



## DO THIRD-PARTY FUNDS AND BANK RISKS AFFECT THE PROFITABILITY OF DIGITAL BANKS?: INDONESIAN EVIDENCE

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### Abstract

This study was conducted on five digital banks in Indonesia, examining the effects of third-party funds (TPF) and bank risks, including credit, market, and operational risks, on profitability. This research employs a quantitative-explanatory approach and uses 96 observational data from five Indonesian digital banks' websites using quarterly financial data from 2019-2023. This study presents novel empirical evidence that the CAR has a positive effect on digital banks' profitability (ROA), and operational risk (OCOI) has a negative effect on profitability (ROA). Using panel data regression, this study finds that TPF and market risks do not significantly affect profitability. The study underscores the crucial role of digital banks' operational and credit risks in profitability while also revealing that TPF and market risk are not among the main drivers of digital banks' profitability.

**Keywords:** digital banks; third-party funds; credit risks; market risks; operational risks; profitability

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### INTRODUCTION

In recent years, there has been an increasing interest in digitalization. Information technology's rapid growth has brought about an age known as the Industrial Revolution 4.0. The widespread utilization of many new technologies in the financial services sector has resulted in considerable changes to the banking sector. Banking digital transformation, make digital bank happen. Several factors drive the demand for banking digitalization and the promotion of the development of digital banks in Indonesia. Since Indonesia is an economy with a high capacity to absorb the flow of digitalization, these driving factors are shown in three aspects: digital opportunity, digital behavior, and digital transactions. Digital transactions include online trade transactions (e-commerce), digital banking, and electronic money transactions (OJK, 2022). In addition, entering the digital era, the transition of people's lifestyles toward the need for fast, easy, and inexpensive services has also stimulated the emergence of digital-based financial services. People's shifting spending habits toward digital has prompted banks to accelerate the digital banking shift. Apart from conventional banks' efforts to provide digital banking services, digital banks have emerged and become an essential part of the financial services ecosystem and the fintech world. Yunita (2021) stated that according to the Financial Services Authority, 2015-2019 is the year of rapid adoption of the digital banking system in Indonesia. Digital banks, a phenomenon in the financial industry over the last few years, provide centralized banking services via mobile applications. Digital banks allow customers to access bank products and services via online or electronic platforms like smartphones. In digital banks, all bank operations and services are online, so customers do not need to come to the bank in person. To support digitalization, banks must allocate large amounts of capital expenditures to provide information technology infrastructure.

Being a phenomenon in the Indonesian financial industry in recent years, digital banks provide centralized banking services through mobile applications. Therefore, customers do not need to be in person to grab banking products and services since they are accessible online. Even though challenges such as uneven internet access, the threat to cyber security, and lack of legal regulation exist, digital banks can improve financial service inclusion to the public and increase banking efficiency, boosting economic activities (OJK, 2022). Various business challenges and uncertain financial performance conditions in digital banking make this research fascinating. Apart from that, there is still discussion among researchers and academics regarding the variables used in this research to influence company profitability.

Profitability was measured using ROA (Return on Assets), the number of returns from financing and credit disbursed (Yunita, 2021). However, during 2019-2023, five of the most prominent digital banks' profitability fluctuated, as illustrated by ROA trends in Figure 1, the performance in 2022 was still negative. This data supporting Budianto (2023) who writes that the performance of digital banks in 2022 was less encouraging compared to conventional big banks. Mayasari & Winarto (2023) conveyed the same thing because not all digital banks were able to achieve good performance and profit until the end of 2022. Kartika (2023) added that although digital banks experienced a significant increase in terms of interest income, the amount of credit disbursement, third-party fund collection, and total assets, Indonesia's digital banks still recorded a loss. Transformation into a digital bank only guarantees profitability if a clear business plan and sound risk management do not accompany it.

