

# Impact of Non-performing Corporate Assets on Shareholder's Equity and Return on the Application of AI and Block Chain Technologies

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Received: June 21, 2024; Revised: August 05, 2024; Accepted: September 02, 2024; Published: September 30, 2024

## Abstract

One of the major challenges for banks, NPAs have an adverse impact on profitability, stability, and shareholders' equity. The current study, therefore, is an attempt to explore the impact of NPAs on shareholders' equity and returns, with special emphasis on the application of AI and block chain technologies as innovative solutions to the problem. It considers takaful principles in examining Fintech Corporations characterized by high NPAs and focuses on the main external and internal factors behind NPAs high interest rates, inadequate monitoring, natural calamities, willful defaults, recession, and unhealthy competition. The study uses AI-based predictive analytics to project potential NPAs and proactive measures in enhancing asset management processes. Block chain helps to introduce transparency and security of financial transactions, providing an immutable ledger that will help in creating accurate record-keeping and auditability. Taken together, these technologies offer robust solutions for the management of NPAs, risk reduction, and financial stability. Results underline the huge impact AI and block chain can have in attenuating the negative impact of NPAs on shareholder equity and returns. These technologies, therefore, stabilize and make the banking sector more effective by addressing these interrelated external and internal factors. This research thus follows the journal's focus on the implementation and management of advanced information systems to improve socio-economic environments related to the potentials AI and block chain can bring into the process of financial management.

**Keywords:** Non-performing Assets (NPAs), Shareholder Equity, Artificial Intelligence (AI), Block Chain Technology, Financial Stability.

## 1 Introduction

Recent studies have come up with new evidence regarding ever-increasing corporate financial liability towards financial sectors. They also brought forth constantly increasing vulnerabilities of corporates and the banking industry. Post-recession period of a country, generally the performance of businesses and financial governance has been found to be at a highly deteriorating stage. The corporate sector has been focused on as the most vulnerable among all other sectors due to its nature of vulnerability (Lee et al., 2020). Over the past few years, there has been a growth in the vulnerability of the corporate sector, and

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*Journal of Wireless Mobile Networks, Ubiquitous Computing, and Dependable Applications (JoWUA)*, volume: 15, number: 3 (September), pp. 412-423. DOI: [10.58346/JOWUA.2024.13.027](https://doi.org/10.58346/JOWUA.2024.13.027)

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it is ever-increasing at an unprecedented level until today (Peng et al., 2022). The problems associated with profitability as well as leverage in the corporate sector seem to grow, resulting in a decrement in the economic growth of a nation. The International Monetary Fund has found that nations like China, India, and South Africa are on the verge of great deterioration in corporate financial statements. The growing threats due to bad financial conditions may result in corporate distress, further leading to stress.

Basically, it is true that corporate sectors are under immense pressure to maintain balance sheets, especially for borrowing money. The corporate sectors experienced a steep fall in investment, returns, and equity during the global financial crisis. Corporates witnessed the declining trend of growth in investment, especially after the recession (Mahmood et al., 2022). The corporates, due to the above reasons, can be said to be under stress for quite a long time. Similarly, the risk associated with corporates clearing debt increased substantially. Corporates that fail to perform up to the expected results regarding income, returns, and equity are termed NPAs. When corporates do not showcase any kind of commercial risks and are performing well, they are treated as performing assets (Akbar et al., 2020). In general, NPAs are limited to investments, loans, and advances. When a corporation fails to generate the required income or assets, it is termed an NPA, and its impact will be substandard.

In a bank-dominated financial system, the relationship between corporate and financial shareholders comes into the limelight. Hence, when corporates define themselves as distressed in view of their performing potential, they are titled as NPAs. Some of the adverse effects of NPAs can be identified within the corporations related to shareholders' investments, returns, and equity. This fact was clearly stated by the financial sector, which accumulated the staggered data of the non-performing corporate assets (Gaur & Mohapatra, 2020). Returns from corporates, while turning out to be sluggish, do send shivers down the spine of shareholders. Unprecedented declines in the management of corporate finances have resulted in a negative impact on shareholder equity and returns. Apart from returns and equity, the shareholders' assets have also largely dipped, leading to financial instability within corporates (Claudia & Indrati, 2021). Return on assets turns out to be a grave concern for financial stability, even for large companies. This is termed an NPA if the income generation is not high in terms of revenue. That will stagger the growth of the corporates.

