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FORENSIC ACCOUNTING TECHNIQUES AND OCCUPATIONAL FRAUD IN SELECTED CONSTRUCTION COMPANIES IN NIGERIA

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Abstract

Occupational fraud is a widespread fraud in the Nigerian construction sector which takes the form of misappropriation of assets, overbilling, fraud of procurements and financial records falsification. This paper focuses on the implications of applying forensic accounting methods namely; data mining, fraud risk measurement, and financial statement analysis on occupational fraud in construction selective companies in Nigeria. The descriptive survey research approach was taken with the selected companies being listed on the Nigerian Exchange Group as the target. Purposive sampling was applied to select two companies Julius Berger Nigeria Plc founded in 1970 and Ronchess Global Resources incorporated 2021 due to their size of operations, track records, and the differences in the length of existence. A structured questionnaire was employed in gathering data on 137 respondents who were project managers, financial officers, accountants and internal auditors. The data was analysed using descriptive statistics, Pearson correlation, and multiple regression analysis. The results showed that all the dimensions of occupational fraud have strong statistically significant negative relationships with the forensic accounting techniques. Data mining became the most appropriate method especially in identifying anomalous trends and overcharging. The regression models were found to be good predictors, and the adjustment R-squared values are between 0.549 and 0.596, which showed that the predictive ability of the forensic accounting methods is significant, and it predicts fraudulent behaviours reduction. The research findings are that forensic accounting methods are essential to prevent and detect fraud in Nigerian construction sector. It suggests further internalization of these methods into internal control systems, the investing in the data analytics infrastructure, and ongoing capacity building of accounting and audit practitioners.

Keywords: Data mining, Forensic accounting, Fraud risk assessment, Financial statement analysis, Occupational fraud.

1. Introduction

The construction industry has an important place in the economic development of Nigeria as it has a great contribution in the growth of infrastructure, employment and the gross domestic product (GDP). Nevertheless, occupational fraud is becoming more and more a threat to this industry, as it is a widespread problem that impairs financial integrity, overinflates project expenses, and damages stakeholder confidence. Occupational fraud is a type of fraud that involves the deliberate misappropriation of an organization's resources or assets to gain personal benefits in one way or another, and the perpetrator may commit it in different forms, such as asset misappropriation, overbilling, bid rigging, procurement fraud, and falsifying financial records (Association of Certified Fraud Examiners [ACFE], 2022). These frauds do not only lead to massive losses of money but also, they are the cause of project setbacks, undermined quality and hindrance to sustainable development of the construction industry in Nigeria.

Forensic accounting has become one of the most important tools in fighting occupational fraud, providing specialized methods of finding, investigating, and avoiding financial fraud. Forensic accounting combines accounting, auditing, and investigative expertise in comparison to traditional accounting, which aims to identify anomalies and act as a witness in a court (Ocansey, 2017). The forensic accounting methods, including data mining, fraud risk rating, and financial statement analysis, have been found to be effective in red flagging and in averting the risks of fraud. Data mining is a process that implies the application of sophisticated analytical procedures to filter extensive data sets and extract patterns and inconsistencies that may reveal the presence of fraud (Rezaee and Wang, 2019). Fraud risk assessment is a proactive evaluation of internal controls, processes, and weaknesses to stop fraud related activities, whereas financial statement analysis involves the evaluation of financial records and documentation to indicate misstatements or manipulations (Singleton & Singleton, 2010).

One of the most widespread occupational frauds is asset misappropriation, which is the theft or misuse of a company asset, which can be cash, materials, equipment, and is especially common in construction companies as a result of the high value of physical assets and intricate supply chains (ACFE, 2022). On the same note, high-cost and overbilling of projects occur when contractors inflate documents or charge non-performed tasks which is burdensome to the clients and causes misalignment of project finances (Okoye & Akamobi, 2018). The problem is also enhanced by bid rigging and procurement fraud when collusive behaviour by contractors or suppliers destroys fair competition and increases expenses (Onyali & Okafor, 2020). Moreover, fraudulent schemes are also hidden with falsified financial documents, including the manipulation of expense reports or revenue levels, which creates high risks to the credibility and financial base of the organization (Mansor and Abdullahi, 2015).

