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The synergy of debt management, big data technology and corporate decision-making: A catalyst for enhanced financial performance through operational efficiency and sustainable business strategies

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Abstract

This research explores the impact of debt management and big data technology utilization in management decision-making on corporate financial performance with a focus on operational efficiency and sustainable business strategy effectiveness as intervening variables. It aims to delve into how a firm's debt management strategies and its incorporation of big data into decision-making processes influence its financial outcomes. This study scrutinizes the company's approach to managing its debt structure and levels while the use of big data technology in decision-making reflects the integration of advanced technology in strategic planning by examining debt management. The study further investigates how operational efficiency and the effectiveness of sustainable business strategies act as intermediaries in this relationship indicating the role of a firm's internal processes and corporate strategy in driving financial success. Moreover, the research considers mediating variables such as industry type and market competition level which could affect the relationship between the independent and dependent variables. This study aims to test these relationships providing insights into the influence of debt management and big data technology on financial performance using statistical data analysis. Expected outcomes include a deeper understanding of the strategic implications of these factors for achieving sustainable and improved financial performance in a complex business landscape. Emphasizing the importance of efficient debt management and the strategic application of big data technology, the study highlights the necessity for firms to adopt wise financial resource management and innovative decision-making approaches to navigate the challenges of the modern business environment effectively.

Keywords: Debt management, Effectiveness of sustainable business strategy, Operational efficiency, Use of big data technology in management decision making.

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1. Introduction

In recent years, the use of big data technology in management decision-making has gained increasing attention in both academic literature and business practice. Big data refers to large and complex data sets that require advanced technologies for processing and analysis. This technology enables companies to access and analyze large volumes of data, providing valuable insights and facilitating better decision-making processes [1, 2]. Big data technology has revolutionized the way companies manage and analyze data. Traditional methods of data analysis often involve small sample sizes and limited variables which may not capture the full complexity of business operations. In contrast, big data technology allows companies to analyze large volumes of data including both structured and unstructured data from various sources such as social media, customer behavior and market trends. This enables companies to gain a more comprehensive understanding of their business environment and make more informed decisions. One key aspect of corporate decision-making is debt management. Prudent debt management is crucial for ensuring a company's financial stability and avoiding financial distress [3]. Debt management involves determining the appropriate level of debt, optimizing the cost of debt and managing debt repayment [4]. Effective debt management can help companies maintain a healthy financial position, reduce financial risks and improve their overall financial performance. The balance between big data technology and debt management is a critical factor that can significantly impact a company's financial performance. On one hand, big data technology can provide companies with valuable insights into their debt structure, debt repayment patterns and overall debt management strategies [5]. Companies can identify potential risks and opportunities associated with their debt enabling them to make more informed decisions regarding debt financing and repayment by analyzing large volumes of data.

On the other hand, effective debt management can also enhance the utilization of big data technology. Companies with efficient debt management practices are likely to have better financial stability which enables them to invest more in big data technology. Companies can allocate resources to acquire and implement advanced technologies, enhancing their decision-making capabilities by maintaining a healthy financial position [6]. This can lead to improved financial performance. The interaction between big data technology and debt management can be mediated by operational efficiency and the effectiveness of sustainable business strategies. Operational efficiency refers to the ability of a company to optimize its resources, minimize costs and maximize productivity. Companies with high operational efficiency are more likely to effectively use big data technology and manage their debt leading to improved financial performance. Sustainable business strategies refer to strategies that consider long-term environmental, social and governance (ESG) factors. Companies that adopt sustainable business strategies are more likely to attract investors, customers and other stakeholders who value ESG considerations. The adoption of sustainable business strategies can positively influence a company's financial performance and its ability to effectively manage its debt [7]. Research on this topic is limited. Most existing research focuses solely on either big data technology or debt management without considering their interaction and the role of mediating variables such as operational efficiency and sustainable business strategies despite the importance of the interaction between big data technology and debt management. This study aims to fill this research gap by exploring how the interaction between big data technology and debt management affects corporate financial performance with a specific focus on the mediating variables of operational efficiency and the effectiveness of sustainable business strategies.

This paper presents a series of sections that comprehensively discuss the content of the entire paper. For example, the introduction section explains the background of this research and the literature review section states the in-depth review of the summary of relevant research results so that the hypothesis is developed. The research method describes and explains the research approach, data collection techniques and units of analysis used to answer research problems and hypotheses. The results and discussion section describes the statistical demonstration of the research results which are then discussed in depth and substantially. Research findings are discussed in the conclusion section which discusses the implications of the results of this study, research limitations and suggestions for future research.

2. Literature Review

2.1. Correlation between Debt Management and the Effectiveness of Sustainable Business Strategies, Operational Efficiencies and Financial Performance

Debt management is an important aspect of corporate accounting that affects financial performance significantly. Previous research has tried to understand the relationship between debt management and corporate financial performance [8, 9]. Knowledge of how debt management affects financial performance can help companies make the right decisions about managing their debt. It is important to understand the basic theory behind debt management. Well-known debt theories are trade-off theory and signaling theory.

Trade-off theory: This theory argues that companies should seek a balance between the benefits and costs of using debt [10]. The use of debt can provide benefits in the form of tax-deductible interest and increase shareholder returns [10, 11]. However, too much debt can increase the financial risk of the company. Therefore, efficient debt management is about finding the right balance [12].

Signaling theory: This theory argues that a firm's debt policy can serve as a signal to investors about the firm's performance [13]. If the firm takes on debt for profitable investments, this can indicate to investors that the firm is confident about its prospects. Conversely, if the company takes on debt without a clear investment, it can be a negative signal [14-16].

Several studies show that good debt management can improve a company's financial performance. For example, research by Lasfer [17], Chen et al. [18] and Florackis [19] found that the use of debt can help reduce agency problems in the firm as debt provides incentives to managers to work harder to increase firm value. However, there are also studies that show that excessive use of debt can have a negative impact on the company's financial performance Prempeh et al. [20] and

Akeem et al. [21]. Berger et al. [22] found that too much debt can increase the risk of bankruptcy which in turn can damage financial performance. Several studies show that the relationship between debt management and financial performance is not always linear. Optimal leverage (the ideal level of debt) may vary depending on the industry and economic conditions. Some companies may experience improved financial performance with increased debt levels up to a certain point but after that performance may decline. Research by Campello [23] shows that the quality of debt management, including the selection of debt instruments and the use of proceeds from the debt can affect firm performance. Companies that choose a debt structure that suits their needs and manage debt proceeds effectively tend to achieve better financial performance [23].

Debts play a crucial role in the functioning of modern economies and governments. They serve as a means of financing various activities including infrastructural investments, social programs and military expenditures [24]. However, not all debts are created equal and understanding the distinction between reproductive and dead weight debts is essential for sustainable development. Reproductive debts contribute to the productive capacity of a state or country [25]. These debts are usually taken on to finance the acquisition of assets such as power utilities, refineries, factories and other income-generating projects. The logic behind reproductive debts is that the returns generated from these investments will be able to service the debt and eventually contribute to economic growth [26, 27]. When debt is used to acquire productive assets, it can be seen as an investment rather than a burden [28]. On the other hand, deadweight debts are those undertaken to fund battles, wars or to cover existing liabilities that do not generate any significant economic returns [29]. These debts do not contribute to a country's productive capacity but instead serve as a financial burden on its economy. Dead weight debts can lead to severe economic consequences such as high interest payments, reduced government spending on essential sectors like education and healthcare and increased income inequality.

Debt must be managed in a way that does not undermine a society's social and economic growth to ensure sustainable development [30, 31]. This requires effective debt management policies that prioritize equitable economic development and poverty reduction. One such concept is "fair debt management," as proposed by Kregel [32] and Rita et al. [33]. Kregel argues that fair debt management involves a collection of policies that allow a nation to achieve its Sustainable Development Goals (SDGs) without increasing inequality [32]. The idea is to strike a balance between debt repayment and investment in social, economic and environmental sectors. A country can ensure that debt servicing does not hinder its ability to address social issues, promote economic growth and protect the environment by implementing fair debt management policies. The importance of fair debt management becomes even more relevant. The 2030 Agenda also known as the Sustainable Development Goals (SDGs) provides a blueprint for global development in the coming years as the world transitions from the Millennium Development Goals to the 2030 Agenda. However, significant financial resources are needed to achieve these objectives. Debt is sometimes required to close the money gap between available funds and the necessary investments.

