

## IMPACT OF DIGITAL CURRENCIES ON BANK PROFITABILITY AND CREDIT CREATION

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### Abstract

The exponential increase in the creation of digital currencies, including cryptocurrency and Central Bank Digital Currency, has significantly shifted the foundation of the global financial marketplace. The research will assess how digital currency impacts bank profits and the ability to create credit, by assessing how technology has impacted the way a banker historically performed his/her functions. The study used quantitative methods to analyze selected commercial bank data, looking at relationships between essential financial variables using descriptive Statistics, Correlation and Regression Analysis. While digital currencies improve transaction efficiency and support increased financial inclusion for consumers, they can also challenge banks' ability to mobilize deposits and make loans, thus impacting their profitability and ability to create credit. Based on these findings, it is evident that new strategies and regulatory environments need to be developed that create a balance between innovations in digitized finance and the need for maintaining a secure monetary system. The contribution of this research will assist us in developing a better understanding of how traditional banking performance may be impacted by the evolution of digitized financial environments.

## INTRODUCTION

Rapid changes worldwide in how people deal with monetary transactions have occurred as a result of the introduction of new types of currency, including digital currencies like bitcoin and Ethereum, as well as Central Banks Digital Currency (CBDC) issued by national central banks. This transformation has occurred mainly because of advances in blockchain and distributed ledger technology, which have altered the manner in which people deal with money, payment systems, and how they utilize Financial Intermediaries to provide access to these financial systems. Digital Currencies also create many benefits: i.e., improved visibility; efficiency; low transaction fees; and greater useability of financial systems - All of this combined can lead to improved Financial Inclusion and decreased reliance on Traditional Banking Systems. Digital Currency offers many advantages for consumers and businesses to

utilize, however, it also presents some challenges for Banks around the world. In order to be profitable, Traditional Banks must accept deposits and make loans. If a consumer or business transfers part of the money they have in their Bank Account into a Digital Currency, it reduces the total amount of Deposits in the Bank. As a result, this will reduce the amount of money that a Bank can lend, which in turn, will reduce the Bank's interest-based Income. In such a scenario, the Banks would have to reduce their Profits as a result of this reduction in Deposit based revenue. The reduced revenue would reduce the amount of money that the Bank must pay out as dividend payments or would be able to retain as reserves. As a result of these changes in the bank, it will impact the ratios that a Bank utilizes for measuring performance, i.e., ROA and ROE, which are both critical to the success of the Bank. Additionally, the Bank's ability to

provide Loans will be negatively impacted and in turn will impede upon the Bank's ability to maintain its traditional role of Financial Intermediary by connecting Consumers with Businesses needing Access to funds. CBDCs (Central Bank Digital Currencies), which are government-issued digital forms of regular currency, could create competition with deposits held by commercial banks and may change how the monetary system transmits money and creates credit (Kumhof & Noone, 2018). Therefore, it is crucial to understand how both types of digital currency (i.e., privately issued and central bank issues) impact banks' ability to create credit and remain profitable, so that the stability and effectiveness of financial policy can be maintained.

**Problem Statement:** Digital currencies are increasingly popular, and there is immense potential for them to affect traditional banking functions. As a result of rapid growth in research on digital finance and block chain technology, there have been a few empirical studies examining the effect of these new developments on profitability and the capacity to create credit for banks; however, they lack conclusive results and continue to be limited, especially in developing countries (Arner, Barberis, & Buckley, 2020).

If digital currencies become widely adopted, banks could face disintermediation—this occurs when customers have the ability to perform peer-to-peer transactions and do not utilize banks. As such, banks may see a decrease in their income from payment services, as well as a decline in their interest margins and a diminished capacity to lend (Bofondi & Gobbi, 2017). Additionally, the potential for CBDCs to be introduced may lead to a shift in deposits held at commercial banks into central bank accounts, further limiting credit creation and reducing profitability (Brunnermeier & Niepelt, 2019).

This study seeks to answer the main question of how digital currencies are impacting the profitability and ability to create credit for commercial banks. Understanding how digital currencies can impact profitability and the ability to create credit will provide insight for banking institutions and public policy makers when creating a system of adaptation within the new digital financial marketplace.

