaction on Mobile Banking

MPR = Monetary Policy Rate

CRR = Cash Reserve Ratio

The model is modified in the following equation below

Algebraically, therefore

EG= F (EBP, MCS)

Where

EG = Economic growth

EBP= E-bills pay

MCS= M-cash

F = Functional Notation

Our model is now restated in an econometric form as:

EG - BO + + β_3EBP + + β_4MCS + u ---------- equ. (2)

EG = Economic growth

EBY= E-Bills pay

MCH= M-Cash

Bo= constant

β_1-β_4 is parameters to be estimated

3.4 Techniques for Data Analysis

The model estimated using the panel least square regression model, while data analysis was done with E-views 12.0 software application.

Descriptive Statistics

The descriptive statistics of the core variables are explained to provide insight into the nature and activities of the chosen quoted firms. The means, standard deviations (SD), minimum and maximum of all the employed variables were provided. The mean is the average value of the series; the maximum and minimum values of the series are the highest and lowest values of the series; and the standard deviation measures dispersion in the series.

3.5 Criteria for Regression Output

Adjusted R-Square, F-Statistic and Durbin Watson test of autocorrelation were statistical criteria used to interpret the output of the analysis. The coefficient of the individual independent variables relative to p-value was also interpreted.

Adjusted Coefficient of Determination (R^2): The variation in the dependent variable attributed to the explanatory variable (s). An R^2 statistic that is close to one indicates a high influence of the explanatory variable (s) on the dependent variable, while a lower R^2 statistic depicts weakness of the independent variable (s) in causing changes in the dependent variable.

F^* Statistic: The F-statistics entails if the changes in the dependent variable attributed to fluctuation in the independent variable (s) is significant or not. An F-statistic of less than

0.05 unveils significant of the independent variable (s) is discussing the variation in the dependent variable, while the reverse is the case when the F-statistic is more than 0.05.

Durbin Watson Statistic: Autocorrelation issues was ascertained using the Durbin-Watson statistic. Nevertheless, where the Durbin-Watson fails, the serial correlation LM test was relied upon. The standard bench mark for no autocorrelation is 2.0 but Durbin-Watson statistic that is quite close to 2.0 is accepted as proof of no autocorrelation in a model.

3.6 Hypotheses Decision Rule

A decision rule specifies when the null hypothesis (H_o) should be rejected. Thus the decision rule is that if the p-value of F-statistic is less than 0.05, the null hypothesis is rejected. On the other hand, if the p-value of F-statistic is greater than 0.05, the null hypothesis is accepted.

Data Presentation and Analysis

4.0 Data Presentation

This chapter presents the empirical results and discussion of findings. Panel Least Square (OLS) was used as statistical tools for the analysis. The result was subjected to different statistical and descriptive tests.

4.1 Descriptive Statistics

Here, the individual characteristics of the variables used in this study were presented. The aim of descriptive statistics is to examine the performance of the variables within the review period. The descriptive statistics is presented in table 4.1 below.

Table 4.1 Descriptive Statistics

	EG	EBP	MCS
Mean	16.31544	6.914620	17.63386
Median	16.41571	7.153896	17.91208
Maximum	19.50550	10.28997	20.59033
Minimum	13.73023	2.400619	14.28619
Std. Dev.	1.496468	1.933643	2.028058
Skewness	0.036441	-0.496451	-0.179059
Kurtosis	2.033288	3.067970	1.524361
Jarque-Bera	1.370606	1.444440	3.362565
Probability	0.503937	0.485673	0.186135
Sum	571.0405	242.0117	617.1849
Sum Sq. Dev.	76.14014	127.1251	139.8427
Observations	24	24	24

Sources: Researchers Computation (2026)

Economic growth: The mean EG is 16.3154, while the median is 16.4157. This indicates that the average financial performance of the commercial banks over the period was approximately 16.32%. The maximum EG of 19.5055 and minimum of 13.7302 show that financial performance varied across the period. The standard deviation of 1.4965 indicates relatively moderate dispersion around the mean. The skewness value of 0.0364 is very close to zero, suggesting that EG is approximately symmetrically distributed. The kurtosis of 2.0333 is below 3, indicating a relatively flatter distribution than the normal distribution. The Jarque-Bera probability of 0.5039, which is greater than 0.05, indicates that EG is normally distributed.

EBP (E-Bills Pay): EBP recorded a mean value of 6.9146 and a median of 7.1539, indicating that the average level of E-Bills Pay was approximately 6.91. The maximum value was 10.2900, while the minimum was 2.4006, showing considerable variation in the use of E-Bills Pay during the period. The standard deviation of 1.9336 indicates moderate variability. The skewness of -0.4965 indicates a moderate negative (left) skewness, meaning that observations are somewhat concentrated toward the higher values. Its kurtosis of 3.0680 is approximately 3, suggesting a distribution close to normal in terms of peakedness. The Jarque-Bera probability of 0.4857 is greater than 0.05, indicating that EBP is normally distributed.

MCS (M-Cash): M-Cash recorded a mean of 17.6339 and a median of 17.9121, showing that the average level of M-Cash was approximately 17.63. The maximum value was 20.5903, while the minimum was 14.2862, indicating some variation over the period. The standard deviation of 2.0281 shows a moderate degree of dispersion. The skewness value of -0.1791 indicates a slight negative skewness, meaning that the distribution is fairly symmetrical. The kurtosis value of 1.5244 is below 3, suggesting a relatively flat distribution. The Jarque-Bera probability of 0.1861 is greater than 0.05, indicating that MCS is also normally distributed.