However, it is crucial to note that the information presented in this literature review may not be accurate or update. Therefore, it is always necessary to verify and cite proper sources when discussing topics related to debts and sustainable development. The complexities of debt management, economic policies and global dynamics require the use of reliable and validated information for accurate analysis and informed decision-making. The hypothesis in this study is as follows based on this review:

H1: Debt management has a significant influence on corporate financial performance and this influence is mediated by operational efficiency and sustainable business strategy effectiveness.

2.2. Correlation Between Debt Management and The Effectiveness of Sustainable Business Strategies, Operational Efficiency and Financial Performance

Operational efficiency plays a crucial role in assessing a debtor's ability to repay debt and reducing debt costs. Creditors must understand the delicate balance between operational efficiency and debt cost to make informed decisions regarding lending and creditworthiness. This literature review aims to explore the significance of operational efficiency in debt management and its impact on reducing debt costs. This review seeks to provide comprehensive insights into the relationship between operational efficiency and debt cost by examining various studies and research findings. Operational efficiency is the ability of a debtor to use its resources effectively and produce maximum output with minimum input [34]. In the context of debt management, operational efficiency becomes crucial as it directly affects a debtor's ability to generate revenue and meet debt obligations. Several studies have highlighted the importance of operational efficiency in reducing debt costs and improving the creditworthiness of debtors. Cathcart et al. [35] conducted a study analyzing the relationship between operational efficiency and debt costs in publicly traded companies. Their findings revealed a significant and negative relationship between operational efficiency and debt costs. Higher operational efficiency was associated with lower debt costs indicating that efficient management of resources and operations positively impacted a debtor's ability to repay debt.

Similarly, Sarangan et al. [36] investigated the impact of operational efficiency on debt costs in Indian manufacturing firms. Their study concluded that firms with higher operational efficiency exhibited reduced debt costs. The authors highlighted various operational efficiency factors including production process optimization, cost control measures and effective inventory management as key contributors to debt cost reduction. Furthermore, Altunbas et al. [37] explored the relationship between operational efficiency and debt costs in the banking sector. Their analysis revealed that banks with higher operational efficiency had lower debt costs and improved financial performance. Altunbas et al. [37] emphasized the importance of efficient risk management, streamlined processes and technology adoption as drivers of operational efficiency in the banking industry. While operational efficiency is crucial for debt cost reduction, it is important to note that excessive cost-cutting measures solely focused on operational efficiency may have adverse effects [38]. Striking a balance

between operational efficiency and debt cost is essential to ensure sustainable debt management and long-term financial stability [39-41].

Kloot and Martin [42] highlighted the importance of a balanced approach by identifying the optimal level of operational efficiency for debt cost reduction. Their study suggested that an excessively high level of operational efficiency may indicate underinvestment in necessary resources leading to suboptimal performance. Conversely, inadequate operational efficiency can result in inefficiencies, increased costs and higher debt burdens. The authors proposed the concept of the "efficiency frontier," where firms need to find the optimal level that maximizes operational efficiency without compromising performance or incurring additional costs. Similarly, Van Empeh [43] examined the trade-off between operational efficiency and debt costs in the airline industry. Their research indicated that airlines must strike a delicate balance to avoid compromising safety and service quality while striving for increased operational efficiency and debt cost reduction [43]. The findings emphasized the need for a comprehensive approach considering multiple operational factors including maintenance practices, workforce management and customer satisfaction to achieve sustainable debt management outcomes. Based on this review, the hypothesis in this study is as follows:

H2: Operational efficiency has a significant effect on the company's financial performance.

2.3. Use of Big Data Technology in Management Decision- Making and Sustainable Business Strategy Effectiveness

In recent years, the use of Big Data Analysis (BDA) tools has gained significant attention in the business world. Many research studies have highlighted the benefits of investing in BDA tools to improve intra- and inter-firm operations as well as forecasting and decision-making processes leading to better operational efficiency. Chatterjee et al. [44] and Chatterjee et al. [45] have explored the impact of BDA on firms and found positive results. Big data refers to large and complex data sets that cannot be easily handled by traditional data processing methods. It includes various types of data such as transactional data, check-stream data and visual data etc. These data sets are used to enhance decision-making processes and improve forecasting accuracy [44]. The ability to analyze and extract insights from big data has become crucial for businesses to gain a competitive edge. One key finding in the literature is the impact of BDA capability on the operational and financial efficiency of firms. Upadhyay and Kumar [46] conducted a study that assessed the relationship between BDA capability and firm efficiency. They found that firms with higher BDA capabilities tend to have better operational and financial performance leading to an improvement in the overall efficiency. Chatterjee et al. [47] also explored the relationship between BDA capability and firm efficiency and found similar results emphasizing the importance of BDA in enhancing overall firm efficiency.

The use of BDA tools allows firms to process vast amounts of data in real-time enabling better decision-making and improved forecasting [48]. Firms can identify potential issues, optimize processes and make informed decisions by analyzing data patterns and trends. This leads to improved operational efficiency and the ability to respond quickly to changes in the business environment [49, 50]. Moreover, BDA tools facilitate better collaboration and information sharing within and across firms. Firms can gain insights into customer behavior, market trends and competitors' strategies through the analysis of big data [49]. This information can be used to develop more effective marketing and sales strategies, optimize supply chains and enhance overall operational performance. However, it is important to note that the implementation of BDA tools requires careful planning and consideration. Firms need to invest in the right infrastructure, talent and training to effectively use BDA tools [51]. The complexity and volume of big data require advanced analytics techniques and expertise to ensure accurate analysis and interpretation of the data. Furthermore, the use of BDA tools raises ethical and privacy concerns. The collection and analysis of large-scale data raises questions about data security and privacy protection. Firms need to establish robust data governance frameworks and comply with legal and regulatory requirements to ensure the responsible use of big data [51, 52]. Several studies have examined the impact of BDA on firm performance highlighting its potential to improve various aspects of organizational effectiveness e.g., Mikalef et al. [53] and Popovič et al. [54]. Bahrami and Shokouhyar [55] argue that BDA-driven dynamic capabilities can enhance financial effectiveness by providing businesses with valuable insights and actionable intelligence. Organizations can uncover patterns, trends and correlations that were previously undiscoverable enabling them to make informed decisions and achieve superior financial outcomes by leveraging big data platforms.

Garmaki et al. [56] conducted a study on the effects of BDA on firm performance and found that organizations that adopt BDA platforms experience significant improvements in their efficiency. These platforms enable businesses to optimize their operations, streamline processes and allocate resources more effectively. Firms can identify areas for improvement and take proactive measures to enhance their overall performance by using data-driven insights. In recent years, scholars have emphasized the importance of dynamic capabilities in leveraging the potential of BDA for improving firm performance. Mikalef et al. [53] argue that firms with strong dynamic capabilities are better equipped to adapt to changing business environments and exploit the opportunities presented by big data analytics. Dynamic capabilities refer to a firm's ability to integrate, build and reconfigure its internal and external resources in response to dynamic market conditions.

Akter et al. [57] propose a conceptual framework that highlights the role of dynamic capabilities in driving the effects of BDA on firm performance. According to their framework, dynamic capabilities act as a mediator between the adoption of BDA platforms and the resulting improvements in financial effectiveness. This suggests that organizations with the ability to effectively leverage big data analytics through dynamic capabilities are more likely to achieve superior financial outcomes. Based on this review, the hypothesis in this study is as follows:

H_3: The use of big data technology in management decision- making has a significant influence on corporate financial performance and this influence is mediated by operational efficiency and sustainable business strategy effectiveness.

H4: The effectiveness of sustainable business strategies has a significant effect on the company's financial performance.

3. Research Method

3.1. Sample Criteria

The participants in this study will be companies from various industries that have implemented big data technology in their decision-making processes. A total of 3 companies in the banking sector in Indonesia (e.g. Bank Negara Indonesia (BNI) Persero, Bank Mandiri Persero, Bank Danamon Persero, Bank Rakyat Indonesia (BRI) Persero, Bank Tabungan Negara (BTN) Persero, Bank Bukopin and Bank Central Asia (BCA) Persero will be selected for the study using a stratified sampling technique with 183 total data. The companies will be selected from a database of companies that have reported their financial performance and debt management practices. The selection criteria will include companies that have been in operation for at least five years and have a stable financial condition.