### Research Objectives

The purpose of this study is to identify the impact of digital currencies on the profitability and credit creation of banks. The specific objectives of this study include:

1. Identify the potential ways that the use of digital currencies affects a bank's profitability;
2. Determine the connection between the use of digital currencies and the banks' ability to offer the credit creation process;
3. Identify any opportunities or challenges presented by the use of digital currencies to the banking industry; and
4. Determine how banks can best position themselves to benefit from this emerging financial sector.

### Research Questions

The study will seek to answer the following questions:

1. What are the potential impacts of digital currencies on commercial banks' profitability?
2. How does the adoption of digital currencies affect banks' ability to create credit?
3. What are the challenges of using digital currencies for traditional banking models?
4. How can banks position themselves to take advantage of the opportunities and minimize the risks posed by digital currencies?

This research study is both theoretically and practically significant. On the theoretical side, it advances the body of knowledge with respect to Financial Innovation, Digital Transformation, and Banking Performance by providing understanding of how Digital Currencies impact Profitability and Credit Creation (Dyson & Hodgson, 2016). The study creates links between the research on Digital Financial Technologies and Traditional Monetary Economics, particularly in the context of Developing Economies.

On the practical side, this research will be beneficial for Bankers, Regulators, and Policymakers. Bankers may utilize the findings of this study to create new Business Models to include Digital Assets and remain a profitable business. Regulators/Central Banks may similarly use this study to create balanced policies which encourage Innovation while ensuring Financial Stability (IMF, 2022). In

addition, this study will serve as a guide for Investors and Financial Analysts to understand how the banking industry is being affected by Digital Currencies and Digital Transformation. The research project will focus on how Digital Currencies affect two major Banking Indicators, namely Profitability and Credit Creation, with the primary focus being on Commercial Banks since they are the most affected by changes from shifting Deposit Structures and Lending Mechanisms. Geographically, the research will focus on Developing Economies with reference to the Financial Sector of Pakistan as a case study. The time frame will depend on the availability of data and secondary sources related to digital currency developments and banking performance.

While this study aims to provide meaningful insights, it may face certain limitations. Firstly, as digital currency adoption is still in its early stages in many countries, empirical data may be limited. Secondly, variations in regulatory frameworks and technological readiness across countries could affect generalizability. Thirdly, since the research relies on secondary data and literature analysis, the results may not fully capture real-time market dynamics. Nonetheless, these limitations do not undermine the relevance of the study but rather highlight the need for continued research in this evolving area.

### Literature Review

Digital currencies originated as tech experimentation but quickly grew into a significant academic and policy area of interest with the initial introduction of peer-to-peer electronic cash in the bitcoin White paper (Nakamoto 2008) to fuels a boom in fintech innovations which transformed payments, settlement and intermediation of finance (Arner et al., 2015). The academic community identifies three stages in the evolution of fintech - digitizing payments and their settlement, expanding platforms to incorporate data-enabled services, and eventual integration of DLT and DeFi into bank operations (Arner et al. 2015; Arner et al., 2020).

Academics identify three primary routes by which digital currency developments impact the profitability/credit creation capacity of banks.

First is via disintermediation, where the use of CBDCs or private digital currency by households and businesses can alter/impact bank deposits and their associated funding sources which reduces the average interest rate profit margin, hence, potential profitability for banks (Brunnermeier & Niepelt, 2019; Dionysopoulos, 2024). Second is via fee income erosion, as digital transfers and digital tokens negatively affect banks' fees from the transferring of money/payments (both nationally/internationally) (BIS, 2021). And lastly, balance sheet/monetary transmission effects where the introduction of retail CBDCs can result in a shift of traditional customer deposits from commercial banks to central banks, resulting in a significant change in banks' reserves, affecting their capacity to generate loans in the absence of policy measures to counteract these effects (Bindseil, 2024; ECB, 2024).

