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# Capital Budgeting Decision and Financial Performance of listed Deposit Money Banks in Nigeria

<sup>1</sup>OLOGBONYO Kehinde Jethro., Halimah Sani SAMBO., <sup>3</sup>Grace Yakubu GADO., <sup>4</sup>ABDULRAHMAN Ahmed Tijjani and <sup>5</sup>IBRAHIM Ali Abubakar

<sup>1.3 & 4</sup>Department of Management Sciences, Faculty of Management Sciences, Nigeria Defence Academy, School of Post Graduate Studies, Kaduna

<sup>2</sup>School of Economics &Business Studies, ABU, Zaria

Corresponding Author: halimahsambo247@gmail.com

#### **Abstract**

The process of examining investment opportunities in long-term assets that are anticipated to yield benefits for more than a year is known as capital budgeting. The majority of Nigerian businesses seldom make wise capital budgeting choices that would enable them to increase their operational and financial performance. Based on this, the study aims to investigate the impact of capital budgeting decisions on the financial performance of Nigeria's listed Deposit Money Banks between 2013 and 2022. A time series of data taken from the Nigerian Stock Exchange Fact Book Annual Reports is used in a longitudinal study design. Data analysis was done using multiple regressions and STATA software (version 13.1). The investigation used diagnostic tests, such as multicolinearity and heteroskedasticity, to determine whether the variables were normally distributed and appropriate for the study. The following recommendations were given after the study looked at the following variables: profitability index (PI), payback period (P), net present value (NPV), internal rate of return (IRR), and dependent variable return on investment (ROI). The Central Bank of Nigeria (CBN) should; (i) issue a circular to all deposit money banks (DMBs) requiring them to use profitability index (PI) when making investment decisions. (ii) develop and provide training programs on how to use PI for DMB staff and investors. (iii) make PI data publicly available so that investors can easily compare different DMBs (iv) use PI as a factor in assessing loan applications and other forms of financial support to DMBs. (v) conduct regular stress tests on DMBs using PI to identify those that are at risk of financial distress.

Keywords: Capital Budgeting, Capital Budgeting Techniques, Bank Performance

# Introduction

One of the most crucial choices that any organization's financial management must make is capital budgeting (Batra & Verma, 2014). An organization uses it as a planning tool to evaluate investment projects and decide how best to distribute resources among them (Al-Mutairi, A., Naser, K., Saeid, M., & McMillan, D., 2018). It also

helps the company identify projects that will generate benefits over the long term, help it generate revenue, or cut expenses in the future (Khamees, B. A., Al-Fayoumi, N., & Al-Thuneibat, A. A. (2010).

The efficient and effective distribution of capital is the primary function of finance in the modern era. Part of it is deciding which long-term assets to allocate a company's resources to. These decisions

often determine a company's value since they have an impact on its profitability, growth, and risk. Capital budgeting is the process of assessing possible investments in long-term assets that are expected to generate returns for more than a year. To decide whether to invest or spend capital is to use capital budgeting. By expanding, purchasing long-term assets, and replacing those assets, businesses invest in this way (Sahar Alayli 2023).

Capital budgeting is carefully allocating the company's present resources to longterm investments (assets) with the hope of generating good returns on those assets. The investing strategies used will determine the foundation of this return (Akinsulire, 2014). The main goal of capital budgeting is to address issues beyond simply selecting which specific fixed assets to buy. One of the most important issues in the field of corporate finance is likely capital budgeting. The decision of how the company chooses to fund its operations and how it manages those activities in the short term are undoubtedly also very interesting, but the firm's fixed assets define its business (Rose, Westerfield, and Jordan 2007).

In general, the firms' investment decisions involve the long-term acquisition and replacement of assets. A respectable amount of the firm's asset portfolio is made up of fixed assets, and the size of this portfolio has a significant impact on the firm's worth. There is a larger need to replace, update, or acquire new assets because these are prone to depreciation. Over the years, replacing assets has become an important part of capital budgeting.

