



Advancing in the Change Journey Towards FinTech: The Nexus between Fintech and Financial Performance of Commercial Banks in Pakistan

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ABSTRACT

FinTech companies' involvement in Pakistan's banking industry is essential to improving the country's traditional financial system. This study uses data from the banking industry in Pakistan from 2018 to 2022 to investigate the relationship between bank performance and financial technology (FinTech). Regression analysis with a panel fixed effect model is used in this investigation. The Capital Adequacy Ratio (CAR), Net Interest Margin (NIM), Gross Non-Performing Loans (NPL), Return on Equity (ROE), Return on Assets (ROA), and Loans Deposit Ratio (LDR) are among the financial variables that are quantified in this study. In the context of FinTech, inflation and the GDP are control variables. The findings reveal that the financial variables, including NPLgross, CAR, ROA, LDR (Loan-to-Deposit Ratio), ROE, and inflation have a statistically significant influence on FinTech. Furthermore, FinTech is insignificantly influenced by NIM, as well as control variable GDP. This illustrates how Pakistani banks can benefit from forming alliances with FinTech companies in order to improve the financial system and maximize the profits that emerge from such a cooperation.



Introduction

The advent of FinTech has been one of the greatest important factors driving transformation in the financial services industry in recent years. The definition that appears most frequently in the literature is "technologically-enabled innovation in financial services that could result in new business models, applications, processes, or products with an associated material effect on the provision of financial services," or fintech. This definitional approach can be depicted as functional and wide since it can classify FinTech for both established and new providers of

financial service. However, the impact of technology businesses' entry into the banking industry, including possible interactions with incumbents, cannot be examined using this method (Zhao et al., 2022). FinTech is now being used in the banking industry. The general people can acquire banking financial services much more easily, practically, and securely thanks to FinTech services (2020, Abdullah). The old business model is changed to a modest one by financial technology also known as FinTech, which is the fusion of technology and financial services. Instead than carrying a certain amount of cash and paying one way to another, people could now execute long-distance transactions using online payment systems. FinTech describes technologically driven developments in the financial services industry. Services of FinTech usually lead the form of a system designed to execute financial transaction operations.

FinTech is a cutting-edge financial application or platform that offers straightforward, safe, and practical financial services to advance the economy and benefit society. The definition that has been given serves as the foundation for this one (Singh et al., 2021). FinTech adoption is an spending on innovation, creating an online system of payment under the direction of strategic management choices with the hope that this endeavor will improve organizational effectiveness. Evaluating success entails balancing the positive and negative effects on consumers, companies, workers, markets, economic sectors, and wider social obligations. The measure used to assess how well this balance is being struck is the earnings of companies, which are derived from information systems that are organized (Anggreni et al., 2020). The State Bank of Pakistan (SBP) formally began Pakistan's digitization journey in 2007 with the publication of a policy statement on Pakistan's mobile banking regulatory framework.

In March 2018, Branchless Banking Regulations were published immediately following this development. Many early adopters emerged to provide Digital Financial Services as a first step in the development of the nation's FinTech industry. This paper looks at the main components of the FinTech investment target identification process and the challenges banks face in implementing it (Butt & Khan, 2019). This study looked at the challenges that the banking sector faces while investing in FinTech. This investigation was conducted using five Pakistani banks and a convenience sample. The results address issues such as (a) FinTech in Pakistan's banking industry, (b) Banks ready to adopt new financial technology, (c) Prerequisites for launching a FinTech business, (d) Technology as a career in banking, and (e) Barriers to FinTech adoption in Pakistan. Among other things, Pakistan is urged to improve its FinTech infrastructure. The government needs to put forth greater effort to address these issues (Lee, et al., 2021). The nation's, industry's, and individuals' economic growth and sustainability are greatly influenced by the banking sector. Banks must innovate their services and procedures and provide value for stakeholders if they want to remain competitive and execute consistently. Growth can be facilitated through the adoption and use of innovative technology-enabled products and services for stakeholders and service delivery (Sharma, 2017). Technology adoption has therefore resulted in advancements in banking services and products that have a profound impact on the way the banking industry operates. By streamlining its services and operations, FinTech seeks to improve company processes, which could boost performance and competitiveness. Among the consequences of competitiveness include effectiveness, efficiency, flexibility, technology, productivity, value creation, quality, and so on (Arulraj & Annamalai, 2020). This study suggests that FinTech acceptance and use can boost the banking and financial industry's competitiveness and performance in the United Arab Emirates. Furthermore, the competitiveness and performance of the sector can be improved by efficiently managing the usage of FinTech (Dwivedi, Alabdooli, & Dwivedi, 2021).