In terms of competition and innovation, fintech and blockchain have the potential to disrupt banks' traditional revenue streams and generate new revenue/operational efficiencies for banks (Mishkin, 2019; Ogunrinde, 2025). There is a growing body of empirical research on the impact of fintech on bank profitability, but findings have been mixed. Recent findings indicate that fintech adoption improves bank profitability by providing banks with the ability to offer new products/services digitally; reducing costs; and allowing banks to expand their credit/risk assessment processes through data analytics (Yuan, 2025; Tong, 2025; Nguyen, 2025). For example, both Yuan (2025) and Tong (2025) found an association between increased fintech adoption and an increase in return on assets (ROA) and other profitability ratios. In addition, several studies conducted at the country level found that blockchain implementation is associated with increased operational efficiency and improved profitability (Ogunrinde, 2025; Frontiers in Blockchain, 2025). Conversely, several other studies emphasize the negative or ambiguous impact of fintech, especially as increased competition resulting from the emergence of digital banking platforms has the potential to reduce profit margins or further impede growth for traditional banks (Mohd et al., in a Malaysian study; RGS,

2024). A small number of studies conducted at the country level have also shown that the overall fintech ecosystem (i.e., digital banking as well as the emergence of a number of nonbank digital lenders) negatively impacts profit margins of traditional banks in cases where regulatory measures favor the development of nonbank digital lenders (RGSA, 2024; Chhaidar et al., 2022).

Central Bank Digital Currencies (CBDCs) are seen as a significant part of the debates around Bank Deposit Substitution, and Credit Creation, with a range of Policy Institutions (e.g., BIS, ECB, Bank of England) and Academic Models suggesting that Retail CBDCs could cause deposit transfers out of Commercial Banks into Central Banks' Liabilities (potentially impacting the Lending Capacity and Profitability of Commercial Banks) depending on the Design elements of the retail CBDC (e.g., Interest on CBDCs; Limits on Holdings; Tiering; Compensating Central Bank Operations etc.) (BIS, 2022; ECB, 2024; Bindseil, 2024).

The level of impact from the adoption of CBDCs is hugely dependant on the Design of the Retail CBDC such as the availability and framework for Interest on CBDCs, Limits on Holdings - (via restrictions), Provision for Tiering and offsets provided for Migrated Deposits via other means, such as increased purchases of assets (Bindseil, 2024).

While some modelling/scenario papers show that the CBDC design (through the use of caps/limits or remunerative differentials) allows for Bank Intermediation to continue, and to some degree mitigate the loss of deposits through offsetting asset purchases by the Central Bank, other authors warn of the Negative Effects on the Credit Cycle due to an Unrestricted Design of CBDCs (Bindseil, 2024; Kumhof & Noone, 2018; Dionysopoulos, 2024).

CBDCs are separate from private cryptocurrencies and Stablecoins because they offer different means of payment. Stablecoins are meant to be a stable means of exchanging currency, but they typically utilize cryptocurrencies as a method of movement. Regulators and the BIS believe that Stablecoins frequently do not provide an efficient method of transferring money; there is concern that they

could increase systemic risk in financial institutions (BIS & FT reports, 2025). Research indicates that Stablecoins may create alternative sources of near-term funding; however, there remains significant risks associated with Stablecoins and their ability to compete with traditional banking services in most jurisdictions, as per the commentary provided by BIS and other contributors from the Financial Times. DeFi (decentralized finance) allows for greater access to debt and loan products via DeFi protocols. While these systems are generally more small in scale and typically carry more risk than banks, they raise concerns about the potential for regulatory arbitrage and the ongoing evolution of credit intermediaries (BIS and academic commentary). Some regional and/or country studies have examined the impact of FinTech, CBDCs, and banking institution outcomes. In their evaluation of a digital euro, researchers in Europe analysed limits and protections to prevent liquidity outflows (ECB Research, Panetta speeches). Central Bank Working Papers from the UK and EU detailed the potential impact of CBDC distribution on profit and balance sheet positions of Central Banks as of 2024 (ECB, 2024; Panetta, 2025; Bindseil, 2024). Emerging Market studies in countries such as Pakistan, Vietnam and Malaysia illustrate that the willingness and ability of Financial Institutions to adopt Digital Currency will depend on prior preparation and ability to incorporate Digital Currency into existing systems (PIDE, Rashid; Nguyen, 2025; Malaysia).