Because of the importance of capital budgeting, a number of studies have been conducted to investigate their purpose and

the ways in which they impact financial performance. However, there haven't been many researches done on the impact that capital budgeting decision have financial performance, particularly, in Nigeria. It is against this backdrop that this study intends to examine capital budgeting decision and financial performance of listed deposit money banks in Nigeria

## Conceptual and Theoretical Framework

Businesses must make capital budgeting decisions on a regular basis. Capital budgeting decisions are any that involve allocating resources toward a longterm goal. For any expanding company, capital budgeting is essentially an ongoing activity (Babu, Thaheer & Vanaja, 2019). Investment choices are made using capital budgeting in order to maximize returns to shareholders. The long-term asset is the foundation for this investment choice. The asset could be an intangible asset like a company's patents or trademarks, or it could be a material asset like real estate, machinery, and plant. This investment has comparatively high cost and often yields a long-term return.

Large investments in long-term assets are the main focus of capital budgeting (Elumilade, Asaolu, and Ologunde, 2006). Therefore, capital budgeting choices are crucial to the organization's success or failure and have a long-term effect on its strategic performance. Capital budgeting is a crucial component of company resource allocation. An organization can compare the profitability of its divisions, evaluate the viability of new business ideas, choose which projects to expand, and build a corporate portfolio to maximize returns,

such as return on asset (ROA), return on equity (ROE), and risk adjusted return of capital (RAROC), while minimizing risk, by having each division complete a well-structured capital budgeting process (Wong, 2009).

Companies frequently use capital budgeting as a management and strategic planning strategy to maximize shareholder wealth and reduce costs (Demigurc, 2017). Additionally, when making investment decisions, the company used capital budgeting tools. These methods identify a performing investment for a business using both old (nondiscounted cash flow) and current (discounted cash flows) methods. company's financial performance indicates its viability. Financial performance metric predicated on the idea that increasing shareholder wealth at the lowest feasible cost is the primary goal of putting capital budgeting methods into practice (Demigurc, 2017). Numerous factors impact company's financial performance, which may be observed in business-specific characteristics including firm profitability, and liquidity situation. It also affects corporate growth potential.

# Capital Budgeting Theory

In corporate finance, the Modigiarian and Miller theories both make use of the capital budgeting theory. It was stated that five key considerations are taken into account when making capital budgeting decisions: the project's cost of capital life, its salvage value, the initial investment, and operating cash inflows. The money needed up front to begin a project is known as the initial investment, and it can cover a variety of expenses such as working capital requirements, transportation costs, sales

taxes, asset purchases, and installation costs. The Net Present Value of the investment project, which is the outcome of the discounted after-tax weighted average cost of capital less the initial investment, serves as the basis for capital budgeting decisions method under this (Pandey, 2000). Therefore, the goal of this investment decision-making process is to ensure the company's commercial success. Profitability, or maximizing shareholder wealth, is the ultimate goal of a successful firm. The return on a shareholder's investment is known as profitability.

# **Empirical Review of Related Literature**

Imegi & Nwokoye (2015) investigate how well capital budgeting methods work when assessing the profitability of projects. The sixty-five (65) quoted companies in Rivers state made up the population of this study, and the sample size consisted of fiftysix (56) companies. The study's sample frame was created using a straightforward random sampling procedure. The general managers of the sample companies were given the questionnaire. The investigation's examination vielded the following conclusions: (i) Payback, accounting rate of return, net present value, internal rate of return, profitability index, and net terminal value are among the capital budgeting methodologies used to assess a project's profitability. (ii) The capital budgeting technique is irrelevant when evaluating projects in risky or uncertain environments (iii) The wealth maximization factor is the most important factor influencing the choice of capital budgeting techniques;; and (vi) The net present value method is the most efficient capital budgeting technique for determining the profitability of risk-free

projects. (v) The assessment of a project is not significantly impacted by taxes.

Mrongo et al., (2016) analyzing capital as a strategy for project performance in Kenya Rural Roads Authority. The study target population is 15 project managers and 15 financial managers of Kenya Rural Roads Authority. Purposive sampling technique was used in the study. A structured questionnaire was developed and utilized in this study. Questionnaires were given to project managers and financial managers. The researcher conducted a multiple regression analysis SO determine the impact of project management on variables of the study. The result of study found that policy on budgeting, expertise, financial resources, accountability and re-training measures affected the performance of project to a great extent. The study concluded that the decision of whether to accept or deny an investment project as part of a company's growth initiatives, involves determining the investment rate of return that such a project will generate.