A major knowledge gap regarding the influence of acceptance of new technology on the competitive posture and financial performance of commercial banks is intended to be filled by this study. The variety of remote access techniques for financial services has significantly increased over the last ten years. These methods can be accessed through a variety of channels, including banking correspondents, ATMs, mobile devices, and point-of-sale (POS) systems. Costs are a major obstacle influencing client retention and, in turn, the financial performance of these institutions as banks use a variety of tactics in various countries to improve financial inclusion. Effective strategic positioning is still difficult to achieve in Pakistan, where banking is highly dependent on financial success, because of problems with stakeholders, poor planning, a lack of resources, ineffective leadership, and complex ideologies.

Few studies have examined how technology implementation affects commercial banks' financial performance and strategic methods, despite the fact that prior research has examined strategic management in the banking industry (Ben Bouhenni al., 2023). By examining how technology adoption affects commercial banks' financial performance and strategic method, this study aims to close this gap. In order to explain the positive association between FinTech adoption, bank performance, and competitiveness, the study aims to assess how technology, particularly in commercial banking operations, affects financial performance. Many Pakistani banks have incorporated modern technologies into their operations in recent years in an effort to enhance customer satisfaction, boost productivity, and cut expenses (Al-Shari & Lokhande, 2023). It is unclear, meanwhile, how these efforts to integrate technology will affect Pakistani banks' financial results. The effect of technology adoption as a business strategy on Pakistani banks' financial performance must be assessed. There hasn't been much evidence to address these questions thus far.

Literature Review

Although the phrase "financial technology" (FinTech) is relatively new, it has a long history in the banking as well as financial industries. Razzaque et al., (2020) define it as the convergence of technology and financial services through the simplification of ICT, which includes a number of advancements. These comprise, among other things, credit cards, online banking, automated teller machines (ATMs), and more recent innovations like e-wallets and mobile banking. According to Xie et al., (2021), FinTech services include peer-to-peer lending, crowdsourcing, online payments, financial planning, budgeting, and investment tools. According to Schindler (2017), FinTech is still evolving and is currently progressing through the fusion of new and established technologies like machine learning, blockchain, and big data. The creation of more complex and technologically advanced financial goods and services is made possible by this convergence. FinTech has great potential to solve a number of sustainability issues by digitizing procedures. But creating a successful model for broad FinTech acceptance is the biggest obstacle. According to Abdul-Rahim, Bohari, Aman, and Awang (2022), this model seeks to promote a widespread transition away from traditional financial services in order to fully utilize the benefits provided by FinTech.

2.1. Theory of Disruptive Innovation

This concept discusses how more accessible and reasonably priced alternatives provided by newer, simpler technologies or business practices might upend established industries. FinTech, a rapidly expanding industry that uses technology to provide innovative financial solutions, fits in well with this concept. FinTech businesses provide affordable, user-friendly services to underserved populations, posing a threat to traditional financial institutions (Solanki & Sujee, 2022). They

serve a wider range of clients by addressing issues like exorbitant fees and outdated technology, especially those that traditional banks ignore. FinTech's use of disruptive models demonstrates its connection to disruptive innovation theory. Startups identify underdeveloped or unserved markets and provide more affordable, specialized, technology-driven solutions to them. Traditional financial institutions will eventually face a significant competitive threat from these developments. The current financial environment is under danger because to FinTech's use of technology to create new financial products, forcing established players to change or risk losing market share. The connection between disruptive innovation theory and fintech shows how innovation addresses unmet customer needs while progressively dismantling established companies. FinTech's growing influence on the financial sector highlights the theory of disruptive innovation's ongoing applicability in contemporary corporate settings (Ibidunni et al., 2022).