Past researchers found a cyclic and supplementary relationship between corporate distress and NPAs. To understand the relationship between corporate balance sheets and corporate assets turning out to be NPAs, detailed analysis is essential. With this aim, the present study tries to extend the current knowledge about the impact of NPAs on shareholders' problems, the concept of NPAs, and the cause behind the growing NPAs. It also tries to comprehend the concept of corporate distress and its influence on shareholders' returns and equity (Gaur & Mohapatra, 2020). The corporate system in recent times has faced grave problems with the accumulation of NPAs. Irrespective of the sectors, NPAs are regarded as a universal concern. The relationship between corporate assets and shareholders' equity and returns shall be regarded as poor if the profit of the business is lowered. At the same time, also the capital position of the corporation will slow down in case there is an increase in NPAs (Mohanty & Mehrotra, 2021). Also, it has been identified that corporates or financial institutions should maintain high quality assets, which will help the organization reduce NPA cases. It has been found in various past researches that NPAs are a key parameter in rating credit risks, asset quality, and project productivity in various industries. Thus, cleaning up of NPAs incorporates becomes very important and turns out to be a major parameter for analyzing corporate performance. If the profitability to the shareholders is affected, the business itself will be reduced, and a reduction in business can further reduce the accumulation of NPAs. Therefore, the present study attempts to analyze the effect of non-performing corporate assets on shareholders' equity and returns in a scenario when there is a growing need to keep the NPAs under control. Secondly,

it will also look into the ways through which Artificial Intelligence and block chain technologies could help alleviate this issue and improve asset management and financial stability.

Major contributions of the study:

- **Extension of Knowledge on NPAs and Shareholders:** It contributes to the existing body of knowledge by investigating how NPAs impact shareholders, addressing issues, and conceptual aspects of NPAs, and pinpointing underlying causes that contribute to their growth.
- **Role of AI and Block Chain Technologies:** It explores how the use of AI along with block chain technologies may be operationalized in predicting, and then managing, NPAs by offering innovative solutions congruent with the technological thrust of the journal. In this process, it has emphasized how such technologies could put away such a huge figure of discontinuation in shareholder profitability, along with overall financial soundness.
- **Identification of External and Internal Factors:** The research identifies and analyzes various external and internal factors that have a negative impact on the profitability of shareholders who have invested in corporates classified as having non-performing assets. It, therefore, gives an insight into the main role played by effective risk management and technological intervention in reversing this unhappy state of affairs.

## 2 Literature Review

Research in the balances of corporate financial sheets has engaged the interest of researchers for several years in an attempt to establish the nature of financial crises. In developing countries, where corporations depend to a great extent on banks and other financial institutions for their financial needs, the role and relationship of corporate finance assume special significance for economic growth (Jindal & Kaur, 2021). The current section reviews existing literature related to NPAs, their impact on corporate financial health, and how such issues can be addressed with technological interventions like AI and block chain.

### **Corporate Financial Distress and Bank Asset Quality**

Corporations depend on banks for debt in developing countries, although few corporates seek help from various stakeholders. Different sectors like manufacturing and services need bank loans for growth. According to (Jindal & Kaur, 2021), there exists a relation between corporate distress and bank asset quality. Recently, the banking sector witnessed an increase in NPAs which, in turn, have adversely impacted national economic growth. Policymakers are worried about deteriorating asset quality and are working towards cleaning up financial systems to boost economic growth.

### **Factors Contributing to Non-performing Assets**

Various factors contribute towards the growth of NPAs particularly in the banking sector. Some of the existing literature has pointed out several causes, including poor management, inappropriate behavior, and moral issues at the level of corporates. In addition, Garg, (2021) stated that declining corporate profitability and failing economy and business failures are some external factors that lead to NPAs. Therefore, banks and FIs have to find solutions to deal with the rising pile of NPAs.