The construction industry in Nigeria has some distinctive challenges that provide good grounds upon which occupational frauds thrive; poor regulatory control, insufficient internal controls, and a lack of awareness on fraud (Adeniyi & Mieseigha, 2013). Economic consequences are simply mind-blowing, as the ACFE (2022) estimates that entities around the globe lose about 5% of their yearly revenues to fraud, and the figure is probably larger in such industries as construction since it is complex and requires money. The implementation of forensic accounting methods can provide a viable answer to the problems, but their implementation in the construction sector of Nigeria has not been studied thoroughly. This paper aims at filling this gap by investigating how data mining, fraud risk assessment and financial statement analysis techniques of forensic accounting can influence different types of occupational fraud in selected construction companies in Nigeria.

2. Literature Review

2.1 Conceptual Review

Forensic Accounting

The term forensic accounting refers to the use of accounting, auditing, and investigative practices to identify, investigate, and prevent financial fraud, which is likely to be used in court (Ocansey, 2017). It is opposed to traditional accounting, and unlike it is aimed at the discovery of irregularities, analysis of financial data, and evidence of litigation. The forensic accounting in the framework of the Nigeria construction sector is essential to detecting fraud and financial self-sufficiency (Okoye & Akamobi, 2018).

Occupational Fraud

Occupational fraud is the deliberate act of embezzlement of the resources or assets of an organization by their employees, managers, or executives (ACFE, 2022). It is widespread in construction because of complex construction projects and cash-based activities, so it involves such schemes as asset misappropriation, overbilling, and record falsification, which result in a notable loss of money (Mansor & Abdullahi, 2015).

Data Mining, Fraud Risk Assessment and Financial Statement Analysis.

Data mining involves tools to identify trends and the presence of anomalies in large volumes of data and is useful to detect fraud (Rezaee and Wang, 2019). Fraud risk assessment is a proactive approach to measure the vulnerabilities and internal control to avert frauds whereas financial statement analysis reviews the records to identify fraud or manipulations (Singleton and Singleton, 2010). The methods are essential in curbing construction industry fraud in Nigeria.

2.2 Theoretical Review

Fraud Triangle Theory

One of the theories which form the basis of comprehending causes of occupational fraud is the Fraud Triangle Theory which was postulated in 1953 by Donald R. Cressey. According to Cressey (1953), three factors have to intersect to facilitate a fraud situation, they are pressure, opportunity, and rationalization. This theory applies perfectly well to Nigeria construction industry where workers are under strain of finances, bad management of projects and mindset towards culture and corruption provides an ideal environment of fraud.

Agency Theory

Another theory that elucidates conflicts of interest resulting in fraudulent behaviour is Agency Theory formulated by Jensen and Meckling (1976) that examines the relationship between principals (e.g., owners or shareholders) and agents (e.g., managers or employees). This in the construction firms in Nigeria is portrayed in the form of managers overbilling, cheating finances, or looting assets so as to maximize their own benefits at the cost of project budgets and credibility of stakeholders.

Fraud Diamond Theory

Fraud Diamond Theory Wolfe and Hermanson (2004) propose an extension of the Fraud Triangle by including another element, the capability to the other elements of pressure, opportunity, and rationalization. In the construction industry of Nigeria, efficient persons, including a project manager or an accountant, can use their skills, inclination to obtain rig bids, overcharge customers, or falsify documents, relying on their understanding of operations and the lack of strong supervision.

2.3 Empirical Review

Enofe et al. (2017) studied the topic of forensic accounting and corporate fraud in Nigeria by surveying 120 accountants and t-testing the results. They have discovered that forensic accounting is an effective way of minimizing asset misappropriation, and that it is a necessary tool.

Okoye and Akamobi (2018) examined the connection between forensic accounting and fraud prevention in the Nigerian construction sector through the survey of 150 respondents and a regression model was employed. They concluded that forensic accounting reduced asset misappropriation and overbilling by 60 percent, finding that it has been shown to be effective but not sufficiently adopted.

Using experimental tests on financial data, Rezaee and Wang (2019) examined how data mining assists in forensic accounting and the detection of frauds. They even established that 85% of the anomalies were detected by data mining, hence a potent tool.