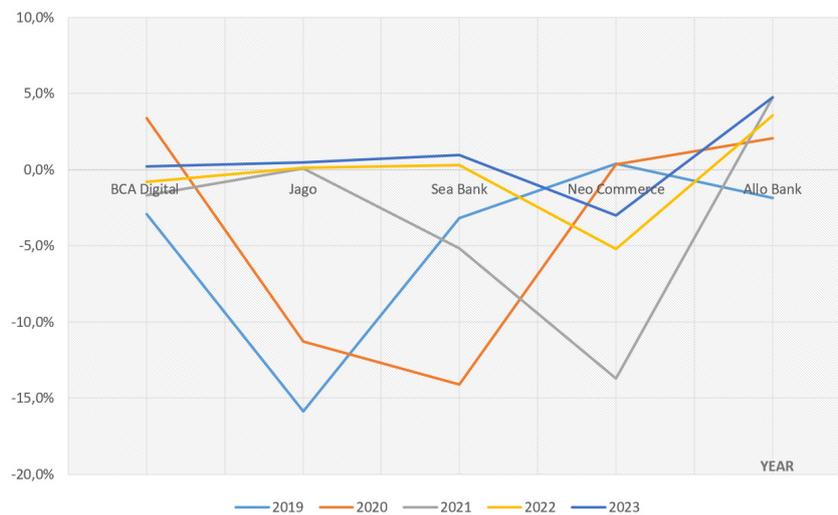


Figure 1. ROA of Five Digital Banks For The Period of 2019-2023  
Source: Financial data from company website pages, processed.

Figure 1 illustrates the varying levels of profitability among five digital banks in Indonesia from 2019 to 2023, as measured by Return on Asset (ROA). These variations highlight the importance of effective management, risk mitigation, and strategic planning in achieving and maintaining profitability in the digital banking sector. Profitability is crucial for the long-term sustainability and growth of banks. This study highlights the critical role of third-party funds (TPF) in determining the profitability of digital banks in Indonesia. While higher TPF can lead to increased profitability through expanded credit distribution, effective risk management is also required to mitigate potential downsides. This balance between leveraging TPF for growth and managing risks is essential for digital banks' sustained profitability and sustainability. Previous research has shown that TPF affects ROA (Heranita & Zamzami, 2022). The study supports the previous research by Said & Ali (2016) and Katuuk et al. (2018) found that TPF has a negative effect on profitability. However, other studies stated contradictory findings, in which TPF does not affect ROA (Buchory, 2021);(Handoyo et al., 2023);(Sondakh et al., 2021); (Tambunan, 2020).

Credit risk is the other factor that was claimed to affect profitability. Previous studies used the Capital Adequacy Ratio (CAR) as a proxy for a company's ability to manage credit risk, and both performance indicators were confirmed to be interrelated since a company's ability to manage credit risk can affect business profits (Al-fadzar et al., 2021); (Butola et al., 2022); (Handoyo et al., 2023); (Hawaldar et al., 2022); (Kusmayadi et al., 2017); (Putri et al., 2022); (Puspitasari et al., 2021); (Rohman et al., 2022); (Siddique et al., 2022). ROA calculates the effectiveness of banking organizations in managing their assets to generate profits; hence, it quantifies their profitability. The higher the ROA, the more efficient the company is at creating net profits from shareholder equity. A high profitability ratio, in general, indicates that the company has excellent financial

performance. Previous research has demonstrated that CAR is the most dominant factor influencing ROA (Rahman et al., 2022). Another opinion stated that higher CAR would lead to higher ROA or have a positive relationship (Khalifaturofi'ah & Ulum, 2022); (Oleiwi et al., 2019); (Nyoka, 2019). In contrast with previous studies, (Prihatni, 2019); (Puspitasari et al., 2021); (Rahmi et al., 2022); (Said & Ali, 2016); (Tangngisalu et al., 2020) argues that there is no effect of CAR on ROA

The banking sector integrates operational risk as an integral component in pursuing optimal performance. According to Suryanto et al.(2022), Banks with strong financial performance demonstrate effective and efficient operations. The Operational Costs to Operating Income (OCOI) is an operational risk measure that was shown by previous studies, to affect the profitability (Astuti & Husna, 2020); (Heranita & Zamzami, 2022); (Puspitasari et al., 2021); (Sondakh et al., 2021); (Said & Ali, 2016); (Tambunan, 2020). This result is consistent with Katuuk et al. (2018) showing that OCOI has a negative effect on ROA. Conversely, Mardahleni & Arsandi (2019) reported that OCOI does not affect ROA. OCOI is a financial ratio that displays the magnitude of a company's comparison between operational costs and operational income over a given period. Because it is more efficient to utilize current resources in a bank, the lower the OCOI ratio, the better the performance of the bank's management.