Ofunya (2017) evaluates the relationship between Kenya's Water Services Boards' performance and capital budgeting techniques. In 2008, there were eight (8) water service boards in Kenya, which comprise the study population and sample size. Regression, descriptive design, and content analysis were used in the study to analyze the data that was gathered. The study found that the Water Services Boards have a propensity to employ advanced capital budgeting strategies.

Demigurc, (2017) analysis the effect of capital budgeting methods on performance of water services boards in Kenya. A

descriptive design is used for the study. A semi-structured questionnaire was used to collect primary data from the respondents through the email. The findings from the study point at a positive relationship between usage of capital budgeting techniques and organizational performance. Improved access to funding to undertake projects and informed decision making were cited by the respondents as being the major benefits of adoption of capital budgeting techniques.

Pearce (2019) investigates how capital budgeting strategies affect the financial performance of commercial banks. The study used both a qualitative and a quantitative research methodology. To find out what the staff of Sierra Leone's eleven commercial banks thought, a questionnaire was created. The payback period technique, which is used in capital budgeting decisions, is highly correlated with the performance of commercial banks, according collected from 187 employees. This is followed by three other techniques, with the exception of the internal rate of return technique, which showed negligible and negative correlations in both the correlation and regression analyses.

Samuel Mansaray-Pearce (2023)examined The Impact of Capital Budget Decision on Financial Performance of Commercial Banks in Sierra Leone. The sample size 187 employees working in 11 commercial banks in Sierra, the correlation and regression model was used to interpret the result of the study. The findings of the study show that the implementation of the technique payback period in budgeting decision is highly correlated with commercial banks performance followed by three other techniques except for the internal rate of return technique.

## Methodology

The study was Ex-post facto research design. Data collected were from public annual reports to serve as secondary data used to draw conclusions about the banks under study, covering the period from 2013 to 2022. The target population consists of 10 DMBs. The DMBs banks were used based on convenience. Access Bank Plc, Guaranty Trust Bank Plc, Stanbic IBTC Bank, Sterling Bank Plc, Fidelity Bank Plc, First Bank of Nigeria Plc, First City Monument Bank Plc, UBA Plc, Unity Bank Plc, Union Bank, Wema Bank Plc, and Zenith Bank Plc.

The acquired data was entered into the scientific analysis tool, STATA version, after sorting, cleaning, and coding. Both inferential and descriptive statistics were used to the coded data, and results were presented as means, standard deviations.

# Data Presentation and Descriptive Statistics

The discussion of results proceeds in the following order: descriptive statistics, correlation matrix, regression analysis, and robustness tests.

Descriptive statistics provide an insight into the characteristics of the data generated on the dependent and independent variables of the study. The table presents the descriptive statistics, including the minimum, maximum, mean, and standard deviation for the variables used. It also includes measures of skewness and kurtosis to assess the

distributional properties of the data. Additionally, the normality of the data is tested using the Jarque-Bera test and depicted using histograms.

Table 1: Descriptive statistics

Variables	min	max	Mean	Std. Dev.	
					Observation
ROI	0	.333	0.146	.074	120
PP	095	.283	0.028	.039	120
NPV	.1	.667	0.394	.135	120
IRR	2	13	6.400	2.254	120
PI	0	.915	0.343	.327	120

**SOURCE**: Computed by the researcher from annual reports and accounts of the sampled, DMBs (2013-2022) using STATA 13.1

The table 1 above presents the descriptive statistics for the variables of interest in the study, including Return on Investment (ROI), Payback Period (PP), Net present value (NPV), internal rate of return (IRR), and Profitability index (PI).

The mean Return on Investment of 0.145549 is relatively low, but it is important to note that there is a moderate amount of variation in Return on Investment, as evidenced by the standard deviation of 0.0740741. The positive skewness of 0.0067659 suggests that there are a few outliers with high Return on Investment values, while the kurtosis of 2.944527 indicates that the distribution of Return on Investment is slightly heavier-tailed than a normal distribution.

The mean Payback Period of 0.0279863 is positive but small, with a moderate standard deviation of 0.0394436. The positive skewness of 2.898564 indicates that there are a few outliers with high PP values, while the very high kurtosis of 22.27214 suggests that the distribution of Payback Period is very heavy-tailed with a few extreme values.