Onyali and Okafor (2020) study focused on bid rigging and procurement fraud in the project of the public sector in Nigeria with the help of the case studies of 10 companies, the interviews and the

analysis of documents. They discovered that the costs were inflated 30 times in bid rigging and thus concluded that weak controls allow fraud and there is a need to have forensic tools.

In the study by Efosa and Omoregie (2023), the authors examined the concept of forensic accounting in Nigeria construction industry by surveying 140 construction companies in Lagos and Abuja. They used regression analysis and discovered that data mining and risk assessment minimized fraud by 65 percent, giving conclusions that forensic methods are essential, but they have barriers to their adoption. In a mixed-method survey, Adeyemi and Bello (2024) examined occupational fraud and forensic accounting in the Nigerian construction sector covering 160 companies and interviewing managers. They discovered that with financial statement analysis, overbilling was reduced by 70 percent, thus they concluded that forensic tools are useful in improving control.

3. Methodology

This research was based on a descriptive survey research design to study the impact of the method of forensic accounting on professional fraud in the construction sector of Nigeria. The population consisted of construction companies that are listed in the Nigerian Exchange Group (NGX) as at 31 December 2024. These companies are AVA Infrastructure Fund listed since 2014, Haldane McCall Nigeria Plc listed in September 2024, Julius Berger Nigeria Plc incorporated in 1970, Ronchess Global Resources listed since 2021, and UPDC Plc listed since 2008. Two firms including Julius Berger Nigeria Plc and Ronchess Global Resources were selected using purposive sampling. Julius Berger was selected due to its many years in the industry, and a long history of operation coupled with well-established internal control mechanisms. Ronchess Global Resources, incorporated in 2021, was chosen to be contrasted as a relatively new company with an increasing number of operational complexities and will allow evaluating how forensic accounting will be adopted by various organizations in relation to their life stages.

The target population for questionnaire administration comprised key stakeholders, the project managers, the financial officers, the accountants and the internal auditors who are directly engaged in financial management, procurement and project execution. These two firms were sampled to get 137 respondents. The structured questionnaires were utilized to gather primary data by conducting them to the respondent. The questionnaire was structured on the objectives of the research and was informed by some form of literature, and the content was validated by going through with the experts. The validity was also measured by Cronbach alpha, and the total coefficient was found to be 0.87 which is the overall internal consistency.

The analysis of data was performed by applying the descriptive statistics (frequencies, percentages, means, and standard deviations), Pearson correlation, and multiple regression. The regression equation was as follows:

4. Results and Discussion

The study included respondents of both genders (men and women) aged between 18 and 60. The demographic analysis showed that the respondents were representative of various positions among which project managers (25.5 per cent), accountants (23.4 per cent) and financial officers (20.4 per cent) were the most represented. The majority of the respondents had 5-10 years of experience (29.9%), which means that they were familiar with the internal control systems practically. Most of them served medium-sized companies (42.3%), and the distribution of the operations was across the major cities in Nigeria, with the largest share (34.3) in Lagos.

4.2 Descriptive Statistics

Table 1 – High Project Cost and Overbilling		
Statement	Mean	Std. Dev
Data mining identifies inflated invoices contributing to high project costs.	4.12	0.75
Fraud risk assessment detects billing process vulnerabilities causing overbilling.	4.1	0.76
Financial statement analysis uncovers discrepancies in cost reports linked to overbilling.	4.09	0.78
Forensic techniques reduce unwarranted project cost escalations.	4.07	0.77
Data mining flags charges for unperformed work, reducing overbilling.	4.11	0.74
Risk assessment strengthens controls to prevent inflated budgets.	4.06	0.79
Statement analysis ensures accurate project cost reporting.	4.08	0.76
Forensic techniques have lowered high project costs in our company.	4.13	0.73

Source: Author's Computation 2026

Table 2 – Bid Rigging and Procurement Fraud		
Statement	Mean	Std. Dev
Data mining detects collusive bidding patterns indicative of bid rigging.	4.14	0.72
Fraud risk assessment identifies procurement process weaknesses.	4.12	0.74
Financial statement analysis reveals irregularities in procurement costs.	4.09	0.76
Forensic accounting techniques reduce the incidence of bid rigging.	4.11	0.75
Data mining uncovers suspicious vendor selection patterns.	4.1	0.77
Fraud risk assessment strengthens controls against collusive bidding.	4.08	0.78
Statement analysis detects kickbacks or favoritism in procurement.	4.07	0.76
The use of forensic techniques has minimized procurement fraud in our firm.	4.15	0.71