Apart from operational risk, banks must also consider market risk proxied by the Net Interest Margin (NIM) indicator (Sondakh et al., 2021). The NIM is used to evaluate a bank's ability to create interest income by assessing its credit disbursement performance; the more significant the NIM obtained by a bank, the higher the interest income on productive assets handled by the bank, hence the bank's profitability. NIM indicates market risks that develop due to changes in market variables, which might harm the bank. Previous research has demonstrated the relationship between NIM and ROA, in which NIM is acknowledged as one of the influencing factors toward ROA (Butola et al., 2022); (Kusmayadi et al., 2017);(Puspitasari et al., 2021); (Supriyono & Herdhayinta, 2019); (Sondakh et al., 2021). Past studies also suggested a strong positive relationship between NIM and ROA. Furthermore, (Astuti & Husna, 2020);(Rahmi et al., 2022) advised a positive effect between NIM and ROA. Meanwhile, Mardahleni & Arsandi (2019) had negative results showing that NIM does not affect ROA.

This study addresses a research gap by examining the impact of internal factors on digital bank profitability. This research will re-examine the elements that can boost digital banking profitability in Indonesia. Various business challenges and volatile financial performance in digital banking generate interest in this field of study. Still, discussions among researchers and academics exist, especially on variables influencing company profitability. Furthermore, the study is structured into five parts: the initial segment provides a contextual background to the research, the second part clarifies the theory and hypothesis, and the research methodology is described in the third segment. The fourth section will discuss the suggested model's results, prove the hypotheses, and provide the findings. Finally, the fifth section will describe our findings, the limits of the current study, and future research prospects.

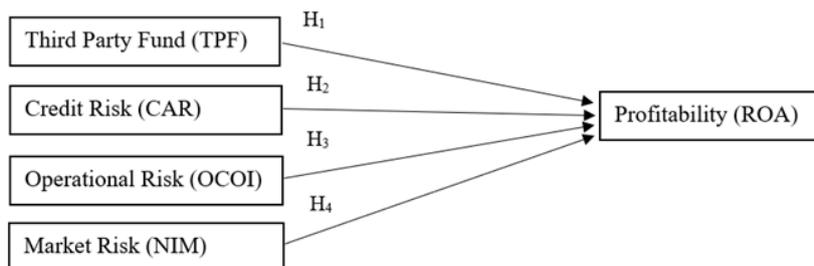


Figure 2. Conceptual Framework

The research hypotheses are as follows: (H<sub>1</sub>) The number of third-party Funds (TPF) affects digital banks' profitability (ROA); (H<sub>2</sub>) Credit Risk (CAR) affects digital banks' profitability (ROA); (H<sub>3</sub>) Operational Risk (OCOI) affects digital banks' profitability (ROA); (H<sub>4</sub>) Market Risk (NIM) affects digital banks' profitability (ROA).

## METHOD

This study used explanatory research, collecting secondary data through documents on published company financial reports on the corporate website. The population in this study covers digital banks in Indonesia. This study uses financial data from five digital banks in Indonesia as samples. Determination of the sample uses judgment sampling, based on the quarterly financial report of the year 2023, available on the companies' webpage. Hidayah (2022) mentioned that eight companies have the most significant assets: PT Bank Seabank Indonesia, PT Bank Neo Commerce Tbk. (BBYB), Bank Jago, PT Bank Raya Indonesia Tbk. (AGRO), PT Allo

Bank Indonesia Tbk. (BBHI), PT Bank BCA Digital, PT Bank Amar Indonesia Tbk. (AMAR) and PT Bank Aladin Syariah Tbk. (BANK). However, only five companies have the complete financial data available for five years of observation (2019-2023): PT Bank Seabank Indonesia, PT Bank Neo Commerce Tbk. (BBYB), Bank Jago, PT Allo Bank Indonesia Tbk. (BBHI), PT Bank BCA Digital. The available data is quarterly financial data. Therefore, 96 observational data are used in this study. This study used panel data regression analysis. Three models can be used in analyzing panel data: common effect, fixed effect, and random effect. The Chow, Hausman, and Lagrange Multiplier tests were conducted to choose the best model. Hypothesis testing and model estimation were processed using Eviews 10 and Stata 17 after completing the classical assumption tests, namely the normality, autocorrelation, heteroscedasticity, and multicollinearity tests, and panel data regression tests were conducted.