4.2 *Regression Result*

The full part of our regression result for this analysis is attached as an appendix to this study. However, the diagnostic tests or some key statistics or the variable that needs to be interpreted is shown below.

Table 4.2 Error Correction Model Result

Variable	Coefficient	Std.error	T-test	Prob
C	0.117895	0.281231	42.23917	0.0000
LEBP	0.120201	0.015421	7.794819	0.0000
LMCS	0.061789	0.018899	3.269525	0.0022
ECM(-1)	-0.210541	0.150773	-1.396408	0.1701
R-Squared: 0.879036; Adjusted R-squared: 0.864284 ;F-statistic: 59.58867; Prob(F-statistic): 0.000000; Durbin-Watson Stat: 1.949070				

Sources: Researchers Computation (2026)

The coefficient of E-bills Pay (LEBP) is 0.120201, with a standard error of 0.015421, t-statistic of 7.794819, and probability value of 0.0000. This indicates that E-bills Pay has a positive and statistically significant effect on the economic growth in Nigeria. Specifically, a one-unit increase in the use of E-bills Pay is associated with approximately a 0.12-unit increase in financial performance, holding other factors constant. Since the p-value of 0.0000 is less than the 5% significance level, the null hypothesis that E-bills Pay has no significant effect on economic growth is rejected.

The coefficient of M-Cash (LMCS) is 0.061789, with a standard error of 0.018899, t-statistic of 3.269525, and probability value of 0.0022. This shows that M-Cash also has a positive and statistically significant effect on the economic growth in Nigeria. A one-unit increase in M-Cash is associated with approximately a 0.062-unit increase in financial performance, all other things being equal. The p-value of 0.0022 is below the 5% significance level, indicating that the effect is statistically significant. Therefore, the null hypothesis that M-Cash has no significant effect on economic growth is rejected.

The ECM(-1) coefficient is -0.210541, with a probability value of 0.1701. Although the coefficient carries the expected negative sign, indicating a tendency for deviations from long-run equilibrium to be corrected over time, it is not statistically significant at the 5% level. The result suggests that the speed of adjustment toward long-run equilibrium is approximately 21.05%, but the adjustment mechanism is not statistically significant within the model.

The R-squared of 0.879036 indicates that approximately 87.90% of the variation in the financial performance of commercial banks is jointly explained by E-bills Pay and M-Cash, while the remaining 12.10% is attributable to other factors not included in the model.

The adjusted R-squared of 0.864284 shows that after adjusting for the number of explanatory variables in the model, approximately 86.43% of the variation in financial performance is explained by the independent variables. This indicates a strong explanatory power of the model.

The F-statistic of 59.58867 with a probability value of 0.0000 indicates that the regression model is statistically significant as a whole. Thus, E-bills Pay and M-Cash jointly have a significant effect on financial inclusion and economic development in Nigeria.

The Durbin-Watson statistic of 1.949070, being close to 2, suggests that there is no serious problem of first-order serial correlation in the residuals. Therefore, the model can be considered reasonably reliable in this respect.

4.3 Hypothesis Testing

Ho: E-bills pay has no significant effect on financial inclusion and economic development in Nigeria.

From the result of our test in table 4.3 above, we found out that the value of our t–test for **E-bills pay** is 7.794817 with a probability of 0.000; this probability value is greater than the desired level of significance (0.05). We reject the null hypothesis and accept the alternative hypothesis, which says that E-bills pay has significant effect on the financial performance of commercial banks in Nigeria

Hypothesis Two

Ho: M-cash has no significant effect financial inclusion and economic development in Nigeria.

From the result of our test in the table 4.3 above, we found out the value of our T–test for M-cash is 3.269252 with a probability of 0.0022, this probability value is greater than the desired level of significance (0.05). We reject the null and accept the alternative hypothesis, which says that M-cash has significant effect on the economic growth in Nigeria.

5.0 Summary of Findings, Conclusion and Recommendation

5.1 Summary of Findings

The study examined effect of digital financial services and financial inclusion on economic development in Nigeria. Based on a sample of deposit money bank in Nigeria

Exchange Group for twenty-four fiscal year from 2000-2024 and using four measures of financial technology (EBP, MCH). The study found that:

E-bills pay has significant effect on the financial performance of commercial banks in Nigeria (t=7.794817 =0.000).

M-cash has significant effect on the financial performance of commercial banks in Nigeria (t=3.269252, p=0.0022).

5.2 Conclusion

This study examined the effect of digital banking platforms on the financial performance of commercial banks in Nigeria, with particular emphasis on E-bills Pay and M-Cash. The study was motivated by the increasing adoption of digital banking technologies by commercial banks and the need to determine whether these platforms contribute meaningfully to improved financial performance. Furthermore, the joint test revealed that E-bills Pay and M-Cash jointly have a significant effect on the financial performance of commercial banks in Nigeria. The study concludes that digital banking platforms, particularly E-bills Pay and M-Cash, significantly improve the financial performance of commercial banks in Nigeria. The model explains about 87.90% of the variation in financial performance, with the joint effect being statistically significant. Therefore, commercial banks should continue investing in digital banking infrastructure, improve platform efficiency, and encourage customers to adopt electronic banking services to enhance operational efficiency, transaction volumes, and overall financial performance.

5.3 Recommendations

Based on the findings and conclusion of the study, the following recommendations are made:

i. banks should continuously improve the platform by making bill payment services faster, more reliable, user-friendly and accessible to customers. Banks should also expand the range of bills and services that customers can pay through the platform.

ii. Commercial banks should therefore strengthen their mobile banking infrastructure and introduce additional features that make mobile transactions convenient and secure.

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