3.2. Data Collection

The primary data for this study will be collected through a comprehensive survey. The survey will consist of structured questions designed to gather information on the following variables: big data technology adoption, debt management practices, operational efficiency and the effectiveness of sustainable business strategies (see Table 1). The survey will be distributed online to the selected companies and a follow-up reminder will be sent after two weeks to maximize the response rate. Secondary data will also be collected from financial reports and industry databases in addition to the primary data. These secondary data sources will provide supplementary information on the financial performance and debt management practices of the companies.

3.3. Data Analysis

The research model integrates advanced statistical methodologies to analyze the relationship between big data technology adoption, debt management practices and their cumulative impact on operational efficiency and sustainable business strategies ultimately influencing corporate financial performance (see Figure 1). This comprehensive approach begins with basic descriptive statistics to establish a foundational understanding of the dataset which includes calculating the mean, median, standard deviation and range for each variable under consideration. This step is crucial for summarizing the data and providing a clear picture of the variables at play. Building upon this, the study advances correlation analysis to explore the relationship between big data technology adoption and debt management practices. This method is pivotal in identifying whether a statistically significant association exists between these two variables setting the stage for a deeper investigation into their interdependencies.

The novelty of this research lies in its application of regression analysis using the Structural Model Partial Least Squares (SMART-PLS) approach. This differs significantly from traditional studies that might rely solely on descriptive and inferential statistics without incorporating advanced modeling techniques like SMART-PLS. The utilization of SMART-PLS enables the examination of complex models and the assessment of the mediation effects between variables, which is particularly suitable for management and business research where model structures can be intricate and multidimensional. The integration of SMART-PLS into the analysis is a key differentiator from past studies as it provides a more nuanced understanding of how big data technology adoption and debt management practices interact to affect operational efficiency and the effectiveness of sustainable business strategies. This technique allows for the evaluation of latent variables that are not directly observable but can be inferred from other variables, offering a more sophisticated analysis of the data. Furthermore, SMART-PLS is beneficial for handling complex models with multiple mediators and interactions, providing robust insights into the direct and indirect effects of the variables under study.

This research not only investigates direct relationships but also examines how the interaction between big data technology adoption and debt management practices mediates the relationship with corporate financial performance by employing SMART-PLS. This approach offers a comprehensive understanding of the underlying mechanisms that drive financial outcomes in the context of technological and managerial practices thereby contributing valuable insights to the literature and practice of corporate management and technology adoption strategies.

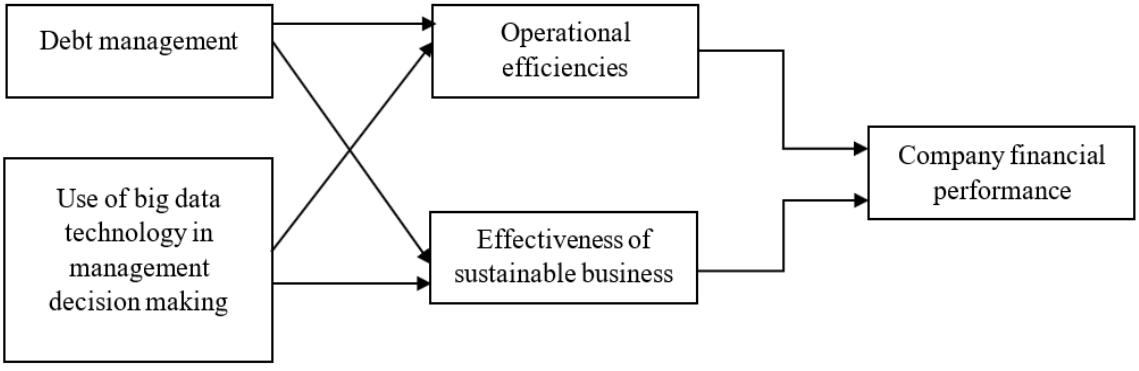

Figure 1.
Conceptual framework.

Table 1 delineates the measurement of variables across four principal domains: Debt management, the use of big data technology in management decision-making, operational efficiency and the effectiveness of sustainable business strategy. Under the variable of debt management, we delve into various dimensions including debt, debt policy, use of debt and debt repayment policy. These encompass the company's long-term debt ratios relative to its total assets, interest rate norms on existing debts, policies surrounding debt issuance and dividend payments and strategies for managing debt risks. Additionally, this section covers the application of debt in funding investments, tax management and daily operations as well as policies regarding the repayment and restructuring of debt during financial hardships. The use of big data technology in management decision-making is explored through dimensions such as data availability, data analysis and integration with management decisions. These highlight the company's access to large, relevant data sources, the utilization of advanced analytical techniques to derive insights and the integration of such insights into strategic decision-making. Operational efficiency is examined through the prisms of operational process, resource usage and cost control. Focus areas include the streamlining of operational processes, optimal utilization of manpower and equipment and policies aimed at sustaining efficient resource usage and controlling operational costs. The effectiveness of sustainable business strategy is assessed by considering a company's dedication to sustainability in its business strategy, the pursuit of continuous innovation for improving efficiency and reducing environmental impact and the implementation of a robust measurement and reporting system for sustainability. Lastly, the company's financial performance section includes metrics such as Return on Equity (RoE), Return on Assets (RoA), Return on Investment (RoI) and various margins and earnings per share (EPS) figures, tracked over trailing twelve months (TTM) and five-year averages (5YA) offering a comprehensive view of the company's financial health over time.

Table 1.
Variable measurement.

Variables	Dimensions	Items
Debt management	• Debt structure	• The ratio of long-term debt to total assets of the company. • The average interest rate on the company's debt. • The company's ability to repay long-term debt according to the repayment schedule.
	• Debt policy	• Issuance of bonds or preferred shares as a source of funding. • The company's dividend payment policy affects debt. • Management approach to debt risk management.
	• Use of debt	• The use of funds from debt for investments in profitable projects. • The use of debt as a tool for tax management. • The use of debt to finance the routine operations of the company.
	• Debt repayment policy	• The company's long-term debt repayment policy. • The company's ability to pay off long-term debt according to the repayment schedule. • The company's debt restructuring policy is in a difficult situation.
Use of big data technology in management decision-making	• Data availability	• Companies have access to a wide range of relevant and large data sources for decision-making. • Data relevant to the company's business is available in large volumes. • Companies have adequate infrastructure to manage and store big data.
	• Data analysis	• Companies use advanced data analysis techniques to extract insights from big data. • Big data analysis helps companies identify business trends and opportunities. • The results of data analysis are actively used in strategic decision-making.
	• Integration with management decisions	• Data and insights from big data are used in an integrated manner in the management decision-making process. • The decisions of the company's management are based on a comprehensive analysis of data. • Companies apply big data analytics in formulating and evaluating business strategies.
Operational efficiency	• Operational process	• The company's operational processes run efficiently and without significant obstacles. • Our operational processes are optimized to reduce time and costs. • We have strong control over key operational processes.
	• Resource usage	• A company's resources such as manpower and equipment are used effectively in operations. • We measure and manage the continuous use of our resources to improve efficiency. • The company has policies that support efficient use of resources.
	• Cost control	• The company actively controls operational costs to maintain

Variables	Dimensions	Items
		efficiency. • We have an effective cost monitoring process in place to identify potential savings. • The company's cost policy is designed to achieve operational efficiency.
Effectiveness of a sustainable business strategy	• Focus on sustainability	• The company has a business strategy that focuses on sustainability aspects including environmental, social and economic. • Sustainability is integrated into a company's business objectives as part of its long-term strategy. • The company has a strong commitment to sustainable business practices.
	• Continuous innovation	• The company engages in continuous innovation to improve products and services. • Continuous innovation is used to reduce environmental impact and increase efficiency. • The company adopts sustainable technology in its business processes.
	• Sustainability measurement and reporting	• The company has an effective measurement system in place to measure the sustainability impact of its operations. • Corporate sustainability reporting covers relevant and important aspects. • Corporate sustainability information is used to inform strategic decisions.
Company financial performance	• RoE: TTM (Trailing twelve months) • RoE: 5-year average (5YA) • RoA: TTM (Trailing twelve months) • RoA: 5-year average (5YA) • RoI: TTM (Trailing twelve months) • RoI: 5-year average (5YA) • (Trailing twelve months) gross margin • 5-year average (5YA) gross margin • (Trailing twelve months) operating margin • 5-year average (5YA) operating margin • (Trailing twelve months) pre-tax margin • 5-year average (5YA) pre-tax margin • Net profit margin (Trailing twelve months) • 5-year average (5YA) net profit margin • Earnings and share (Trailing twelve months) • Annual ordinary EPS • Annual diluted EPS • MRQ asset value/Share • Fixed asset value/Share most recent quarter (MRQ) • Cash / most recent quarter (MRQ) shares • Cash flow/share TTM • EPS most recent quarter (MRQ) vs 1st quarter last year most recent quarter (MRQ) • EPS (TTM) vs. TTM 1 year ago TTM • 5-year average (5YA) EPS growth • Sales most recent quarter (MRQ) vs. last 1Q most recent quarter (MRQ) • Sales (Trailing twelve months) vs. 1 year ago TTM (Trailing twelve months) • 5-year average (5YA) sales growth • 5-year average (5YA) capital expenditure growth	