## RESULTS

Table 1. reflects the use of descriptive analysis for each variable, namely ROA, LN\_TPF, CAR, OCOI, and NIM.

Table 1. Descriptive Analysis

	ROA	CAR	NIM	OCOI	LN_TPF
Mean	-0.015495	0.918394	0.069928	1.179827	14.94153
Median	0.000750	0.473750	0.048650	0.996300	15.12831
Maximum	0.048500	11.07970	0.195700	2.611000	17.07619
Minimum	-0.158900	0.135300	0.020500	0.399400	6.890609
Std. Dev.	0.043444	1.451375	0.046801	0.472190	1.543200
Skewness	-1.257490	4.540541	1.420587	1.346334	-2.387940
Kurtosis	4.509290	28.30849	3.834399	4.637244	12.36639
Jarque-Bera	34.41234	2891.944	35.07397	39.72413	442.1535
Probability	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	-1.487500	88.16580	6.713100	113.2634	1434.387
Sum Sq. Dev.	0.179305	200.1164	0.208078	21.18151	226.2392
Observations	96	96	96	96	96

Table 1 shows that the average ROA of digital bank companies during 2019q1-2023q4 is minus 1.54%. The average CAR for these five digital banks is 0.918394, and OCOI and NIM are 1.179827 and 0.069928. Meanwhile, the average natural logarithmic of TPF (LN\_TPF) is 14.94153. The standard deviation of ROA is 6,687%. The standard deviation for all variables is within the range of values below one, except for CAR and LN\_TPF; a high standard deviation value indicates this gap. However, the standard deviation values for these variables are still below two, making them acceptable. Therefore, it can be concluded that the deviation of these variables is not extreme (Altman & Bland, 2005).

Table 2. Best Model Selection Test

Hypotesis Test	H_0	H_1	Prob>Chibar2	Result
Chow Test	Common Effect Model	Fixed Effect Model	0.000	H_0 rejected
Hausman Test	Random Effect Model	Fixed Effect Model	0.0316	H_0 rejected
Lagrange Multiplier Test	Common Effect Model	Random Effect Model	1.000	H_0 accepted

Table 2 explains that using the Chow test, the output results of model estimation show a cross-section chi-square value of  $0.0000 > 0.05$ . Based on the Chow model test results, the proper model is the fixed effect model. On the other hand, according to the implementation of the Hausman test, which is utilized to select the optimal model between the Fixed Effect Model and the Random Effect Model, the output results above the probability value. Since the value of the random cross-section is  $0.0316 > 0.05$ , the suitable model is the fixed effect model. Meanwhile, the Lagrange multiplier test is exercised to choose the fittest from the random or common effect models. From the Lagrange multiplier test results, the value of the prob >chibar2 Breusch Pagan is  $1.000 > 0.05$ . Therefore, the selected model is the common effect model. The fixed effect model has been determined to be the optimal model for estimation based on the results of the Chow test and the Hausman test. Thus, this study selects the fixed effect model.

Table 3. Classic Assumption Test

Classic Assumption Test	H <sub>0</sub>	H <sub>1</sub>	Prob>Chibar <sup>2</sup> (Mean VIF for multicollinearity test)	Result
Normality Test (Shapiro- Wilk Test)	the data distribution does not differ significantly from the normal distribution.	the data distribution differ significantly from the normal distribution.	0.000	H <sub>0</sub> rejected
Multicollinearity Test (VIF)	The data does not have a multicollinearity problem	The data has a multicollinearity problem	1.40	H <sub>0</sub> rejected
Heteroscedasticity Test (Modified Wald Test)	The data is Homokedastic	The data is not homoscedastic (including of heteroskedasticity problem)	0.000	H <sub>0</sub> rejected
Autocorrelation Test (Wooldridge Test)	The data does not have an autocorrelation problem	The data has an autocorrelation problem	0.004	H <sub>0</sub> rejected