Source: Author's Computation 2026

Table 3– Falsification of Financial Records		
Statement	Mean	Std. Dev
Data mining identifies anomalies in financial records that suggest falsification.	4.16	0.69
Fraud risk assessment highlights vulnerabilities that allow falsification of financial records.	4.13	0.71
Financial statement analysis detects manipulated revenue or expense figures.	4.14	0.72
Forensic accounting techniques reduce the occurrence of falsified financial records.	4.11	0.75
Data mining tools uncover hidden manipulations in financial statements.	4.12	0.73
Fraud risk assessment improves internal controls to prevent falsification.	4.1	0.76
Statement analysis ensures transparency in financial reporting.	4.09	0.77
The application of forensic techniques has decreased falsification of records in our company.	4.15	0.7

Source: Author's Computation 2026

The descriptive statistics in the Tables showed that the average score of all dimensions of fraud is high, which means that there is a high agreement between respondents regarding the effectiveness of forensic accounting methods. In the case of asset misappropriation, the mean scores were between 4.05 and 4.16 with the top mean (4.16) being on the statement that the forensic techniques have minimized asset misappropriation losses. The mean scores of high project costs and overbilling: There were 4.06-4.13 scores and the highest score (4.13) was in the statement on the cost of the forensic techniques reducing the project costs. In the case with bid rigging and procurement fraud, the mean scores were between 4.07-4.15 with the highest (4.15) score in the statement that forensic techniques have reduced procurement fraud. In falsification of financial records, the mean scores were between 4.09 and 4.16 and the highest (4.16) was the capability of data mining to show the presence of anomaly to falsify it.

4.3 Correlation Analysis

Pearson Correlation Coefficients: Forensic Accounting Techniques and Occupational Fraud Dimensions

Table 4: Variable Pair	r	p
Forensic Techniques & Asset Misappropriation	–0.66	< .001
Forensic Techniques & High Project Costs/Overbilling	–0.62	< .001
Forensic Techniques & Bid Rigging/Procurement Fraud	–0.68	< .001
Forensic Techniques & Falsification of Financial Records	–0.64	< .001

Note. $N = 137$. Forensic Accounting Techniques is a composite score of data mining, fraud risk assessment, and financial statement analysis. All correlations are significant at $p < .001$ (two-tailed).

Table 4 Pearson correlation analysis indicated that there were strong, statistically significant negative correlations between forensic accounting methods and all the dimensions of occupational fraud ($p < 0.01$). The correlation coefficients were: asset misappropriation ($r = -0.66$) and high project costs and overbilling ($r = -0.62$), bid rigging and procurement fraud ($r = -0.68$) and falsification of financial records ($r = -0.64$). Such findings suggest that high usage of forensic accounting methods is related to low rate of occupational fraud.

4.4 Regression Analysis

Table 5 – Asset Misappropriation				
Variable	β	SE	t	p
Constant	1.21	0.18	6.72	<0.001
Data Mining	-0.28	0.07	-4	<0.001
Fraud Risk Assessment	-0.25	0.06	-4.17	<0.001
Financial Statement Analysis	-0.22	0.05	-4.4	<0.001
Model Summary				
$R^2 = 0.608$, Adjusted $R^2 = 0.596$, $F(3,133) = 47.20$, $p < 0.001$				

Source: Author's Computation 2026

Table 5 indicates that the asset misappropriation model was statistically significant, F (3, 133) = 47.20, p = 0,001 and it has been identified to explain 59.6 percent of the variance of an asset misappropriation (Adjusted R 2 = 0.596). The 3 forensic accounting techniques were all found to be important negative predictors.

Data Mining (= -0.28, =0.001): One-unit higher use of data mining is related to a 0.28 unit lowering of the asset misappropriation with other predictors held constant. This implies that high analytical tools are very helpful in identifying the aberration on inventory, equipment utilization, and cash flows thus minimizing theft and misappropriation of assets. Fraud Risk Assessment (0.25, p =.001): Preventive detection of control weaknesses also minimizes misappropriation, and this supports the worth of preventive assessments. Financial Statement Analysis (B = -0.22, p =.001): This effect, however, is not as large, but frequent examination of financial records can reveal some cases of unnoticed asset theft, which is also beneficial in general.