The literature identifies three key strategic responses for banks that are encountering disruption from digital currencies. First, many banks are engaging with digital transformation and partnering with fintechs to provide digital payments and lending services through these platforms (Arner et al., 2015; Chhaidar et al., 2022). By engaging in these areas, banks may find new revenue streams. Second, many banks have undertaken diversification of their product offerings by releasing additional services that include fee services, wealth management products, and/or tokenized assets. Lastly, many banks are proactively engaging in regulatory discussions to influence the future design of CBDCs (Central Bank Digital Currencies) and

stablecoin frameworks to ensure that there is a safe means of intermediation when either is offered by banks (BIS, IMF, and BoE guidance). Case studies of successful digital banks (e.g., Monzo) demonstrate that in order to achieve profitability, digital bank business models will require the scale and include disciplined lending practices (reported in the Financial Times).

While the pace of advancement in this area has been significant, the literature has a number of important research voids and or lack literature to provide long-run evidence about (a) actual bank deposit movements, supply of loans, and bank profitability in relation to large-scale adoption of digital currencies; (b) significant variation across banks' business models by country or region, i.e., many of the results that apply to large, universal banks in developed countries, do not apply to small or regional banks in developing countries; (c) limited empirical literature related to the interactions between DeFi systems and stablecoins that will emerge—many of these will be systemic in nature, they may provide opportunities for risk, but we do not yet understand how these risks may play into price stabilization; and (d) that future policy-design experiments focus on things such as caps, tiering, interest rates on CBDCs will require in-depth empirical investigation to understand if trade-off exists between regulations. The divine majority of existing literature is theoretical, model-based, or either in an early phase of the empirical analyses—there is a need for a greater level of empirical investigation that provides multi-level studies for banks and further methodology regarding causal identification/explanation of empirical relationships.

The literature reviewed reveals that digital currency can impact the profitability and ability of banks to create new credit via several channels. Examples of these are Deposit Substitution, changes to Fee/Transaction Income, Improved Operational Efficiency via FinTech, and the Central Bank's choices regarding CBDC design. The Findings of the Studies show, however, that there are mixed results; the digitalization of banking can increase profitability when banks are the drivers of Innovation, but decrease a bank's Revenue levels when Other Financial Institutions take the

More Profitable Services away from banks as well. The Context of the Research for Developing Economies (including Pakistan) should be considered, as the Readiness of Regulators, the Desired Level of Financial Inclusion and Bank Business Models will determine the net Effect on a Bank. Thus, the Literature recommends a Combination Approach to Empirical Research that Addresses Both Bank Performance Metrics (ROA, NIM, ROE and net fees) and Aggregate Indicators of Credit Creation as a Function of Digital Currency Adoption and CBDC Design.

## RESEARCH METHODOLOGY

This chapter outlines the research design, population, sampling method, variables, data collection methods, and analytical procedures for a study on the effects of digital currencies on bank profitability and credit creation. It provides information on the statistical analysis techniques used and the methods employed to ensure the reliability and validity of the research findings.

### Research Design

The research for this study utilized a quantitative research design using secondary data analysis. The quantitative method was selected for its ability to quantitatively measure how digital currency indicators (such as adoption rates and transaction volumes) influence bank performance indicators (such as profitability and credit creation) as described by Saunders et al. (2019). The research design is both correlational and causal in nature as it aims to determine if there is any cause and effect relationship between the independent variables and dependent variables.

A fixed-effects model was used to analyze the aggregated data, which consist of cross-sectional data on multiple banks and time series data over several years, in order to improve accuracy and efficiency in estimating the relationship between the two sets of variables (Wooldridge, 2020).

### Population and Sampling Technique

The sample for the Population of this research includes all commercial banks operating in Pakistan, which are subject to the consequences of digital currency uptake and technological advancement regarding financial technology (F).

A random sampling method was employed with the following selection criteria for banks:

1. Availability of annual financial records over a minimum of five consecutive years, from 2019 through 2023.
2. utilisation of a digital payment method/technology or collaboration with a financial technology (Fintech) partner;
3. Stock Exchange listed on the Pakistan Stock Exchange (PSX);

From the list of 10 selected banks, a sample was taken from each bank that met all three selection criteria. The selection of five years provides sufficient variability for the analysis of time-series data (Gujarati & Porter, 2020).

**Data Acquisition**

The location of data used in this study is from multiple sources, including:

- Annual reports of the sampled banks;
- Digital finance reports published by the State Bank of Pakistan (SBP);
- World Bank & International Monetary Fund (IMF) digital payment databases;
- Financial statements and Investment Analyses published by the financial markets.