Table 3 shows The normality test results in the probability value of  $0.000 < 0.05$ , which does not meet the normality assumption. Therefore, the data is not normally distributed and can be used in the study with robust regression. In addition, the heteroscedasticity test shows that the probability value of  $0.000 < 0.05$ . Thus, the heteroscedasticity problem is concluded. The multicollinearity test result shows a correlation value of less than 10. Therefore, the data is free from multicollinearity problems and subject to use. Meanwhile, the autocorrelation test exhibits the Woldridge test for autocorrelation in Panel Data. Test results in the probability value of  $0.004 < 0.05$ , which meets the autocorrelation problem assumption. Therefore, we can use robust standard error regression to solve the heteroskedasticity and autocorrelation problem in the model (Atkinson et al., 2016).

Furthermore, the partial significance test in Table 4 indicates that OCOI factors partially affect ROA in digital banks. However, this study cannot provide any evidence of the effects of CAR, NIM, and TPF on ROA.

Table 4. t Test (fixed effect model)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.103249	0.015348	6.727291	0.0000
CAR	0.001702	0.000920	1.848800	0.0679
NIM	-0.043876	0.031347	-1.399687	0.1652
OCOI	-0.091388	0.003105	-29.43299	0.0000
LN_TPF	-0.000630	0.000974	-0.647283	0.5192

Table 4 shows the result of fixed-effect panel regression. The result shows that this study can deliver proof of research hypothesis 3, showing that operational risk (OCOI) negatively and significantly affects profitability (ROA). However, based on the results of the classical assumption test shown in Table 3, the fixed-effect estimation model faces issues of heteroskedasticity and autocorrelation. Therefore, the estimation of standard error robustness is needed to address these issues (Atkinson et al., 2016).

Table 5. t Test (standard error robustness fixed effect model)

Variable	Coefficient	Robust Std. Error	t-Statistic	Prob.
C	.1032488	.0342557	3.01	0.039
CAR	.0017016	.0002999	5.67	0.005
NIM	-.0438757	.0855891	-0.51	0.635
OCOI	-.0913883	.0117196	-7.80	0.001
LN_TPF	-.0006302	.0014714	-0.43	0.690

Table 5 shows the fixed effect panel regression result with standard error robustness. The result shows that this study can deliver proof of research hypothesis 2, whether CAR positively affects digital banks' profitability (ROA). A high Capital Adequacy Ratio (CAR) equips digital banks with the financial resilience to withstand economic downturns, manage risks effectively, comply with regulations, and maintain lower capital costs, all contributing positively to their Return on Assets (ROA). Furthermore, this study supports hypothesis 3, showing that operational risk (OCOI) negatively and significantly affects profitability (ROA). Operational risk poses significant threats to digital banks by potentially disrupting their operations, causing financial losses, attracting regulatory penalties, and damaging their reputation. These risks increase operational costs and can reduce profitability, negatively affecting the Return on Assets (ROA).

Table 6. Determination Coefficient Test Data

R-squared	0.9267	Mean dependent var	-0.015495
Adjusted R-squared	0.940431	S.D. dependent var	0.043444
S.E. of regression	0.010603	Akaike info criterion	-6.166227
Sum squared resid	0.009782	Schwarz criterion	-5.925819
Log likelihood	304.9789	Hannan-Quinn criter.	-6.069050
F-statistic	259.74	Durbin-Watson stat	1.059157
Prob(F-statistic)	0.000000		

Table 6 shows an R-squared value of 0.9267 or 92.67%. It indicates that the deviation of changes in the independent variables, namely third-party fund (TPF), CAR, a ratio of OCOI, and NIM, in explaining the magnitude of the deviation of changes in profitability (ROA) as the dependent variable is 92.67%. Hence, the remaining 7.33% is influenced by other variables not included in this study.

Table 6 also explains the results of the F test, which reveal the probability value of 0.0000 for the F statistic, which is less than the significance level of 0.05 or 5%. Thus, this study proves there are influences from TPF, CAR, OCOI, and NIM on ROA. Profitability is significantly affected by the company's ability to collect third-party funds and risk factors, namely credit, operational, and market risks.