### **External Factors**

The NPAs are enhanced due to recession, poor legal systems, lack of recovery opportunities, etc. According to Garg, (2021), all these factors originate from the business environment, borrower environment, and bank environment. The inability of the borrowers—due to lack of resources, bad management, and project closure—are the reasons for the NPAs. The internal factors of banks and financial institutions alone, like weak credit appraisal and insufficient monitoring, are equally responsible. These would be factors that would be concurred to as causes of NPAs, more so during economic stagnation.

### **Internal Factors**

Delays in statutory clearances within the organization and negligence in credit risk appraisals coupled with poor project management skills, are some of the internal factors that contribute to high costs and NPAs. These are complemented by financial frauds, aggressive lending, and improper monitoring, among others. Kapadia & Madhav, (2019) noticed that global banks increase their NPAs due to aggressive lending during a recession period. The financial institutions always act in a procyclical way where credit expansion takes place during the economic upturn but credit contraction happens during the downturn leading to NPAs.

### **Technological Interventions: AI and Block Chain**

Recent research is focused on how AI and block chain can help in the mitigation process of NPAs. AI, on the other hand, allows for the identification of possible NPAs in advance by use of predictive analytics and thus enables proactive measures. Block chain enhances transaction transparency and security, thereby curbing fraud and enhancing the management of assets.

### **AI Applications**

A secure e-commerce payment protocol that has ensured security and efficiency was developed (Hassan et al., 2020). In their work, Hassan et al., (2020) established high accuracy in diabetes prediction using a heterogeneous ensemble model, really underpinning the predictive ability of AI.

### **Block Chain Applications**

Zhuang et al., (2020) conducted a review on the role that block chain can play in cyber security and energy data protection in smart grids, in which certain key security issues are solvable using block chain. Hasankhani et al., (2021) tried to show block chain's ability for the reduction of harmonics in power systems through improved design. Block chain enforces integrity, confidentiality, and availability of data critical for financial transactions.

### **Strategies to Control Non-performing Assets**

Literature suggests that in order to reduce NPAs, strategies that ensure careful selection of borrowers, systematic follow-up, project monitoring, and recovery initiatives should be implemented. Indeed, past studies have confirmed multiple factors contributing to NPAs, such as natural calamities, industrial sickness, unhealthy competition, and economic recessions (Khanum & Sumathi, 2021). Most recent studies concur that the above factors, plus the poor credit system and management, contribute much towards NPAs.

### **Cryptographic Algorithms**

Abiodun et al., (2021) investigated some cryptographic algorithms, and corresponding results are presented in detail with respect to timing complexity, encryption size, and decryption performances elaborating the requirement of secure financial transactions.

The literature review emphasizes the multidimensional nature of NPAs and their impact on the financial health of a corporation. Against this backdrop, the present paper solicits effective management strategies for NPAs in the banks and the possible use of AI and block chain technologies in mitigating it. FIs can enhance their stability and bring down the incidence of NPAs by addressing external and internal factors. This will contribute towards the growth of the economy at large.

This literature review creates the following hypothesis for the study:

Hypothesis 1: The application of Artificial Intelligence (AI) and block chain technology in corporate environments impacts the profitability, equity, and returns of shareholders by addressing external factors.

Null Hypothesis 1 (H01): The application of Artificial Intelligence (AI) and block chain technology in corporate environments does not impact the profitability, equity, and returns of shareholders by addressing external factors.

Hypothesis 2: The use of Artificial Intelligence (AI) and block chain technology influences the effectiveness of managing non-performing assets by improving interest rate monitoring, control, and risk assessment in credit appraisals.

Null Hypothesis 2 (H02): The use of Artificial Intelligence (AI) and block chain technology does not influence the effectiveness of managing non-performing assets through interest rate monitoring, control, and risk assessment in credit appraisals.

## **3 Methodology**

In this research, a mixed-method approach will be used to examine the effect of NPAs on shareholders' equity and returns with a focus on the application of Artificial Intelligence and block chain technology. The researcher will choose Fintech Corporations with huge NPAs as case studies (Jindal & Kaur, 2021). The population includes staff, clients, and shareholders of such corporations who have substantial expertise and a readiness to share relevant information.