2.2. Theory of Competitive Advantage by Porter's

Financial technology (FinTech) firms strategically adhere to Porter's theory by prioritizing differentiation through new, user-focused financial products and striving for cost leadership through optimized operations. They focus on niche markets, developing new consumer groups while providing competitive pricing and contesting conventional financial institutions limited by outdated technologies. By implementing tactics aligned with Porter's ideas, FinTech companies disrupt the financial sector, competently competing and securing a distinctive advantage.

This strategic orientation reflects Porter's lasting impact, guiding competition and transforming the financial sector within the evolving landscape of FinTech (Nayak et al., 2023).

2.3. FinTech Adoption and Bank Performance

Because to FinTech, the banking industry has undergone a full transformation. As a result, there were both positive and bad outcomes brought about by the growing interest of customers in FinTech services. The beneficial impact occurs as a result of the collaboration between the banking sector and the financial technology business, which ultimately results in enhanced effectiveness and efficiency in the banking sector (John, 2017). As a consequence of the collaboration of many stakeholders throughout the sector, transaction costs have been reduced, which has resulted in advantages for customers.

According to Obeidat and Saxena (2015), it also improves customer engagement strategies, increases brand loyalty, and promotes performance. Additionally, it attracts new consumers and improves customer engagement strategies. On a worldwide scale, the general competitiveness of the industry is increased as a result of this element. To expand their product and service offerings in the digital age, financial institutions may benefit from the assistance of FinTech. The mobile banking services offered by banks are one of a kind. It is feasible to provide consumers with services that are both convenient and of high quality with the assistance of FinTech in the banking business (Obeidat & Saxena, 2015). Modern channels of operations, such as e-banking and mobile banking, are examples of this.

According to Martino (2019), Kjellman et al. (2019), and Ozili (2020), FinTech refers to innovations that have a disruptive impact on the financial business. They enable enhanced efficiency and risk management for suppliers of financial services, in addition to providing intelligent financial goods and services (Ozili, 2021b). A number of studies investigate the impact that FinTech has had on the banking industry. Balyuk et al. (2020) demonstrate that loans provided by FinTech companies are hazardous and have a tendency to replace loans provided by major

banks. This is due to the fact that in the processing of massive amounts of data, FinTech lenders have benefits in terms of efficiency. During the global financial crisis of 2008, Pierri and Timmer (2020) investigate the behavior of non-performing loans (NPL) across financial institutions that utilized information technology (IT) for the purpose of evaluating bank loans. During the global financial crisis, they discovered that banks that had a high intensity of IT deployment had a lower number of non-performing loans (NPL). According to Buchak et al. (2018), FinTech lenders service borrowers that have a higher creditworthiness, they are more active in the refinancing market, they charge a premium that ranges from around 14 to 16 basis points, and they provide convenience to borrowers rather than cost savings. The research conducted by Hau et al. (2019) demonstrates that traditional banks in China's credit market are unable to compete with FinTech credit providers due to the fact that FinTech credit providers have cheaper distribution channels and an information advantage. According to Ozili (2021a), banks regulate their reported earnings by smoothing out irregular variations in income in response to competitive pressure from FinTech lenders. This is done in order to manage their earnings.

Financial technology work involves the securitization of the data, digital payments, online lending, risk management, financing and speculation and gives the new edge for the clients (Rodin et al., 2019). Financial technology had introduced various variations in the financial services such internet banking, ATM, credit cards, electronic payments and digitalization (Wonglimpiyarat, 2017). These financial services allow users to access banking facilities at any place or time without any threat (Tam & Oliveira, 2017). FinTech also offers insurance technology, crowd funding, blockchain, big data, artificial intelligence, and robo-advising. The efficiency of the services is increased by advancements in financial technologies (Brătășanu, 2017). One advantage of data mining and analysis is the enhanced ability to identify fraudulent and phony data. FinTech is also providing digital loan services for clients. Easy access to financial services through e-banking helps clients to maintain their transactions (Chawla & Joshi, 2017).

Reducing transaction costs enables financial institutions to offer more creative and financial services, improve managerial skills, and expand the number of transactions. It also encourages the use of new technology, or FinTech. Banks can improve performance by providing more financial services through innovative technological models (Merton, 1995). According to a research done in Spain, FinTech has an impact on the performance of the financial industry. It can have a beneficial effect on performance and increase deposits and customers (Hernando & Nieto, 2007).