The mean Net Present Value of 0.3937822 is positive, indicating that the projects are generally profitable. moderate standard deviation of 0.1352098 suggests that there is some variation in Net Present Value, while the slightly negative skewness of -0.0018411 suggests that there are a few outliers with low Net Present Value values. The slightly higher than normal kurtosis of 2.03007 indicates that the distribution of Net Present Value is slightly heavier-tailed than a normal distribution.

The mean internal rate of return of 6.4 is a reasonable rate of return, but there is a high degree of variation in internal rate of return, as evidenced by the standard deviation of 2.254407. The positive

Table 2. Correlations

Variables	ROI	PP	NPV	IRR	PI
ROI	1.000				
PP	-0.096	1.000			
NPV	-0.100	0.177	1.000		
IRR	-0.304	-0.126	0.107	1.000	
PI	0.223	-0.127	0.017	0.183	1.000

SOURCE: Computed by the researcher from annual reports and accounts of the sampled, DMBs (2013-2022)

The pairwise correlations table shows the correlation between each pair of variables in the data set. The correlation is a measure of the linear relationship between two variables. It can range from -1 to 1, with -1 indicating a perfect negative correlation, 1 indicating a perfect positive correlation, and 0 indicating no correlation.

**ROI and PI**: There is a strong positive correlation between ROI and PI (0.223). This means that, on average, a one-unit increase in PI is associated with a 0.223-unit increase in ROI. This finding is

skewness of 0.9004159 suggests that there are a few outliers with high internal rate of return values, while the slightly higher than normal kurtosis of 3.481481 indicates that the distribution of internal rate of return is slightly heavier-tailed than a normal distribution.

The mean ProfI of 0.3434134 is greater than 1, which is a good sign, as it indicates that the projects are generally profitable. The moderate standard deviation of 0.3271629 suggests that there is some variation in PI, while the slightly positive skewness of 0.0691657 indicates that there are a few outliers with high PI values. The slightly higher than normal kurtosis of 1.298605 indicates that the distribution of PI is slightly heavier-tailed than a normal distribution.

consistent with the expectation that PI is a good measure of financial performance.

IRR and PI: There is a moderate positive correlation between IRR and PI (0.183). This means that, on average, a one-unit increase in IRR is associated with a 0.183-unit increase in PI. This finding is also consistent with the expectation that PI is a good measure of financial performance.

**NPV and PI**: There is a weak positive correlation between NPV and PI (0.017). This means that, on average, a one-unit increase in NPV is associated with a 0.017-unit increase in PI. This finding

suggests that NPV is not as strongly correlated with financial performance as ROI and IRR.

**PP** and residuals: There is a weak negative correlation between PP and residuals (-0.223). This means that projects with higher PP tend to have lower residuals. This finding suggests that PP may be a useful variable for explaining some of the variation in the residuals.

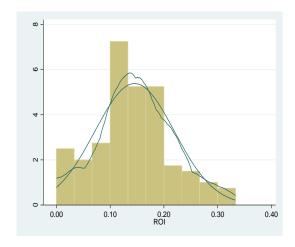
Overall, the pairwise correlations table suggests that ROI, PI, and IRR are all important factors that influence financial performance. The weak negative correlation between PP and residuals suggests that PP may also be a useful variable for understanding financial performance.

It is important to note that correlation does not imply causation. Just because two variables are correlated does not mean that one variable causes the other. However, the pairwise correlations table can provide valuable insights into the relationships between different variables in the data set.

### **Robustness Tests**

The pre-estimation robustness test is conducted to ensure the validity of the instruments used in the study to discover whether key assumptions of OLS regressions have been violated. The pre-estimation regression tests conducted in this study include normality and linearity multicollinearity, heteroskedasticity.

Normality test



The histogram and normal kernel density plot of ROI suggest that the data is not perfectly normally distributed. There is a slight positive skew and the distribution is slightly heavier-tailed than a normal distribution. This indicates that the ROI of the projects is not evenly distributed, with a small number of projects having very high ROI and the majority of projects having lower ROI. Despite the non-normality of the data, the mean ROI of 0.145549 is still relatively high, suggesting that the projects are generally profitable.