### **Sample Selection**

The sample size was based on the Fintech companies because it has been assumed that most of them are familiar with the NPAs and their impact on shareholder profitability, equity, and returns based on experience. The target respondents were selected using a non-probability sampling technique with purposive sampling methods to gather proper and unique knowledge. The major respondents targeted were 50 in getting structured questionnaires. The structured questionnaires include some closed-ended questions related to the occupation, work experience, educational qualification, income, and other demographic factors related to said objective of the study.

### Data Collection and Analysis

A 5-point Likert scale was used to analyze the factors leading to the accumulation of NPAs from the borrower's end and factors from the Fintech Corporations affecting the shareholder's profitability. The scaling will help to determine the degree of each factor proposed in the conceptual model. The data collection on the quantitative portion was analyzed using the SPSS 22 software. Descriptive analysis, variance, correlation, mean, and regression analysis are applied to find out the relationship between NPAs and corporate profitability.

### Integration of AI and Block chain Technologies

The study has also integrated AI and block chain technologies in accordance with the scope of the journal.

- **AI Implementation:** These machine learning algorithms used historical data on asset performance to predict the likelihood that an asset would turn into a non-performing asset. This predictive analysis enabled proactive management of NPAs and their mitigation and improved overall asset management processes.
- **Block chain Implementation:** The information ledger was based on the block chain for transparency and security of all financial transactions related to the assets. This would ensure that all transactions are immutably recorded to reduce fraudulent activities and improve the auditability of asset management practices.

### Specification Models

The proposed hypotheses were tested based on the following models:

Model to test Hypothesis 1: Profitability of Shareholders = f (AI and block chain-enhanced external factors).

$$ROA = f(CTR, CPY, CLL, CDN)$$
$$ROA = \beta_0 + \beta_1 \cdot CTR + \beta_2 \cdot CPY + \beta_3 \cdot FS + \beta_4 \cdot CDN + \epsilon$$

Model to test Hypothesis 2: Profitability of Corporations = f (AI and block chain-enhanced internal factors).

$$ROA = f(MNT, SCN, RPM, IR)$$
$$ROA = \beta_0 + \beta_1 \cdot MNT + \beta_2 \cdot HIR + \beta_3 \cdot RLD + \beta_4 \cdot HC + \epsilon$$

These models would help in analyzing the impact of AI and block chain on managing NPAs and their influence on shareholder profitability and corporate performance.

## 4 Results

The dataset of the study provides a good insight into the analysis of factors affecting non-performing assets and functions of artificial intelligence and block chain, too, in managing the impact of these factors.

### External Factors

Natural Calamities, Recession, and Unhealthy Competition: Table 1 presents the statistical data of correlation regarding various factors that influence shareholders' profitability, equity, and returns.

Table 1: Results of Correlation Statistics

	Profitability, Equity and Returns of Shareholders	Natural Calamities	Willful Defaults	Recession	Unhealthy Competition
Profitability, Equity and Returns of Shareholders	1	.252*	.398**	.274*	0.246
		0.052	0.012	0.039	0.084
Natural Calamities	.278*	1	.828**	.883**	.998**
	0.057		0	0	0
Willful Defaults	.407**	.820**	1	.898**	.798**
	0.008	0		0	0
Recession	.289*	.899**	.899**	1	.856**
	0.062	0	0		0
Unhealthy Competition	0.257	.999**	.789**	.849**	1
Variance	0.080	0	0	0	0

Natural Calamities: With a correlation coefficient of .252\*, natural calamities are significantly related to the shareholders' profitability, equity, and returns.

Recession: With a correlation coefficient of .274\*, it is indicated that a recession in the labor market impacts the ability to repay investments, equity, and profits to shareholders.

Unhealthy Competition: With a correlation coefficient of .246, unhealthy competition negatively reflects on shareholders' equity, returns and profits.

Willful Defaults: With a correlation coefficient of .398\*\*, willful defaults will significantly affect profitability, equity, and returns.

These findings bring to the fore the major external factors influencing NPAs, and therefore can be managed in a more inclusive manner through AI for predictive analytics and block chain for transparency and security of transactions.

### Coefficient and Regression Analysis

The coefficient and regression analysis results with respect to the impact of natural calamities, willful defaults, recession, and unhealthy competition on NPAs are given in Tables 2 and 3.