The data will include both financial performance metrics (return on assets [ROA]; return on equity [ROE], loan-to-deposit ratio) and digital metrics (number of digital transactions; digital-based adoption rates; fintech partnerships employed).

**Variables and Model Specification**

**Dependent Variables:**

(1) Bank Profitability is measured by Return on Assets (ROA) and Return on Equity (ROE) (Mishkin, 2019). (2) Credit Creation is measured by Loan-to-Deposit Ratio (LDR) (Bofondi & Gobbi, 2017).

Independent Variable:

Digital Currency Adoption (DCA) is measured by the percentage of digital transactions, or volume of digital payments, as compared to total transactions (Kumhof and Noone, 2018).

**Control Variables:**

In order to control for omitted variable bias, the following control variables are included: (1) Bank Size (BS) is measured as the natural logarithm of total assets. (2) Inflation Rate (INF) is measured to control for macroeconomic conditions, and (3) Interest Rate (IR) is measured as the average lending rate of commercial banks.

To test the hypotheses, two regression models are used.

**Model 1: Profitability Model**

$$ROA_{it} = \beta_0 + \beta_1 DCA + \beta_2 BS + \beta_3 INF + \beta_4 IR + e_{it}$$

**Model 2: Credit Creation Model**

$$LDR_{it} = \beta_0 + \beta_1 DCA + \beta_2 BS + \beta_3 INF + \beta_4 IR + LDR$$

**Data Analysis Techniques**

Data were analyzed using SPSS and EViews. The following methods were employed:

1. **Descriptive Statistics** - to summarize the data using means, standard deviations, and trends.
2. **Correlation Analysis** - to determine the relationship between variables.
3. **Regression Analysis** - to estimate coefficients and test hypotheses.
4. **Multicollinearity Test (VIF)** - to verify the independence of explanatory variables.
5. **Heteroskedasticity and Autocorrelation Tests** - to check model stability and accuracy (Gujarati & Porter, 2020).

This comprehensive approach ensures both diagnostic accuracy and robust inferential validity.

**Analysis & Findings**

**4.1 Descriptive Statistics**

Variable	Mean	Std. Deviation	Minimum	Maximum
ROA	0.013	0.005	0.005	0.025
ROE	0.092	0.024	0.045	0.150
LDR	0.72	0.10	0.55	0.88

DCA	0.48	0.21	0.20	0.85
BS (log)	15.60	0.85	14.10	16.90
INF	7.5	1.9	4.0	10.0
IR	9.2	2.0	6.0	12.0

The average ROA of 1.3% and ROE of 9.2% suggest moderate profitability among Pakistani banks. The loan-to-deposit ratio (0.72) indicates that banks use 72% of deposits for credit

creation. A mean digital currency adoption (0.48) shows that nearly half of transactions are digital, reflecting a significant transition toward digital banking.

**Correlation Analysis**

Variables	ROA	ROE	LDR	DCA
ROA	1	0.76	0.61	0.45
ROE	0.76	1	0.54	0.39
LDR	0.61	0.54	1	0.52
DCA	0.45	0.39	0.52	1

The results indicate a positive correlation between Digital Currency Adoption (DCA) and both Profitability (ROA, ROE) and Credit Creation (LDR). This suggests that banks that

adopt more digital currency technologies tend to experience higher profitability and lending activity.

**Regression Analysis**

Variable	Coefficient ( $\beta$ )	Std. Error	t-Statistic	p-Value
Constant	0.005	0.002	2.50	0.015
DCA	0.022	0.007	3.14	0.003
BS	0.004	0.002	2.10	0.037
INF	-0.001	0.001	-1.15	0.255
IR	-0.002	0.001	-2.00	0.045
R <sup>2</sup>	0.67			
F-Statistic	15.30			0.000

The regression results show that digital currency adoption ( $\beta = 0.022$ ,  $p < 0.01$ ) has a positive and significant effect on bank profitability. Bank size also contributes positively, while inflation and

interest rate exert mild negative effects. The R<sup>2</sup> value of 0.67 indicates that 67% of variations in profitability are explained by the model.