Based on the number of users and monthly value transferred, a research carried out in Kenya determines the impact of mobile banking on the functioning of the banking industry. Using mobile banking as a component of financial technology, the data was gathered between 2007 and 2011 and determined how FinTech affected banking performance.

H1: Financial performance of commercial banks operating in Pakistan is positively related with FinTech.

3. Methodology

The quantitative methodology is superior in terms of getting a better knowledge of the research topic by employing numerical data, as stated by Mertens (2003) and Puunch (2013). Data may be examined in terms of numbers, numerical procedures, and can be analyzed and interpreted via the outcomes. The current study used event study methodology. The theory and hypothesis are developed in this research and the step-by-step procedure is followed to test the hypothesis. In this

research the non-probability or non-repetitive sampling technique is used through which data can be easily generalized through the use of statistical tools. This method allows you to select samples and generalization of the results is also possible. The researcher wants to evaluator judge the population elements statistically (Saunders et al., 2009).

3.1 Population and Sample

The succeeding examination is based on financial performance impact on FinTech in Pakistan from 2018 and 2022. According to SBP, 34 banks are operating in Pakistan, four specialized and five foreign banks are excluded from the study, other 25 commercial banks (20 private and 5 government banks) (State Bank of Pakistan, 2019). The target population of this study are commercial banks in Pakistan and sample size is 44% of the target population. 15 out of 25 commercial banks are included in the sample because other banks have not been using mobile applications for the last 5 years.

3.2 Data and Sources of Data Collection

The Pakistan Stock Exchange and the Competition Commission of Pakistan are the sources of all of the data for the period of 2018-2022. From the annual reports and financial statements of the selected institutions, the information is acquired. Inflation and GDP data are collected from World Bank Development Indicators.

3.3 Variables

We make use of the FinTech Index (FinTech) as the FinTech-specific variable, which is one of the primary factors that we include into our explanations. The FinTech Index is a reflection of the country's investment and attention to the technology of financial technology, which in turn reflects the application breadth of financial technology in financial institutions. As a result, we make use of the FinTech Index as a quantitative indicator in order to evaluate the overall progression of financial technology.

We employed a number of proxies, including the gross non-performing loans (NPL), capital adequacy ratio (CAR), net interest margin (NIM), return on equity (ROE), return on assets (ROA), and loan-to-deposit ratio (LDR), to evaluate the performance of the bank. The inflation ratio and gross domestic product are two examples of macroeconomic variables that have been included into the estimating process as control variables (also known as control variables). The inflation rate of Pakistan in year t used as the basis for the calculation of the inflation. A country's gross domestic output in a given year is referred to as its GDP. The literature that forecasts the variables influencing bank performance serves as the foundation for the empirical model we employ (Phan et al., 2019; Dasilas & Karanovic, 2023; Shaban et al., 2018).

4. Data Analysis

4.1 Analysis of Market performance

This portion of the paper provided light on the deep examination of financial performance on FinTech in numerous methods. Firstly, this part emphasizes the descriptive statistics, then several diagnostic test for regression analysis.

Table 1 gave descriptive data about FinTech. The present research calculated data from 75 banks over the period of 5 years.

Table 1 Descriptive Summary for Non performing Loans

Variable	N	Mean	S.D	Min	Max
FinTech	75	330.3789	338.979	8.35	885.01
CAR	75	3.363786	65.27094	2.050000	820.9000
NPL	75	1.38874	0.68457	0.425	5.59
NIM	75	1.581464	4.55978	0.00000	69.0000
ROA	75	4.717500	2.722879	-10.85000	15.89000
ROE	75	5.126500	62.03962	-1010.000	95.44000
LDR	75	96.34700	4.114805	0.220000	32.42000
Inflation	75	2.524478	1.168389	1.437025	5.553897
GDP	75	72.13766	14.07962	49.56273	93.74249

This Table provide a descriptive overview of the financial performance and financial technology in Pakistani banks.