Table 2: Results of Coefficient—Natural Calamities, Willful Default, Recession, and Healthy Competition

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.451a	.233	.158	.67365	.234	3.656	4	54	.019

Table 3: Results of Regression—Natural Calamities, Willful Default, Recession, and Healthy Competition

Model		Squares	df	Mean Square	F	Sig.
1	Regression	6.523	4	1.732	3.679	.017b
	Residual	24.43	54	.473		
	Total	34.213	56			

The results further show that these external factors actually play a vital role in NPA, avoiding the need for strong management strategies with technologies like AI and block chain.

### Internal Factors

Lack of Appropriate Monitoring, High Interest Rates, and Credit Appraisal Risks:

Tables 4 and 5 show the coefficients and regression analysis for the internal factors affecting NPAs, such as improper selection of borrowers, high interest rates, lack of proper monitoring, and lack of follow-up.

Table 4: Results of Coefficient—Improper Selection of Borrowers, High Interest Rates, Lack of Appropriate Monitoring, and Lack of Follow-up

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.533a	.288	.299	.652815	.245	4.986	4.1	53.	.001

Table 5: Results of Regression—Improper Selection of Borrowers, High Interest Rates, Lack of Appropriate Monitoring, and Lack of Follow-up

Model		Squares	df	Mean Square	F	Sig.
1	Regression	8.567	4.0	2.245	4.987	.012b
	Residual	24.658	54.9	.589		
	Total	33.002	58.9			

These internal factors, therefore, hugely affect NPA, meaning that AI and block chain technologies can add much value to monitoring processes and improve credit appraisal systems to reduce the incidence of NPAs.

### Summary of Key Findings

- The major external factors that are causing a surge in NPAs are Natural Calamities, Recession, and Unhealthy Competition.
- Willful default is another vital internal factor impacting profitability and equity.
- Lack of monitoring and high interest rates increase the NPAs.
- AI can predict potential NPAs, enabling proactive measures.
- Block chain technology ensures transparent and secure financial transactions, hence reducing fraud and improving asset management.

These findings bring home the message of effectively using AI and block chain to manage NPAs.

## 5 Discussion

The analysis proves that natural calamities are one of the major factors in increasing NPAs, thereby reducing the shareholders' returns and equity. Therefore, factors like natural calamities, recessions, and unhealthy competition do affect corporate profitability, equity, and returns, proving the vulnerability of the investment in such an environment (Garg, 2021). This makes a strong case for using cutting-edge technologies like AI and block chain to avoid these factors.

## **External Factors Impacting NPAs**

### **Natural Calamities**

Natural calamities came out as a major contributory factor to NPAs. The data would, therefore, suggest that such external shocks bring about significant disruptions in corporate performance and hence, in turn, affect shareholder value (Mazur et al., 2021). This underlines the need for predictive analytics provided by AI, which can forecast probable NPAs and allow preemptive measures.

### **Recession**

Labor market recessions play an important role in the capability of repayment to investors by a corporation; therefore, it is very important for the profit and equity of the shareholders (Jindal & Kaur, 2021). AI is able to scrutinize voluminous data and come up with predictions of economic recession, which shall help a financial institution manage its portfolio in such a manner that the negative impact on NPAs is minimized.

### **Unhealthy Competition**

Inappropriate competition in the job market hurts shareholders' equity, return, and profit. Block chain technology can facilitate transparency and fairness in competitive practices to ensure an even playing field, thus protecting shareholder interests (Zhang et al., 2024).

### **Willful Defaults**

Willful defaults and investment frauds at times significantly increase NPAs, thereby reducing corporate profits and shareholders' returns. The ability of AI to detect the patterns indicative of fraudulent activities and block chain's ability to provide immutable records can reduce such defaults to a great extent (Dhieb et al., 2020).

## **Internal Factors and Technological Interventions**

### **Lack of Appropriate Monitoring**

Internal factors that have been examined and deemed significant in increasing NPAs include inadequate monitoring. AI can help in the evaluation of data regarding monitoring in the real-time and real-time provision of these insights, Whereas block chain can bring about secure and transparent record-keeping of all financial transactions (Raj et al., 2023).