Table 2 presents the demographics and job distribution of 183 respondents from various banks and job positions, detailing their gender, age, and education level. In terms of bank representation, Bank Bukopin accounts for 19.7%, Bank BRI for 13.7%, Bank BCA leads with 21.3%, Bank Mandiri has a share of 10.9%, Bank Danamon comes in at 14.2%, Bank BNI at 7.1%, and Bank BTN at 13.1%. When considering job positions, the spread is diverse with investment bankers making up 4.9%, back-office staff 6%, general staff 13.7%, credit analysts 9.3%, tellers 3.3%, customer service representatives 7.1%, sales officers 6%, junior account officers 3.3%, account officers forming the largest group at 31.1%, managers at 6%, supervisors at 3.8% and general account officers at 5.5%. The gender distribution among the respondents leans towards men comprising 63.4% while women represent 36.6%. According to age, respondents under 30 years old constitute 22.4% those between 31 and 40 years old make up the largest group at 48.6%, the 41 to 50 age group represents 25.1% and those over 50 are the smallest group at 3.8%. In terms of education, the majority hold a bachelor's degree at 59.6% followed by magister (master's degree) holders at 27.9% and those with a diploma at 12.6%. These figures provide a snapshot of the professional and demographic composition of the banking sector's workforce in this sample.

Table 2.
Respondent measurement (n = 183).

Bank	Total	%
Bank Bukopin	36	19.7
Bank BRI	25	13.7
Bank BCA	39	21.3
Bank Mandiri	20	10.9
Bank Danamon	26	14.2
Bank BNI	13	7.1
Bank BTN	24	13.1
Job position	Total	%
Investment banker	9	4.9
Back office	11	6.0
Staff	25	13.7
Credit analyst	17	9.3
Teller	6	3.3
Customer service	13	7.1
Sales officer	11	6.0
Junior account officer	6	3.3
Account officer	57	31.1
Manager	11	6.0
Supervisor	7	3.8
General account officer	10	5.5
Gender	Total	%
Man	116	63.4
Woman	67	36.6
Age (Years)	Total	%
< 30	41	22.4
31 - 40	89	48.6
41 - 50	46	25.1
> 50	7	3.8
Education level	Total	%
Bachelor	109	59.6
Magister	51	27.9
Diploma	23	12.6

4. Result and Discussion

4.1. Data

This survey encompasses 183 respondents across various banks and job positions. Among the banks surveyed, Bank BCA had the highest representation accounting for 21.3% of the total respondents followed by Bank Bukopin (19.7%) and Bank Danamon (14.2%). Meanwhile, Bank BNI had the lowest representation with 7.1% of the respondents. Regarding job positions, account officers formed the largest group comprising 31.1% of the respondents followed by staff (13.7%) and credit analysts (9.3%). Investment bankers had the smallest representation at 4.9%. In terms of gender, male respondents constituted the majority representing 63.4% of the total respondents while female respondents made up 36.6%. The distribution of respondents by age groups showed that the highest percentage falls within the age range of 31 to 40, accounting for 48.6% of the respondents. Those under 30 years old comprised 22.4% while respondents aged 41 to 50 years old constituted 25.1%. A smaller percentage (3.8%) was over 50 years old. When considering the education level, respondents with a bachelor's degree were the most prevalent making up 59.6% of the respondents followed by those with a master's degree at 27.9%. Respondents with a diploma constituted 12.6% of the total respondents.

Table 3 provides an extensive overview of Bank BNI's financial performance across two distinct periods: the trailing twelve months (TTM) and the five-year average (5YA). Various critical performance indicators are detailed in the table encompassing Return on Equity (RoE), Return on Assets (RoA), Return on Investment (RoI), margins, net profit, earnings per share (EPS), asset values, cash flows, EPS growth, sales growth, and capital expenditure growth over the past five years. Analyzing profitability metrics, it's evident that RoE, RoA and RoI for Bank BNI show a declining trend from the TTM period to the 5YA period. Nevertheless, over the five-year span, the bank has managed to sustain relatively stable levels of profitability. Margin indicators exhibit consistent trends as well. While the TTM gross margin data is unavailable, the operating margin, pre-tax margin and net profit margin show a similar pattern indicating a slight decrease from TTM to 5YA. However, the bank has managed to maintain healthy margins over the five-year period. Furthermore, metrics related to earnings per share such as EPS compared to previous periods and year-on-year growth show a positive trajectory with noticeable improvements in both TTM and 5YA. In terms of sales performance, Bank BNI has experienced notable growth over the observed periods demonstrating positive percentages in both TTM and 5YA compared to the respective earlier periods. The five-year sales growth metrics also highlight a consistent upward trend. Lastly, the capital expenditure growth

for the five-year average shows a substantial increase indicating the bank's strategic investments over the years to expand its operations or improve infrastructure. Overall, despite some fluctuations in certain areas, Bank BNI has managed to maintain a resilient financial performance showing growth and stability across various key financial metrics over the past five years.

Table 3.
The financial performance of Bank Negara Indonesia (BNI).

Bank Negara Indonesia (BNI)	TTM	5YA
RoE: TTM (Trailing twelve months)	14.95%	18.14
RoE:5-year average (5YA)	11%	14.11
RoA:TTM (Trailing twelve months)	2.11%	2.88
RoA:5-year average (5YA)	1.49%	2.27
RoI: TTM (Trailing twelve months)	9.26%	13.44
RoI 5-year average (5YA)	6.78%	10.78
TTM: (Trailing twelve months) gross margin	-	1.35
5-year average (5YA) gross margin	0%	1.35
TTM (Trailing twelve months) operating margin	47.32%	49.17
5-year average (5YA) operating margin	37.39%	38.89
TTM (Trailing twelve months) pre-tax margin	51.69%	51.68
5- year average (5YA) pre-tax margin	40.61%	42.02
Net profit margin TTM (Trailing twelve months)	41.66%	40.49
5- year average (5YA) net profit margin	32.3%	24.43
Earnings/Share TTM	1.311.28	926.19
Annual ordinary EPS	491.25	348.69
Annual diluted EPS	491.25	348.49
Most recent quarter (MRQ) asset value/Share	3.828.2	2.174.55
Fixed asset value/share MRQ	3.808.19	2.152.59
Cash / MRQ shares	1.400.88	695.11
Cash flow/share TTM	-1.873.02	-680.44
EPS(MRQ) vs. 1st quarter last year MRQ	11.48%	45.6
EPS(TTM) vs. TTM 1 year ago TTM	20.84%	32.89
5-year EPS growth (5YA)	6.12%	10.85
Sales (MRQ) vs. last 1Q MRQ	3.34%	16.74
Sales (TTM) vs. TTM 1 year ago TTM	15.52%	23.26
5-year (5YA) sales growth	5.17%	12.48
5-year capital expenditure growth (5YA)	4.94%	23.52

Table 4 shows that the financial performance of Bank Mandiri indicates a mixed trend in its Return on Equity (RoE), Return on Assets (RoA) and Return on Investment (RoI) over the trailing twelve months (TTM) and the past five years. The RoE for TTM stands at 14.95%, slightly higher than the 5YA RoE of 11% indicating an improvement in recent performance compared to the long-term average. Similarly, the RoA and RoI for TTM are 2.11% and 9.26%, respectively showing a decrease compared to the 5YA figures of 2.88% and 13.44%, respectively. In terms of margins, the TTM gross margin remains unspecified while the 5YA gross margin is steady at 1.35%. The operating margin for TTM decreased slightly to 47.32% compared to the 5YA margin of 49.17%. However, the pre-tax margin for TTM remained almost constant at 51.69% compared to the 5YA margin of 51.68%. Notably, the net profit margin improved for TTM, reaching 41.66% surpassing the 5YA margin of 40.49%. The earnings per share (EPS) for TTM are higher at 1,311.28 compared to the 5YA figure of 926.19 indicating an increase in profitability per share over the recent period. Furthermore, the asset value per share and fixed asset value per share in the most recent quarter (MRQ) are higher than the values from the previous quarter showcasing an improvement in asset worth. The cash available per MRQ share also displays an increase in TTM compared to the 5YA data. Examining the growth rates, the EPS for MRQ compared to the first quarter of the last year shows a growth of 11.48% whereas the EPS for TTM compared to the TTM one year ago exhibits a growth of 20.84%. The 5YA EPS growth is 6.12% signaling a varying growth pattern over different time frames. Regarding sales growth, there is an increase in sales for both MRQ and TTM compared to the respective periods in the prior year. The 5YA sales growth rates stand at 5.17% and 12.48% indicating a moderate upward trajectory in sales over the long term. Moreover, the 5YA capital expenditure growth stands at 4.94% contrasting with a higher growth rate of 23.52% in the same period suggesting varying investment patterns.