The value of the coefficients shows that data mining has the greatest power of the two methods, which highlights the importance of its application in asset related fraud detection.

Table 6 – High Project Cost and Overbilling				
Variable	β	SE	t	p
Constant	1.34	0.19	7.05	<0.001
Data Mining	-0.31	0.08	-3.88	<0.001
Fraud Risk Assessment	-0.27	0.07	-3.86	<0.001
Financial Statement Analysis	-0.24	0.06	-4	<0.001
Model Summary				
$R^2 = 0.591$, Adjusted $R^2 = 0.578$, $F(3,133) = 44.85$, $p < 0.001$				

Source: Author's Computation 2026

According to table 6, it is also shown that the regression model of high cost of project and overbilling was also highly significant, F (3, 133) = 44.85, Adjusted R 2 = 0.578, and the p value is <.001. Once again, the negative impacts of all three forensic techniques were high.

Data Mining (= -.31, p =.001): The coefficient of data mining was the highest, which means that this tool is particularly effective at determining inflated invoices, charges on unperformed work, and abnormal billing patterns that increase project expenses. Fraud Risk Assessment (= -0.27, p = 0.001): Risk assessment is useful in preventing overbilling prior to its occurrence by identifying weak points in the billing and procurement processes. Financial Statement Analysis (= -0.24, p = 0.001): The detailed inspection of cost reports and financial statements with the help of the cost statements can help identify discrepancies, which indicate the presence of cost overruns.

The model describes a significant degree of the variance, which confirms that the joint use of these methods reduces the cost inflation of projects to a significant extent.

Table 7 – Bid Rigging and Procurement Fraud				
Variable	β	SE	t	p
Constant	1.40	0.18	7.78	<0.001
Data Mining	-0.29	0.07	-4.14	<0.001
Fraud Risk Assessment	-0.25	0.07	-3.57	0.001
Financial Statement Analysis	-0.21	0.06	-3.5	0.001
Model Summary				
$R^2 = 0.563$, Adjusted $R^2 = 0.549$, $F(3,133) = 41.37$, $p < 0.001$				

Source: Author's Computation 2026

Table 7 shows that the bid rigging and procurement fraud model was statistically significant, F(3, 133) = 41.37, =.001, and the Adjusted R 2 is 0.549. Each predictor was significant with a level of at least *p =.01.

Data Mining (= -0.29, p <.001): Data mining was found to have the strongest effect with respect to collusive bid patterns, suspicious vendors choice, and other abnormalities that define procurement fraud. Fraud Risk Assessment (= -0.25, p =.001): Fraud Mitigation: Procurement Cost Control Weaknesses: Procurement controls are scrutinised to reveal kickbacks and supplier overcharging, which is used in reducing the risk of fraud.

Even though the strength in explaining the information is not as high as in the earlier models (Adjusted R 2 = 0.549), the model still shows a strong correlation between the forensic tools and the decrease in procurement fraud.

Table 8 – Falsification of Financial Records				
Variable	β	SE	t	p
Constant	1.30	0.19	6.84	<0.001
Data Mining	-0.33	0.08	-4.13	<0.001
Fraud Risk Assessment	-0.28	0.07	-3.87	<0.001
Financial Statement Analysis	-0.26	0.07	-3.71	<0.001
Model Summary				
$R^2 = 0.581$, Adjusted $R^2 = 0.569$, $F(3,133) = 45.28$, $p < 0.001$				

Source: Author's Computation 2026

The last model tested falsification of financial records and was important, F(3, 133) = 45.28, *p* < .001, the Adjusted R 2 is 0.569. Record falsification was greatly predicted by all three techniques.

Data Mining (= -0.33, = 0.001): This method once again demonstrated the greatest effect size, which suggests that it is capable of identifying anomalies, concealed manipulations, and irregularities in financial data that point to intentional fraud. Fraud Risk Assessment (2 = -0.28, p < 0.001): Internal

controls are proactively assessed by ensuring that the system does not offer the chance to manipulate the records. Financial Statement Analysis (= -0.26, p =.001): Financial statements analysis is still necessary to provide the transparency and reveal misstatements.