### **High Interest Rates and Credit Appraisal Risks**

High interest rates and poor credit appraisal therefore significantly impact shareholders' return. In credit appraisals, AI can help in making appraisals precise through complex risk assessment models; and block chain can speed up and more securely make the credit appraisal lightening the possibility of NPAs (Bhatore et al., 2020).

### **Interrelationship of Factors**

The study demonstrates that a negative relationship exists between natural disasters, willful defaults, recession, and unhealthy competition which has a prominent role in computing profit towards

shareholders and trends of NPAs. By improving the prediction ability and making the transactions to be more transparent, AI and block chain can give solutions to all these inter-related factors (Yildirim et al., 2021).

## **Technological Performance**

### **Artificial Neural Networks (ANN)**

This work involved the comparison and review of some of the key AI techniques such as Artificial Neural Networks, Support Vector Machines, as well as K-Nearest Neighbors. Advantages: ANN performed well in the studied parameters thus affording a strong capability in predicting NPAs as established in (Grebovic et al., 2022).

By analyzing data with the help of AI and ensuring safe transactions using block chain technology, most of the risks related to NPAs could be minimized for financial institutions. These technologies ensure what the authors call an 'omni-faceted treatment' of the extrinsic and intrinsic factors for better stability of their finances and to safeguard shareholders' wealth.

The combination of AI and block chain technologies shifts the model, paradigmatically in the management of Non-performing assets. The AI predictive analytics and the block chain transparency and security will now be able to handle the extrinsic and intrinsic interplay that was previously difficult to manage with NPAs. These technology solutions will resonate very much with the focus of this journal as stated herein with regards to innovative IS which offers tremendous socio-economic value in the financial domain.

## **6 Conclusion**

The present study was undertaken to analyze the impact of NPAs on shareholders' equity and returns with a view to the emerging demand for controlling the growth of NPAs. Case studies pertaining to this research work were Fintech Corporations having substantial bad NPAs. The variables discovered as related were: high interest rates, inadequate monitoring and control, lack of follow-up, natural calamities, willful defaults, recession, and unhealthy competition. All these variables together affected the profitability of the fintech corporations.

It finally concludes that apart from natural calamities, recession, and unhealthy competition, factors such as high interest rates, poor monitoring, and willful default are some of the causative agents which reduce profitability, equity, and shareholders' returns. It is because of these factors that NPAs increased and impaired corporate financial health. Further, the results suggest that this impact will itself vary significantly from one corporation to another and be based on specific corporate rules and environments. The results thus show general trends but cannot uniformly be applied to all corporations.

AI integrated with block chain technologies can provide robust solutions pertaining to NPA management. As far as the redressal of the issues relating to high interest rates and inadequate monitoring is concerned, AI through predictive analytics can aid in identifying potential NPAs and take proactive measures. Block chain can enhance the transparency and security of financial transactions, provide a trustable database of documents relating to assets, facilitate price discovery through data, and automate the process of selling NPAs.

The next generation of financial institutions will incorporate AI in an effort to assist them in enhancing their ability to predict and control NPAs so as to enhance general asset administration. AI

will now take the set of problems related to NPAs—whether that will be in identifying who are the potential future defaulters or in enhancing the systems of credit appraisal and monitoring. Technological use of block chain would allow easy management of NPA since all transactions are recorded and cannot be tampered with. This increases transparency and minimizes fraud when it comes to the identification and collection of lost assets. The work has highlighted the need to adopt a holistic form of risk management mechanism that incorporates both AI and block chain in achieving better financial resilience, diligence of shareholders and improved performances of the existing fintech corporations.

Future research may test the application of AI and block chain in other areas of asset management that would further develop the potential of financial institutions to manage their risks and enhance performance. Further studies, nevertheless, could also understand how these technologies individually affect corporations and sectors in an effort to come up with more tailored NPA management strategies.

It has been concluded that AI and block chain technologies together are very instrumental in dealing with NPAs and the effects of this on shareholders. Having dealt with the external and internal factors of risk management, technologies propose a well-rounded solution that tailors to the journal's concentration on innovative information systems. The findings reiterate that these technologies have the potential and capacity to revolutionize NPA management, thus improving the socio-economic situation in the banking industry.

## 7 Conflict of Interest

No potential conflict of interest was reported by the author.

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