The Jarque-Bera normality test suggests that the residuals of the regression model are approximately normally distributed. This is a positive finding, as it implies that the assumptions of many statistical tests, such as the t-test and F-test, are met.

The non-normality of the data could impact the results of statistical tests that assume normality, such as the t-test and F-test. It is important to consider this when choosing statistical tests and interpreting the results.

The fact that the residuals are approximately normally distributed means that you can be more confident in the results

of your statistical tests. However, it is important to note that the Jarque-Bera test is just one test for normality and it is always a good idea to visually inspect the distribution of the residuals to confirm that they are approximately normally distributed.

Overall, the results suggest that the ROI of the projects is not evenly distributed, but the projects are generally profitable. The non-normality of the data could impact the results of statistical tests that assume normality, but the Jarque-Bera normality test suggests that the residuals of the regression model are approximately normally distributed.

## **Multicollinearity Test**

The OLS pooled regression is always the first step to determine the relationship between the dependent and independent variables. After running the OLS regression, the variance inflation factor (VIF) test was conducted, mainly to determine the presence of collinearity and multicollinearity problem between the independent variables.

Collinearity is a situation where independent variable has perfect linear function with any other independent variable, i.e., where two of the independent variables are related. Multicollinearity is an instance where more than two of the independent variables or predictors are correlations. As such, multicollinearity implies interdependence among predictors or independent variables. If multicollinearity is high in magnitude, it adversely affects the predictive ability of the independent variables. VIF of less than 10 is seen as proof of absence of collinearity and multicollinearity (Gregorich et al., 2021; Gujarati, 2003). While the inverse should be greater than 0.1.

To determine the presence of multicollinearity problem, of VIF test was carried out and the result of the VIF test was presented on table which have three columns, where column one is for independent variables, column two for the VIF for each independent variable and the total VIF while column three for the inverse VIF.

Table 3. Multicollinearity Test Result

Variable	VIF	1/VIF	
PP	1.07	0.9362	
IRR	1.06	0.9402	
NPV	1.05	0.9124	
PI	1.05	0.9551	
Mean VIF	1.06		

Source: Computed by the researcher from annual reports and accounts of the sampled DMBs, (2013-2022) using STATA 13.1. STATA Output:

The VIF results suggest that there is no serious multicollinearity in the model. However, the VIF for PI is slightly higher than the VIF for the other independent variables, suggesting that PI is more correlated with the other independent variables.

Heteroskedasticity Test

The VIF results suggest that the model is suitable for regression analysis. However, it is important to interpret the regression coefficients with caution, as they may be biased due to moderate multicollinearity.

. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of ROI

chi2(1) = 0.33Prob > chi2 = 0.5681

The Breusch-Pagan / Cook-Weisberg test for heteroskedasticity statistic is 0.33, with a p-value of 0.5681. This indicates that there

# Hausman (1978) specification test on ROI Model

Test HO: differences in Coefficients no systemic

Chi-square test value 29.92

P-value 0.0000

STATA output: 2023

The Hausman test is a statistical test that is used to determine whether the fixed-effects (FE) or random-effects (RE) regression model is the preferred model. The Hausman test tests the null hypothesis that the RE model is consistent and efficient. If the null hypothesis is rejected, then the FE model is the preferred model.

In the context of the given data, the Hausman test statistic is 29.92 and the p-value is 0.0000. This means that the null hypothesis can be rejected at the 1% significance level, which indicates that the FE model is the preferred model.

This finding suggests that the unobserved individual effects (e.g., bank size, management quality, and customer base) are correlated with the independent variables. As a result, the RE model is not consistent, and the FE model is the preferred model.

is no evidence of heteroskedasticity in the model.

### **Fixed Effects Post Estimation Tests**

From the GLS results of the study (RE and FE), the Hausman specification test was conducted to choose between the fixed and random effects models. The hausman test was significant (P value of 0.0100) which directed the choice of the fixed effects result.

The FE model is a more reliable model for estimating the causal effects of the independent variables because it controls for all unobserved individual effects. This is important because it minimizes the risk of bias in the estimated coefficients.

The finding that the FE model is the preferred model has important implications for managers, investors, and regulators.

Managers should focus on investing in projects with high PI in order to maximize ROI. Investors should consider PI when evaluating potential investments in deposit money banks. Regulators should encourage deposit money banks to use PI when making investment decisions.