Table 4.
The financial performance of Bank Mandiri.

Mandiri	**TTM**	**5YA**
RoE: TTM (Trailing twelve months)	14.95%	18.14
RoE:5- year average (5YA)	11%	14.11
RoA: TTM (Trailing twelve months)	2.11%	2.88
RoA: 5-year average (5YA)	1.49%	2.27
RoI: TTM (Trailing twelve months)	9.26%	13.44
RoI:5- year average (5YA)	6.78%	10.78
TTM (Trailing twelve months) gross margin	-	1.35
5-year average (5YA) gross margin	0%	1.35
TTM (Trailing twelve months) operating margin	47.32%	49.17
5- year average (5YA) operating margin	37.39%	38.89
TTM (Trailing twelve months) pre-tax margin	51.69%	51.68
5- year average (5YA) pre-tax margin	40.61%	42.02
Net profit margin TTM (Trailing twelve months)	41.66%	40.49
5- year average (5YA) net profit margin	32.3%	24.43
Earnings/Share TTM	1.311.28	926.19
Annual ordinary EPS	491.25	348.69
Annual diluted EPS	491.25	348.49
Most recent quarter (MRQ) asset value/ Share	3.828.2	2.174.55
Fixed asset value/ Share MRQ	3.808.19	2.152.59
Cash / MRQ shares	1.400.88	695.11
Cash flow/ share TTM	-1.873.02	-680.44
EPS(MRQ) vs. 1st quarter last year MRQ	11.48%	45.6
EPS(TTM) vs. TTM 1 year ago TTM	20.84%	32.89
5-year EPS growth (5YA)	6.12%	10.85
Sales (MRQ) vs. last 1Q MRQ	3.34%	16.74
Sales (TTM) vs. TTM 1 year ago TTM	15.52%	23.26
5-year (5YA) sales growth	5.17%	12.48
5-year capital expenditure growth (5YA)	4.94%	23.52

Table 5.
The financial performance of Bank Rakyat Indonesia (BRI).

Bank Rakyat Indonesia (BRI)	TTM	5YA
RoE: TTM (Trailing twelve months)	18.57%	18.14
RoE:5-year average (5YA)	15.79%	14.11
RoA: TTM (Trailing twelve months)	3.18%	2.88
RoA:5 year average (5YA)	2.4%	2.27
RoI: TTM (Trailing twelve months)	9.66%	13.44
RoI: 5 year average (5YA)	8.44%	10.78
TTM: (Trailing twelve months) gross margin	-	1.35
5 year average (5YA) gross margin	0%	1.35
TTM (Trailing twelve months) operating margin	40.36%	49.17
5 year average (5YA) operating margin	36.31%	38.89
TTM (Trailing twelve months) pre-tax margin	49.53%	51.68
5 years average (5YA) pre-tax margin	44.44%	42.02
Net profit margin TTM (Trailing twelve months)	39.02%	40.49
5-year average (5YA) net profit margin	34.4%	24.43
Earnings/Share TTM	951.05	926.19
Annual ordinary EPS	338.01	348.69
Annual diluted EPS	338	348.49
Most recent quarter (MRQ) asset value/Share	2.031.78	2.174.55
Fixed asset value/Share MRQ	2.032.43	2.152.59
Cash / MRQ shares	414.36	695.11
Cash flow/Share TTM	-838.42	-680.44
EPS(MRQ) vs. 1st quarter last year MRQ	1.69%	45.6
EPS(TTM) vs. TTM 1 year ago TTM	9.64%	32.89
5-year EPS growth (5YA)	7.36%	10.85
Sales (MRQ) vs. last 1Q MRQ	9.5%	16.74
Sales (TTM) vs. TTM 1 year ago TTM	16.32%	23.26
5-year (5YA) sales growth	13.72%	12.48
5-year capital expenditure growth (5YA)	39.34%	23.52

Table 5 shows that Bank BRI's financial performance portrays a discernible trend across various key indicators over both the trailing twelve months (TTM) and the past five years (5YA). The Return on Equity (RoE) for TTM stands at 18.57% exhibiting an increase compared to both the 5YA RoE (15.79%) and the industry's average. This signifies a recent upturn in the bank's efficiency in generating returns for its shareholders. Similarly, the Return on Assets (RoA) and Return on Investment (RoI) for TTM have increased to 3.18% and 9.66%, respectively compared to their 5YA counterparts, showing an improvement in asset utilization and investment efficiency. The 5YA gross margin remains constant at 1.35% despite a lack of data for the TTM gross margin. The operating margin for TTM witnessed a decrease to 40.36% compared to the 5YA margin of 49.17% indicating potential operational challenges faced by the bank in recent months. However, the pre-tax margin for TTM stands at 49.53% slightly higher than the 5YA margin of 44.44% showing enhanced profitability before tax. The net profit margin for TTM is 39.02% slightly lower than the 5YA margin of 34.4%, yet indicating a robust level of profitability. Earnings per share (EPS) for TTM are at 951.05 showing growth from the 5YA figure of 926.19 indicating an upward trend in earnings per individual share. In terms of asset value per share, there's a slight decrease in TTM compared to the 5YA, yet the values remain relatively robust. The cash available per MRQ share has decreased in TTM compared to the 5YA data indicating a potential decrease in available cash reserves per share. Analyzing growth metrics, EPS for MRQ compared to the first quarter of the last year displays a growth of 1.69% while EPS for TTM compared to the TTM one year ago shows a growth of 9.64%. The 5YA EPS growth rates are 7.36% depicting a steady increase in earnings per share over the long term. Sales growth for both MRQ and TTM compared to the respective periods in the prior year showcases positive figures indicating an upward trajectory in sales. The 5YA sales growth rates for BRI stand at 13.72% reflecting sustained growth in sales over the long term. Additionally, the 5YA capital expenditure growth has been notably higher at 39.34% indicating substantial investment in capital projects over the past five years.

Table 6.
The financial performance of Bank Tabungan Negara (BTN).

Bank Tabungan Negara (BTN)	TTM	5YA
RoE: TTM (Trailing twelve months)	12.35%	18.14
RoE:5-year average (5YA)	9.3%	14.11
RoA: TTM (Trailing twelve months)	0.78%	2.88
RoA: 5-year average (5YA)	0.6%	2.27
RoI: TTM (Trailing twelve months)	6.57%	13.44
RoI: 5-year average (5YA)	4.38%	10.78
TTM (Trailing twelve months) gross margin	-	1.35
5-year average (5YA) gross margin	0%	1.35
TTM (Trailing twelve months) operating margin	50.77%	49.17
5-year average (5YA) operating margin	36.07%	38.89
TTM (Trailing twelve months) pre-tax margin	30.77%	51.68
5-year average (5YA) pre-tax margin	23.89%	42.02
Net profit margin TTM (Trailing twelve months)	24.53%	40.49
5-year average (5YA) net profit margin	18.08%	24.43
Earnings/Share TTM	885.68	926.19
Annual ordinary EPS	287.54	348.69
Annual diluted EPS	279	348.49
Most recent quarter (MRQ) asset value/ Share	2.023.22	2.174.55
Fixed asset value/Share MRQ	2.023.22	2.152.59
Cash / MRQ shares	1.202.28	695.11
Cash flow/Share TTM	-654.81	-680.44
EPS(MRQ) vs. 1st quarter last year MRQ	-26.78%	45.6
EPS(TTM) vs. TTM 1 year ago TTM	-10.33%	32.89
5-year EPS growth (5YA)	0.12%	10.85
Sales (MRQ) vs. last 1Q MRQ	-8.26%	16.74
Sales (TTM) vs. TTM 1 year ago TTM	-2.48%	23.26
5 year 5YA sales growth	4.75%	12.48
5 year capital expenditure growth (5YA)	21.32%	23.52