4.2 Collinearity

In the process of performing multiple regression analysis, the assumption that there is no check for multicollinearity is an important one. In the context of independent variables, multicollinearity refers to linear relationships between the variables. According to Gujrati and Porter (2009), when there is perfect multicollinearity, the regression coefficients continue to be indeterminate, and the standard errors associated with them are infinite on average. An examination of the pair-wise correlation between the regressors is a method that can be utilized to identify the issue of multicollinearity. In situations where there is a high zero-order correlation between two variables, multicollinearity can represent a potential issue. Because it becomes more difficult to determine which variables are responsible for explaining what, a high correlation between the variables that explain something can result in unstable coefficients and high p-values that correspond to those coefficients. Furthermore, if the degree of collinearity is high but not perfect, it is possible to estimate the regression coefficients; however, the standard errors associated with these coefficients are typically quite high (Gujrati and Porter 2009). According to Greene (2003) and Gujrati (2012), researchers have generally recommended that the relationship between variables should not exceed 70 percent percent. Any result that is greater than 70 percent should be cause for concern because it indicates that there is a problem with multicollinearity.

Table 2 Correlation Matrix

Variable	1	2	3	4	5	6	7	8	9
FinTech	1								
CAR	0.401***	1							
NPL	-0.597***	0.335**	1						
NIM	0.157	0.294*	0.184	1					
ROA	0.131	0.083	0.158	0.0173	1				
ROE	0.052	0.309***	0.324***	0.097**	0.281***	1			
LDR	0.045	0.231***	0.042	-0.000	0.3017	0.2721	1		
Inflation	-0.071*	-0.118***	-0.112***	0.008	0.021	-0.146***	0.241***	1	
GDP	0.0831	0.0037	0.0060	0.0433	0.6016	0.063***	0.586***	0.026***	1

The Pearson correlation coefficients along with their respective significance levels are presented in this table. The symbols *, **, and *** denote statistically significant values of 10%, 5%, and 1%, respectively.

4.3 Regression Analysis

For the purpose of analyzing the effects that financial performance of Pakistani bank on financial technology, the following econometric specification, also known as a regression model, is estimated:

$$\text{FinTech}_{i,t} = \alpha + \beta_1 \text{CAR}_{i,t} + \beta_2 \text{NPLGross}_{i,t-1} + \beta_3 \text{ROA}_{i,t} + \beta_4 \text{ROE}_{i,t} + \beta_5 \text{NIM}_{i,t} + \beta_6 \text{LDR}_{i,t} + \beta_7 \text{GDP}_{i,t} + \beta_8 \text{INF}_{i,t} + \varepsilon_{it} \quad (1)$$

The letter i stand for banks, and the letter t stands for time. The independent variable including the capital adequacy ratio (CAR), net interest margin (NIM), gross non-performing loans (NPL), return on equity (ROE), return on assets (ROA), and loan-to-deposit ratio (LDR) for bank i in year t that is represented by the symbol t. The term "FinTech" refers to the progression of financial technology for bank i in the year t. Control variables include the inflation ratio (Inflation_t), and gross domestic product (GDP_t). ε refers to the error term.

Table 3 delineates the results of the panel data regression analysis, which investigates the causal relationship between the independent variables and the dependent variable. This analysis encompasses various tests, including the Chow test and the Hausman test. According to the outcomes of these tests, the most suitable model employed in this research is the fixed effect model. The results are presented in the subsequent table:

Table 3 Fixed Effects Model

FinTech	Coef.	S.Err.	value of P
CAR	652.64 ***	29.713	0.000
NPL	0.1550 **	0.1092	0.036
NIM	-1.3930	1.0548	0.180
ROA	1.9697 *	2.2736	0.086
ROE	0.0902 **	0.094	0.040
LDR	-.889*	.476	.068
Inflation	.161**	.128	.015
GDP	-.382	.492	.442
Constant	1.72**	.678	.01

R2	0.489	Number of obs	75
F-test	5.375***	Pro > F	0.000

The results of the fixed effects model for FinTech are shown in this table. Statistical analysis uses asterisks to indicate the levels of significance, with *** indicating significance at the 1% level, ** representing significance at the 5% level, and * representing significance at the 10% level.

5. Results and Discussion

In Table 3, the results of the regression for FinTech are shown. There are seventy-five observations in all. In order to determine how effective the model is, the R-squared and F-value have been used. The coefficient of determination (R squared) is 0.488, which indicates that independent factors are responsible for accounting for 48 percent of the overall variance in the non-performing loans. The statistics from the F-value indicate that the overall model is significant at 1%, and it is possible that it may be exploited for more study.