## DISCUSSION

The results of this study are consistent with the works by (Said & Ali, 2016); (Katuuk et al., 2018); (Syachfuddin & Rosyidi, 2020), indicating that a Third-party Fund negatively influences profitability. Third-party funds in digital banking companies greatly influence their level of profitability. When Third Party Funds increase but Operational Expenses increase, or the bank is unable to distribute credit effectively so that credit interest income does not increase significantly, and there is even an increase in the percentage of bad loans, the bank will experience a decline in profitability because the interest income from credit is not large enough to cover interest costs. That must be paid to depositors.

This research also substantiates the third hypothesis that OCOI exerts a partially negative effect on profitability. The OCOI ratio illustrates a bank's efficiency in handling its business costs, such as interest, marketing, labor, depreciation, and other operational costs. As digital bank develops their products, there can be significant growth or an increase in operational costs. A significant progression in operating expenses, which is not accompanied by advancement in interest income, causes bank profits to fall or, even worse, incur losses. A smaller OCOI ratio implies that the bank is more efficient in managing the company. OCOI has a negative effect, meaning that an increase in OCOI denotes a decrease in efficiency, leading to reduced profitability (ROA). The more efficient a bank is, the better its performance will be. Increased bank performance will improve public trust in banks. The results of this study are consistent with the research by (Astuti & Husna, 2020); (Heranita & Zamzami, 2022); (Katuuk et al., 2018); (Puspitasari et al., 2021); (Katuuk et al., 2018);(Said & Ali, 2016); (Sondakh et al., 2021);(Tambunan, 2020) stating that OCOI affects the profitability (ROA). The OCOI ratio shows the bank's efficiency in carrying out and controlling its main business activities, such as interest, marketing, labor, depreciation, and other operational costs. When a digital bank develops its products, there may be a significant increase or increase in operational costs. A significant increase in operational expenses, not accompanied by an increase in credit interest income, causes bank profits to fall, and the bank may even experience losses. The smaller the OCOI, the more efficient the bank is in its business activities. OCOI has a negative effect, meaning that if OCOI increases, efficiency decreases, and profitability (ROA) will decrease. The more efficient a bank is, the better its performance will be. Increasing bank performance will increase public confidence in banks.

The results of this study are consistent Rahman et al.(2022) stated that CAR affects profitability. The fluctuation of digital bank profitability depends on its CAR. It means that investors consider the CAR of digital banking companies as an essential factor, as well as other factors such as liquidity, company growth rates, dividends, social and economic conditions, technological developments, monetary stimulus, business development strategies, and long-term prospects. The rise and fall in digital bank profitability depend on the value of the Capital Adequacy Ratio. This means that investors see the CAR value of digital banking companies as an essential factor but rather other factors such as liquidity, company growth rate, dividends, social and economic conditions, technological developments, monetary stimulus, business development strategies, and long-term prospects.

However, this study cannot validate the first and fourth hypotheses concerning the effect of TPF and NIM on profitability. However, owing to technological advancements, several routine tasks, such as shopping, education, and employment, continued to occur. The rapid development of technology, including the advancement of digital banks, has resulted in the execution of all activities online. Evidence found in this study is also in line with the prior studies conducted (Rahman et al., 2022) expressing that CAR affects profitability. Moreover,

NIM does not partially affect profitability. The size of the NIM has absolutely no effect on the profitability of a digital bank. The outcome of this report is also in line with the investigation performed by (Mardahleni & Arsandi, 2019), asserting that NIM does not affect profitability (ROA).

## CONCLUSION

Based on the data analysis, it can be concluded that operational and market risks affect profitability (ROA). Meanwhile, TPF and credit risk do not affect profitability (ROA) for five of Indonesia's most prominent digital banks based on their assets. Third-party funds, credit risk, operational risk, and market risk simultaneously affect profitability (ROA). To achieve maximum business profitability, various factors must be managed effectively and efficiently, including the number of third-party funds and the ratio of OCOI. The smaller the OCOI, the more efficient the bank is in its business activities. This study proves that in emerging markets, The size of the NIM value held by a digital bank does not affect the profitability of the digital bank. This study has limited samples in use. Therefore, further research can observe more data and explore other factors that can explain the performance of digital banks' profitability beyond those examined in this study. Further research can be developed by measuring other factors influencing digital bank performance, such as company growth rate, dividends, and external factors including economic conditions, technological developments, and monetary stimulus.

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