The Hausman test results suggest that the FE model is the preferred model for estimating the causal effects of PP, NPV, IRR, and PI on ROI for deposit money banks in Nigeria. This finding has implications for managers, investors, and regulators.

Regression Result of Capital budgeting decision and financial performance

The fixed effect regression result in table shows the effect of the dependent variable (ROI) on the explanatory variables (PP, NPV, IRR, and PI).

Table 4: Fixed effect Model Regression Result for ROI

Variables	Coefficient	Std. Err	Z-values Si	g
CONSTANT	0.2156	0.0254	8.48	0.000
PP	0.1834	0.1633	-0.12	0.264
NPV	0.0265	0.0473	-0.56	0.576
IRR	-0.0119	0.0029	-4.17	0.000
PI	0.0627	0.0195	3.22	0.002
$R^2$	0.1857			
Wald chi <sup>2</sup> Prob Wald chi <sup>2</sup>	56.81 0.0001			
Panels:	Correlated(balanced)			
Correlation:	No autocorrelation			

Source: STATA 13.1 Output:

Note: \*\*\*, \*\* and \* indicate 1%, 5% and 10% significant levels respectively.

The fixed-effects model regression results suggest that PI has a statistically significant positive impact on ROI ( $\beta$  = 0.0627, t = 3.22, p = 0.002). This means that, after controlling for unobserved individual effects, such as bank size and management quality, a one-unit increase in PI is associated with a 0.0627-unit increase in ROI.

This finding is consistent with the expectation that PI is a good measure of profitability. PI is calculated by dividing the NPV of a project by its initial investment. Therefore, a higher PI indicates that a project is more profitable.

The other independent variables in the model (PP, NPV, and IRR) do not have statistically significant impacts on ROI. This may be because these variables are less directly correlated with profitability than PI. For example, PP is a measure of liquidity, NPV is a measure of value creation, and IRR is a measure of return on investment.

The results suggest that the only independent variable that has a statistically significant impact on return on investment (ROI) is profitability index (PI). This means that, after controlling for unobserved individual effects, such as bank size and management quality, a one-unit increase in

PI is associated with a 0.0627-unit increase in ROI.

The other independent variables in the model (payback period (PP), net present value (NPV), and interest rate of return (IRR)) do not have statistically significant impacts on ROI. This may be due to the fact that these variables are less directly correlated with profitability than PI. For example, PP is a measure of liquidity, NPV is a measure of value creation, and IRR is a measure of return on investment.

The fact that the fixed-effects model controls for unobserved individual effects means that the results are less likely to be biased by omitted variables. Therefore, the results of the fixed-effects regression are more likely to be causal than the results of a regression model that does not control for unobserved individual effects.

### **Conclusion and Recommendations**

The study examines capital budgeting decision and financial performance of listed deposit money banks in Nigeria covering the period of 2013 to 2022. The study examined the dependent variable Return on Investment (ROI), independent variables Payback period (P), Net present value (NPV), internal rate of return (IRR), and Profitability index (PI) and made the following recommendations;

The Central Bank of Nigeria (CBN) should issue a circular to all deposit money banks (DMBs) requiring them to use profitability index (PI) when making investment decisions. This would help to institutionalize the use of PI in the Nigerian banking system and ensure that DMBs are

investing in projects that are likely to generate the highest returns.

The CBN should develop and provide training programs on how to use PI for DMB staff and investors. This would help to build capacity and knowledge on the use of PI, and ensure that DMBs and investors are able to use this tool effectively.

The CBN should make PI data publicly available so that investors can easily compare different DMBs. This would help to promote transparency and accountability in the Nigerian banking system, and enable investors to make more informed investment decisions.

The CBN should use PI as a factor in assessing loan applications and other forms of financial support to DMBs. This would help to ensure that DMBs with strong PI are given priority access to financial resources, and that financial resources are allocated to projects that are likely to generate the highest returns.

The CBN should conduct regular stress tests on DMBs using PI to identify those that are at risk of financial distress. This would help to identify potential risks to the financial stability of the Nigerian banking system and allow the CBN to take timely and effective remedial measures.

By implementing these recommendations, the CBN can help to promote the use of PI in the Nigerian banking system and reap the benefits that this can bring for financial stability and soundness.

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