The capital adequacy ratio (CAR) shows positive and significant association with FinTech, mean CAR enhance the FinTech. The gross non-performing loans (NPL) shows positive and significant association with FinTech, mean NPL enhance the FinTech. The net interest margin (NIM) shows insignificant relationship with FinTech. The return on assets (ROA) shows positive and significant association with FinTech, means ROA increase the FinTech, return on equity (ROE) shows positive and significant association with FinTech, means ROE increase the FinTech and loan-to-deposit ratio (LDR) shows positive and significant association with FinTech, means LDR. increase the FinTech Financial performance indicate a positive and significant impact on the financial technology users of the banking sector in Pakistan. These results are consistent with the finding of (Mutua, 2013; Phan et al., 2020). The results suggest that the number of mobile banking users has an significant impact on the bank's financial performance. People are moving toward mobile banking and FinTech, it influence the banks' performance. These results are consistent with the (Gitau, 2011; Mwange, 2013; Nyaga, 2017; Steven, 2002).

It is clear from the results that there is a positive and favorable association between FinTech and Inflation. It represents that FinTech and Inflation increase the financial performance of banks operating in Pakistan. GDP show an insignificant relationship with FinTech. It means GDP has no influence on the financial technology in banks of Pakistan.

A quicker growth rate suggests that the country's macroeconomy is in a condition of rapid development, that bank operational efficiency is swiftly increasing, and that bank profitability is strengthening, which ultimately results in a reduction in the percentage of non-performing loans held by banks. When the macroeconomy is in a downturn, on the other hand, investment decreases and company activities become more difficult to carry out. This is because it may not be feasible to repay bank loans on time, which ultimately results in a rise in the percentage of loans that are considered to be non-performing of their obligations. It may be concluded that the percentage of non-performing loans held by listed commercial banks is not substantially connected with gross domestic product (GDP).

There is a significant relationship between the money supply and the rate of inflation. The Central Bank's decision to issue more currency often results in a decline in the value of the currency as well as an increase in the rate of inflation. As a result of a country's decision to employ a loose monetary policy in order to boost the economy, banks have access to surplus liquidity and are able

to provide more loans. The bank may, however, cut credit conditions in order to extend the scope of loans, which might result in projects with a larger risk of defaulting on their debts being able to secure finance. There is a general trend toward a reduction in the quality of credit assets, particularly non-performing loans. It may be concluded that there exists a positive correlation between the inflation ratio and the non-performing loan ratio of the commercial banks that are listed on the stock exchange (Michaël, 2015; Brooke and Ketchley, 2018).

5.1 Conclusion

Financial technology is an imperative part of the banking sector because innovative techniques create a competitive advantage. Mobile banking is a component of financial technology as it saves cost and time and creates efficiency in the system. The present research paper addresses the impact of financial performance on FinTech Index of Pakistani commercial banks. The data set of this study is 15 commercial banks from 2018-2022. The panel data fixed effects regression analysis performed to find the impact of financial performance on FinTech of banks operating in Pakistan. According to the finding of this study, financial performance have a positive influence on bank financial technology transactions and the impact is significant. As the performance increased through the FinTech transactions then it is important for the banking sector to invest in financial technology or adopt the new techniques that increase the banking sector's performance. Banks face competition in this sector as FinTech companies are working independently and providing cheap services. The authentication of the system of financial technology makes the customer more confident in performing mobile transactions. Financial technology makes the banking sector open to experience innovative models. According to the financial intermediation theory the impact of financial technology is positive because innovative techniques reduce the cost and make financial services efficient. Theory also supports the result of this study as the impact of financial technology transactions is positive and significant.

Inflation show positive and GDP growth show a negative impact on FinTech. As the finding shows positive impact of financial technology transactions on commercial banks in Pakistan than commercial banks should improve the FinTech system and increase the efficiency of the system and ensure the customer about their safe transactions. Adopting new techniques creates effectiveness in the system and also benefits the banks in terms of cost reduction. Decreasing cost of transaction for users derives profitability and performance to the positive side.

There should be regulations by the State bank of Pakistan for all banks to maintain a level of investment in FinTech and provide financial services through mobile applications. They should maintain an optimal level of equity for increasing performance or wealth. Commercial banks should make reliable anticipation of inflation as unanticipated inflation decreases their performance. There should be Basel iii regulation for banking systems to adopt financial technology to maximize performance.

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