Table 6 shows that bank BTN's financial performance over both the trailing twelve months (TTM) and the past five years (5YA) indicates a relatively stable trajectory with moderate improvements across key metrics. The Return on Equity (RoE) for TTM stands at 12.35% showcasing a modest increase compared to the 5YA RoE (9.3%). Similarly, the Return on Assets (RoA) and Return on Investment (RoI) for TTM have also shown a slight increase to 0.78% and 6.57%, respectively from their 5YA figures indicating gradual progress in asset utilization and investment efficiency. There is no available data for the TTM gross margin while the 5YA gross margin remains stable at 0%. The TTM operating margin is 50.77% higher than the 5YA margin of 36.07% suggesting improved operational efficiency in the current period. The pre-tax margin for TTM is also higher at 30.77% reflecting better profitability before tax compared to the 5YA margin of 23.89%. The net profit margin for TTM is 24.53% displaying an increase from the 5YA margin of 18.08% indicating

improved profitability after accounting for all expenses. Earnings per share (EPS) for TTM stand at 88,568 slightly lower than the 5YA figure of 926.19 suggesting a potential dip in earnings per share in the recent period. Examining growth metrics, the EPS for MRQ compared to the first quarter of the last year MRQ displays a decline of 26.78% while the EPS for TTM compared to the TTM one year ago shows a decrease of 10.33%. The 5YA EPS growth rates are relatively stable at 0.12% showcasing a consistent albeit marginal increase in earnings per share over the past five years. Sales growth for both MRQ and TTM compared to the respective periods in the prior year portrays negative percentages indicating a slight decrease in sales performance. However, the 5YA sales growth rates for BTN stand at 4.75% showcasing a moderate increase in sales over the long term. Furthermore, the 5YA capital expenditure growth stands at 21.32% indicating a considerable investment in capital projects over the past five years potentially contributing to the bank's growth initiatives and infrastructure development.

Table 7.
The financial performance of Bank Danamon.

Danamon	TTM	5YA
RoE: TTM (Trailing twelve months)	7.09%	18.14
RoE: 5 year average (5YA)	5.95%	14.11
RoA: TTM (Trailing twelve months)	1.75%	2.88
RoA: 5 year average (5YA)	1.47%	2.27
RoI: TTM (Trailing twelve months)	5.32%	13.44
RoI: 5 year average (5YA)	4.28%	10.78
TTM (Trailing twelve months) gross margin	-	1.35
5 year average (5YA) gross margin	0%	1.35
TTM (Trailing twelve months) operating margin	30.23%	49.17
5 year average (5YA) operating margin	27.24%	38.89
TTM (Trailing twelve months) pre-tax margin	28.86%	51.68
5 year average (5YA) pre-tax margin	26.16%	42.02
Net profit margin TTM (Trailing twelve months)	21.62%	40.49
5 year average (5YA) net profit margin	19.47%	24.43
Earnings/share TTM	1.579.32	926.19
Annual ordinary EPS	337.88	348.69
Annual diluted EPS	337.88	348.49
Most recent quarter (MRQ) asset value/ Share	4.940.74	2.174.55
Fixed asset value/Share MRQ	4.762.95	2.152.59
Cash / MRQ shares	1.049.84	695.11
Cash flow/Share TTM	-1.867.54	-680.44
EPS(MRQ) vs. 1st quarter last year MRQ	26.83%	45.6
EPS(TTM) vs. TTM 1 year ago TTM	24.18%	32.89
5 year EPS growth (5YA)	-2.53%	10.85
Sales (MRQ) vs. last 1Q MRQ	10.73%	16.74
Sales (TTM) vs. TTM 1 year ago TTM	11.9%	23.26
5 year (5YA) sales growth	0.91%	12.48
5 year capital expenditure growth (5YA)	-4.41%	23.52

Table 7 shows that Bank Danamon's financial performance indicates a distinct pattern of moderate growth and stability across various metrics both over the trailing twelve months (TTM) and the past five years (5YA). However, compared to its competitors, it shows relatively lower returns and growth rates. The Return on Equity (RoE) for TTM stands at 7.09%, displaying a slight increase from the 5YA RoE of 5.95%. Similarly, the Return on Assets (RoA) and Return on Investment (RoI) for TTM are 1.75% and 5.32% respectively, indicating a slight improvement from the 5YA figures of 1.47% and 4.28%, respectively. These numbers suggest a gradual but not substantial increase in profitability and efficiency in assets and investments. There is no available data for the TTM gross margin while the 5YA gross margin remains constant at 1.35%. The operating margin for TTM stands at 30.23% slightly below the 5YA margin of 27.24% indicating consistent but modest operational performance. The pre-tax margin for TTM is also lower at 28.86% compared to the 5YA margin of 26.16% signaling marginally better pre-tax profitability in the current period. The net profit margin for TTM is at 21.62%, showing a decrease from the 5YA margin of 19.47%, yet maintaining a respectable level of profitability. Earnings per share (EPS) for TTM are notably higher at 1,579.32 compared to the 5YA figure of 926.19 illustrating a significant improvement in earnings per share. Examining growth metrics, the EPS for MRQ compared to the first quarter of the last year MRQ displays a growth of 26.83% while the EPS for TTM compared to the TTM one year ago shows a growth of 24.18%. The 5YA EPS growth rates stand at -2.53% suggesting a decline in earnings per share over the past five years, a potential area for concern. Sales growth for both MRQ and TTM compared to the respective periods in the prior year shows positive figures, though relatively lower than some competitors indicating a steady but less aggressive growth trajectory. The 5YA sales growth rates for Danamon stand at 0.91% which is considerably lower compared to peers signaling relatively sluggish sales growth over the long term. Furthermore, the 5YA capital expenditure growth is negative at -4.41%

contrasting with a higher growth rate of 23.52% in the same period among competitors suggesting restrained investment in capital projects over the past five years.

Table 8.
The financial performance of Bank Bukopin.

Bukopin	TTM	5YA
RoE: TTM (Trailing twelve months)	-42.29%	18.14
RoE: 5 year average (5YA)	-22.84%	14.11
RoA: : TTM (Trailing twelve months)	-6.76%	2.88
RoA: 5 year average (5YA)	-2.77%	2.27
RoI: TTM (Trailing twelve months)	-13.31%	13.44
RoI: 5 year average (5YA)	-7.54%	10.78
TTM (Trailing twelve months) gross margin	-	1.35
5 year average (5YA) gross margin	0%	1.35
TTM (Trailing twelve months) operating margin	157.63%	49.17
5 year average (5YA) operating margin	312.68%	38.89
TTM (Trailing twelve months) pre-tax margin	163.21%	51.68
5 year average (5YA) pre-tax margin	324.08%	42.02
Net profit margin TTM (Trailing twelve months)	154.4%	40.49
5 year average (5YA) net profit margin	-2.75%	24.43
Earnings/Share TTM	-19.89	926.19
Annual ordinary EPS	-74.06	348.69
Annual diluted EPS	-74.06	348.49
Most recent quarter (MRQ) asset value/Share	89.28	2.174.55
Fixed asset value/Share MRQ	87.41	2.152.59
Cash / MRQ shares	24.38	695.11
Cash flow/Share TTM	13.86	-680.44
EPS(MRQ) vs. 1st quarter last year MRQ	-125.74%	45.6
EPS(TTM) vs. TTM 1 year ago TTM	24.32%	32.89
5 year EPS growth 5YA	0%	10.85
Sales (MRQ) vs. last 1Q MRQ	-109.29%	16.74
Sales (TTM) vs. TTM 1 year ago TTM	-16.99%	23.26
5 year sales growth	0%	12.48
5 year capital expenditure growth (5YA)	-16.62%	23.52