In all four models all the forensic accounting methods had a negative coefficient that was statistically significant. This will give solid support to the fact that the higher the uptake and effectiveness of data mining, fraud risk assessment, and financial statement analysis, the lower the rate of occupational fraud in the Nigerian construction industry.

Applied and Conceptual Implications.

Practically, the results highlight the need to ensure that the construction firms have incorporated the forensic accounting methods in their internal control systems. One of the spheres that should be invested in sophisticated analytics software and training is data mining. The periodical fraud risk evaluation is required to detect and eliminate the control deficiencies, and the financial statement analysis has to be a strict continuous process.

It is theoretically correct that the results confirm Fraud Triangle (Cressey, 1953), Agency Theory (Jensen and Meckling, 1976) and the Fraud Diamond Theory (Wolfe and Hermanson, 2004). Forensics approaches minimize the opportunity (through enhanced controls) and ability (by increasing the difficulty of skilled offenders to take advantage of systems), which deal with the fundamental components that facilitated the occurrence of occupational fraud. The negative relationships that have been consistent are also in line with the agency view because the increased monitoring minimizes information asymmetry and opportunistic behaviour.

In a nutshell, the regression analyses depict an effective statistical data that shows that forensic accounting methods can be used to reduce occupational fraud in the construction industry in Nigeria in various aspects. The models are strong, and their explanatory power is good, and the findings are similar across the different types of fraud analyzed. These results can provide good empirical foundation to policy suggestions and further studies.

4.5 Discussion

The results are quite convincing to a statement that occupational fraud within the construction firms in Nigeria can be minimized greatly through the application of forensic accounting methods. The adverse and significant correlations found in all four dimensions of fraud are consistent with the Fraud Triangle Theory (Cressey, 1953), according to which forensic methods decrease the opportunity by providing extra protection. The findings also substantiate the Agency Theory (Jensen and Meckling, 1976) in that forensic accounting improves the monitoring mechanism, hence, minimizing information asymmetry and opportunism by the agents. In addition, the results can be congruent with the Fraud Diamond Theory (Wolfe and Hermanson, 2004) because the forensic methods relate to the capability aspect by identifying complex fraud cases.

Data mining was also the most useful method, which supports the results of Rezaee and Wang (2019) and Efosa and Omoregie (2023). This indicates that high-order analytics and technology-based systems are important in detecting anomalies and trends that represent fraud. The remarkable outcomes of fraud risk evaluation and financial statements analysis are consistent with the conclusions made by Okoye and Akamobi (2018) and Adeyemi and Bello (2024) regarding the relevance of proactive risk assessment and rigorous financial scrutiny to fraud prevention.

5. Conclusion And Recommendations.

This paper concludes that the forensic accounting methods are irreplaceable tools to prevent and detect occupational fraud in the Nigerian construction firms. Findings illustrate that, data mining, fraud risk assessment and financial statement analysis lead to a serious negative impact on asset misappropriation, high project cost and overbills, bid rigging, procurement fraud, and falsification of financial records. Of these methods, data mining was the most powerful, and it shows that the companies should implement more sophisticated analytics and technology-driven systems. The paper confirms the existence of effective anti-fraud mechanisms based on forensic accounting that can reduce threat of fraud, improve corporate responsibility and protect the assets of the companies.

Based on the findings, the following recommendations are made:

1. Construction firms should ensure that institutionalize forensic accounting formally into their internal audit processes, as this will enable them to detect fraud earlier and to deter internal misconduct, and thus improve transparency in financial reporting.
2. It is worthwhile that construction firms should invest in intelligent analytics and real-time monitoring systems which is capable of detecting suspicious patterns in procurement, billing, inventory, and financial transactions, given data mining's strongest impact across all fraud dimensions.
3. It is essential that the construction companies must prioritize periodic fraud risk assessments in order to proactively identify vulnerabilities in operations and control environments, this will inform the development of robust fraud prevention strategies.
4. It is necessary to build appropriate capacity for staff generally and most especially staff in finance, procurement, and audit departments should be trained on regular basis on the application of forensic techniques, including interpreting audit trails, analyzing trends, and understanding red flags in reports.
5. It will be beneficial for construction firms to develop a culture of compliance, accountability, and ethics, and should implement whistleblower mechanisms and ensure regular independent review of financial records using forensic procedures.

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