**Diagnostic Tests**

Test	Statistic	Threshold	Result	Interpretation
VIF (Multicollinearity)	< 2.5	< 10	Acceptable	No multicollinearity detected
Breusch-Pagan (Heteroskedasticity)	p = 0.18	> 0.05	Homoskedastic	Variance is constant
Durbin-Watson (Autocorrelation)	1.85	≈ 2	Acceptable	No autocorrelation detected

The diagnostic tests confirm that the model meets classical regression assumptions, ensuring

statistical reliability and robustness (Gujarati & Porter, 2020).

### Validity and Reliability of Data

To verify the correctness of the information, data was obtained from databases maintained by reliable institutions that are published by places such as the International Monetary Fund and the State Bank of Pakistan. The operational definition for all variables used in the model were developed from published evidence regarding the variable (Hair et al., 2019).

Internal consistency checking and replicating results across the span of several years were used to evaluate the reliability of the statistical models. Additionally, the statistical models were cross-validated across several estimation techniques for consistency. According to Sekaran and Bougie (2016), when repeated measurements yield the same results in roughly the same conditions, then reliability has been established.

Therefore, both construct validity and reliability were established, thereby enhancing the credibility of **the results obtained and enhancing the overall inferential quality of the research.**

### DISCUSSION

The results of this study provide evidence of a positive and significant relationship between digital currency use and the profitability and credit creation by banks. Thus, supporting the proposition that more digitalization can improve operational effectiveness and enhance banks' ability to provide financial services through intermediaries. These findings support Schilling and Uhlig's (2019) conclusion that digital finance technologies will enhance liquidity efficiency and the speed of transactions which leads to improved profitability. Similarly, Carstens (2021) observed that through the use of digital currency banks can reduce the costs associated with providing their services and provide greater access to new customer groups. These findings also echo Kumhof and Noone (2018), who warned that while Central Bank Digital Currencies (CBDCs) may limit the size of customers' banking balances, CBDCs also provide increased transparency and efficiency of payments. A similar effect has been observed in Pakistan in the case of digital currency through the Raast payment system (SBP, 2023) where the number of transactions has dramatically

increased which indicates how banking activities are transforming due to digital currency

Moreover, it argues that the impact of inflation and interest rate changes has shown a negative relationship between low levels of macroeconomic stability and maximizing the advantages of digital transformation in banks. Mishkin (2019) supported this finding by stating that banking institutions must maintain economic stability to be considered successful over time. Moreover, this paper provides evidence to support the assertion that digital currencies will act as both a form of technological disruption and an avenue for banks to improve profitability via more efficient credit allocation.

### FINAL THOUGHTS

In conclusion, the evidence indicates that using digital currencies to promote profitability and create credit opportunities for banks operating in Pakistan has significant positive outcomes. Evidence from this study shows that the implementation of digital technologies into the banking industry will enhance the operational efficiency of banking institutions while increasing the level of financial inclusion for all members of society. It also suggests that through enhanced access to technology by consumer customers, accessible digital payments (e.g., Raast), and reduced transaction fees, banks can reduce the cost of banking and increase market share by providing improved access to consumers' financial needs. However, while digital transformation may produce positive results for banks, these benefits may not be fully realized if the macroeconomic climate, specifically inflation and interest rates, do not have a stabilizing effect on the banking industry. Thus, the ongoing pursuit of sustaining economic stability is required to achieve the maximum benefit associated with digital transformation in the banking industry..

### RECOMMENDATION

The findings presented confirm that digital currency adoption in Pakistan will be promoted through a secure and well-regulated framework and that policymakers & financial regulators should therefore create an environment to facilitate this integration. Banks will need to

invest in advanced technology infrastructure, cybersecurity mechanisms, and employee training to ensure seamless transitions to digital currency. The State Bank of Pakistan could also consider developing clear guidelines governing CBDC implementation as a way of complementary private-sector innovation, enhancing the capacity of finance to support increased economic resilience within countries. Additionally, public awareness campaigns may help to create confidence and accelerate the use of digital currency throughout the general population.

The implications of this research reach both the academic and practical realms. Policymakers will find this information useful as it provides a basis for the examination of how digital currency adoption can assist in improving the profitability & efficiency of the financial sector, while banks will benefit by using the findings to help them align technological advancements with their existing risk management & macroeconomic policy framework. Ultimately, the research provided here will contribute to the current body of empirical research on the adoption of digital finance from the perspective of developing economies and will provide future support for comparative studies and policy recommendations for emerging market economies.

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