Table 8 shows that Bank Bukopin's financial performance over both the trailing twelve months (TTM) and the past five years (5YA) displays a concerning downward trend across various crucial metrics. The Return on Equity (RoE) for TTM stands notably low at -42.29% significantly declining from the 5YA RoE of -22.84%. Similarly, the Return on Assets (RoA) and Return on Investment (RoI) for TTM depict negative figures at -6. 76% and -13.31%, respectively, indicating substantial decreases from their 5YA counterparts. There is no available data for the TTM gross margin while the 5YA gross margin remains at 0% which might indicate potential stability or a lack of change in this area. Surprisingly, the TTM operating margin stands at an exceptionally high 157.63%, considerably higher than the 5YA margin of 312.68% indicating a significant decrease in operational efficiency or potential irregularities in financial reporting. The pre-tax margin for TTM is also unusually high at 163.21% significantly lower than the 5YA margin of 324.08%. This suggests a considerable decline in pre-tax profitability compared to the five-year average. The net profit margin for TTM is exceptionally high at 154.4% though a stark contrast to the 5YA margin of -2.75% indicating potentially abnormal profitability trends or anomalies in financial performance. Earnings per share (EPS) for TTM are negative at -19.89, reflecting a decrease from the 5YA EPS of -74.06. Comparing the EPS for TTM against the TTM one year ago shows a positive growth rate of 24.32% potentially indicating a recent improvement in earnings per share despite the negative value. Analyzing sales figures, both MRQ and TTM sales compared to their respective periods in the prior year display negative percentages indicating a substantial decline in sales performance. This contrasts with competitors who generally exhibit positive sales growth showcasing a worrying trend for Bank Bukopin. The 5YA sales growth rates are flat at 0% illustrating stagnation in sales over the long term. Additionally, the 5YA capital expenditure growth stands at -16.62%, indicating a decrease in investment in capital projects over the past five years which might signify potential constraints on the bank's growth and development initiatives. In a nutshell, Bank Bukopin's financial performance raises concerns due to a significant decline in key metrics such as RoE, RoA, RoI and sales. The unusual and irregular figures in margins, profitability and negative EPS suggest potential financial irregularities or challenges within the bank that warrant thorough investigation and strategic intervention to stabilize and steer the bank towards sustainable growth and profitability.

Table 9.
The financial performance of Bank Central Asia (BCA).

Bank Central Asia (BCA)	TTM	5YA
RoE: TTM (Trailing twelve months)	21.53%	18.14
RoE: 5 year average (5YA)	17.92%	14.11
RoA: TTM (Trailing twelve months)	3.61%	2.88
RoA: 5 year average (5YA)	3.1%	2.27
RoI: TTM (Trailing twelve months)	21.07%	13.44
RoI: 5 year average (5YA)	17.53%	10.78
TTM (Trailing twelve months) gross margin	-	1.35
5 year average (5YA) gross margin	0%	1.35
TTM (Trailing twelve months) operating margin	62.21%	49.17
5 year average (5YA) operating margin	56.48%	38.89
TTM (Trailing twelve months) pre-tax margin	62.21%	51.68
5 year average (5YA) pre-tax margin	56.44%	42.02
Net profit margin TTM (Trailing twelve months)	50.25%	40.49
5 year average (5YA) net profit margin	45.27%	24.43
Earnings/Share TTM	778.11	926.19
Annual ordinary EPS	330.45	348.69
Annual diluted EPS	330	348.49
Most recent quarter (MRQ) asset value/Share	1.912.4	2.174.55
Fixed asset value/Share MRQ	1.900.54	2.152.59
Cash / MRQ shares	197.57	695.11
Cash flow/Share TTM	3.29	-680.44
EPS(MRQ) vs. 1st quarter last year MRQ	12.15%	45.6
EPS(TTM) vs. TTM 1 year ago TTM	29.65%	32.89
5 year EPS growth (5YA)	11.81%	10.85
Sales (MRQ) vs. last 1Q MRQ	12.79%	16.74
Sales (TTM) vs. TTM 1 year ago TTM	22.8%	23.26
5 year (5YA) sales growth	8.82%	12.48
5 year capital expenditure growth (5YA)	8.66%	23.52

Table 9 shows that Bank BCA's financial performance depicts a consistent and robust growth trend across various key metrics both over the trailing twelve months (TTM) and the past five years (5YA). The Return on Equity (RoE) for TTM stands at 21.53% indicating a steady increase from the 5YA RoE of 17.92%.

Similarly, the Return on Assets (RoA) and Return on Investment (RoI) for TTM have also shown improvements reaching 3.61% and 21.07%, respectively compared to their 5YA counterparts demonstrating the bank's enhanced efficiency in utilizing assets and investments. There is no available data for the TTM gross margin while the 5YA gross margin remains consistent at 0%. Notably, the TTM operating margin stands at 62.21% higher than the 5YA margin of 56.48% indicating improved operational efficiency in the current period. The pre-tax margin for TTM is also higher at 62.21% reflecting better profitability before tax compared to the 5YA margin of 56.44%. The net profit margin for TTM is 50.25% significantly higher than the 5YA margin of 45.27% illustrating a notable increase in profitability after accounting for all expenses.

Earnings per share (EPS) for TTM stand at 778.11 slightly lower than the 5YA figure of 926.19 suggesting potential stabilization or a slight decrease in earnings per share in the recent period. Analyzing growth metrics, the EPS for MRQ compared to the first quarter of the last year MRQ displays a growth of 12.15% while the EPS for TTM compared to the TTM one year ago shows a growth of 29.65%. The 5YA EPS growth rates stand at 11.81% indicating consistent and commendable growth in earnings per share over the past five years. Sales growth for both MRQ and TTM compared to their respective periods in the prior year showcases positive percentages highlighting a substantial increase in sales performance.

The 5YA sales growth rates for BCA stand at 8.82% indicating consistent growth in sales over the long term. Furthermore, the 5YA capital expenditure growth stands at 8.66% reflecting steady investment in capital projects over the past five years and potentially contributing to the bank's growth initiatives and infrastructure development.

4.2. Statistical Result

The outer loading in Table 10 presents the correlation strength between the observed variables and their respective latent constructs in our analysis. Each value indicates the extent to which a particular variable contributes to the construct it represents. The utilization of big data technology in management decision-making shows a strong relationship with its designated construct with values ranging between 0.692 and 0.761 across its items (big data1 to big data 9). This implies that these variables significantly influence the overall construct of using big data technology in decision-making processes. Similarly, debt management (DM) exhibits a considerable association with its construct where items such as DM1 to DM12 display substantial loading values between 0.641 and 0.757. These variables collectively contribute significantly to the debt

management construct. The Effectiveness of Sustainable Business Strategy (ESBS) also demonstrates a noteworthy relationship with its construct as evidenced by loading values ranging from 0.652 to 0.767 across items EFF1 to EFF9. These variables substantially impact the overall construct of sustainable business strategy effectiveness. Operational Efficiencies (OE) showcase a strong correlation with their respective constructs with values ranging between 0.738 and 0.846 across items OE1 to OE9. These variables significantly contribute to defining the construct of operational efficiencies. Moreover, the variables TTM and TY5A exhibit high loading values of 0.843 and 0.993 respectively suggesting their strong relationship with the constructs they represent, albeit not being directly linked to specific items.

Table 10.
Outer loading.

Items	Company financial performance	Debt management	Effectiveness of a sustainable business strategy	Operational efficiencies	Use of big data technology in management decision-making
Big data 1					0.731
Big data 2					0.729
Big data 3					0.716
Big data 4					0.692
Big data 5					0.720
Big data 6					0.738
Big data 7					0.761
Big data 8					0.702
Big data 9					0.703
DM1		0.679			
DM10		0.701			
DM11		0.707			
DM12		0.715			
DM2		0.731			
DM3		0.692			
DM4		0.641			
DM5		0.692			
DM6		0.732			
DM7		0.727			
DM8		0.746			
DM9		0.757			
ESBS1			0.653		
ESBS2			0.752		
ESBS3			0.728		
ESBS4			0.767		
ESBS5			0.698		
ESBS6			0.761		
ESBS7			0.652		
ESBS8			0.731		
ESBS9			0.754		
OE1				0.795	
OE2				0.745	
OE3				0.779	
OE4				0.846	
OE5				0.759	
OE6				0.798	
OE7				0.738	
OE8				0.740	
OE9				0.788	
TTM	0.843				
TY5A	0.993				

Table 11.
Construct validity and reliability.

Variables	Cronbach's alpha	rho_A	Composite reliability	Average variance extracted (AVE)
Company financial performance	0.948	-6.864	0.917	0.848
Debt management	0.888	0.890	0.907	0.848
Effectiveness of a sustainable business strategy	0.857	0.860	0.884	0.860
Operational efficiencies	0.870	0.881	0.897	0.896
Use of big data technology in management decision-making	0.869	0.871	0.896	0.890

Table 11 displays the validity and reliability measures for various constructs assessed within our study using Smart PLS. The construct validity and reliability assessment using Cronbach's alpha, rho_A, composite reliability and average variance extracted values portray strong internal consistency, reliability and adequate convergent validity among the company financial performance, debt management, effectiveness of sustainable business strategy, financial performance, operational efficiencies and the use of big data technology in management decision-making constructs within the study.

Table 12.
R-square.

Variables	R-square	R-square adjusted
Company financial performance	0.765	0.763
Effectiveness of a sustainable business strategy	0.691	0.693
Operational efficiencies	0.778	0.774

The R-square in Table 12 illustrates the goodness-of-fit measures for the models predicting the variance in the constructs of company financial performance, effectiveness of sustainable business strategy and operational efficiencies. For company financial performance, the R-square value stands at 0.765 indicating that approximately 76.5% of the variance in this construct can be explained by the predictors included in the model. The adjusted R-square which considers the number of predictors in the model, remains high at 0.763 affirming the robustness of the predictive capacity while accounting for model complexity. In terms of the effectiveness of sustainable business strategy, the R-square value is 0.691 suggesting that around 69.1% of the variance in this construct is accounted for by the predictors in the model. The adjusted R-square maintains a similar level at 0.693 indicating a reliable fit even when considering the model's complexity. Regarding operational efficiencies, the R-square value reaches 0.778 indicating that approximately 77.8% of the variance in this construct is explained by the model's predictors. The adjusted R-square accounting for model complexity remains high at 0.774 confirming the model's effectiveness in predicting operational efficiencies. Overall, these R-square values demonstrate the proportion of variance in each construct that can be elucidated by the model's predictors. The adjusted R-square values further support the robustness of these models in explaining the variance in company financial performance, the effectiveness of sustainable business strategy, and operational efficiencies showcasing their predictive strength and reliability.

Table 13.
F-test.

Variables	Company financial performance	Debt management	Effectiveness of a sustainable business strategy	Operational efficiencies	Use of big data technology in management decision-making
Company financial performance					
Debt management			0.459	0.157	
Effectiveness of a sustainable business strategy	0.561				
Operational efficiencies	0.651				
Use of big data technology in management decision-making			0.472	0.423	

Table 13 provides F-test results that suggest that company financial performance has moderate positive correlations with debt management, the effectiveness of sustainable business strategies and operational efficiencies. Additionally, debt management shows a moderate positive relationship with the use of big data technology in management decision-making while operational displays a similar moderate positive relationship with the use of big data technology in management

decision-making. These findings provide insights into the interconnectedness and potential influences among the constructs assessed in the study.

Table 14.
Direct effect.

Direct effect test	Sample mean	Standard deviation	T statistics	P values
Debt management → Company financial performance	0.408	0.036	3.654	0.001
Debt management → Effectiveness of sustainable business strategy	0.501	0.062	2.881	0.004
Debt management → Operational efficiencies	0.534	0.064	5.198	0.000
Effectiveness of sustainable business strategy → Company financial performance	0.535	0.087	4.469	0.000
Operational efficiencies → Company financial performance	0.508	0.098	4.361	0.014
Use of big data technology in management decision-making → Company financial performance	0.397	0.053	2.013	0.040
Use of big data technology in management decision-making → Effectiveness of sustainable business strategy	0.328	0.092	3.507	0.000
Use of big data technology in management decision-making → Operational efficiencies	0.548	0.057	9.553	0.000

The direct effect in Table 14 provides insights into the relationships between different constructs within the model and their impacts on each other.

1. Debt management shows significant direct effects on various constructs. It positively influences company financial performance (T=3.654, p=0.001) suggesting that effective debt management contributes to enhanced financial performance. Additionally, debt management also exhibits positive effects on the effectiveness of sustainable business strategy (T=2.881, p=0.004) and operational efficiencies (T=5.198, p=0.000) emphasizing its role in shaping these aspects within an organization.
2. The effectiveness of a sustainable business strategy significantly affects company financial performance (T=4.469, p=0.000) indicating that a well-structured and effective sustainable business strategy correlates positively with better financial performance.
3. Operational efficiencies also show a notable positive impact on company financial performance (T=4.361, p=0.014), emphasizing the importance of operational effectiveness in driving financial outcomes.
4. The use of big data technology in management decision-making demonstrates direct effects on different constructs: It positively influences company financial performance (T=2.013, p=0.040) indicating that leveraging big data technology in decision-making processes contributes to improved financial performance. Moreover, it significantly impacts the effectiveness of sustainable business strategy (T=3.507, p=0.000) and operational efficiencies (T=9.553, p=0.000) highlighting its role in enhancing both strategic effectiveness and operational efficiencies within an organization.

These direct effect analyses reveal the significant contributions of debt management, the effectiveness of sustainable business strategy, operational efficiencies and the use of big data technology in management decision-making towards enhancing company financial performance illustrating their interconnectedness and impacts within the organizational context.

Table 15.
Indirect effect.

Indirect effect test	Sample mean	Standard deviation	T statistics	P-values
Debt management → Effectiveness of sustainable business strategy → Company financial performance	0.534	0.033	3.154	0.000
Use of big data technology in management decision-making → Effectiveness of sustainable business strategy → Company financial performance	0.535	0.042	2.881	0.022
Debt management → Operational efficiencies → Company financial performance	0.508	0.087	4.419	0.000
Use of big data technology in management decision-making → Operational efficiencies → Company financial performance	0.548	0.053	2.013	0.000

The indirect effect in Table 15 explains the mediating influence of intermediate constructs on the relationships between various factors and company financial performance. Debt management exhibits an indirect effect on company financial performance through the mediation of the effectiveness of sustainable business strategies. This indirect path shows a significant positive impact (T=3.154, p=0.000) indicating that the effectiveness of sustainable business strategies partially

mediates the relationship between debt management and company financial performance. Similarly, the use of big data technology in management decision-making indirectly influences company financial performance through the mediating role of sustainable business strategy. This indirect effect is also statistically significant (T=2.881, p=0.022) suggesting that the effectiveness of sustainable business strategies partially mediates the relationship between utilizing big data technology and company financial performance. Moreover, debt management indirectly affects company financial performance through operational efficiencies with a significant positive impact (T=4.419, p=0.000). This indicates that the influence of debt management on company financial performance is partly mediated by operational efficiencies. Lastly, the use of big data technology in management decision-making also affects company financial performance indirectly through operational efficiencies showing a significant positive impact (T=2.013, p=0.000). This implies that operational efficiencies mediate the relationship between using big data technology and company financial performance.

4.3. Discussion

Debt management is an aspect that greatly affects the performance of a company. Various related factors such as debt structure, debt policy, debt usage and debt repayment policy have a significant and positive impact on the company's operational efficiency. The company's debt structure is the main foundation for determining financial stability. The ratio of long-term debt to total assets and the average interest rate are key determinants in assessing the company's financial health. The company's ability to pay long-term debt according to the payment schedule is also an important factor in maintaining smooth operations. In addition, the debt policy implemented has a significant impact. The issuance of bonds or preferred shares as a source of funding can affect the company's capital structure as well as the dividend payment policy which in turn affects the company's financial position. The use of debt funds also plays an important role in operational efficiency. Utilization of funds from debt for investment in profitable projects or for tax management can make a significant contribution to the company's operational efficiency.

A good debt repayment policy also has a positive impact. The company's ability to pay long-term debt on schedule and its debt restructuring policy in difficult situations can strengthen operational stability. Operational efficiency is also reflected in the management of efficient operational processes, optimal use of resources and effective cost control. With good debt management, companies can focus more on process optimization, effective resource utilization and cost control to achieve better operational efficiency. Overall, smart and well-planned debt management has the potential to positively influence a company's operational efficiency. By focusing on the right debt structure, policies, utilization and repayment policies, a company can strengthen the financial foundation that supports the achievement of its operational efficiency goals. This aligns closely with the insights from the scholarly works reviewed, reinforcing the concept that smart and well-planned debt management is crucial for enhancing a company's operational efficiency. The research supports and elaborates on the notion that strategic debt management and repayment policies are not only beneficial but essential for maintaining and strengthening a company's operational stability and efficiency. The studies by Bolton et al. [58] and Crouzet [59] highlight the importance of managing debt wisely, especially under financial constraints to preserve liquidity and adapt debt maturity to mitigate investment and operational challenges. These insights support our study which claims that the ability to pay long-term debt on schedule and implement effective debt restructuring policies in difficult situations can significantly enhance operational stability. Secondly, Wang and Werbin's [60] research on the implications of fair value accounting for debt structure choices emphasizes the strategic selection of debt instruments to manage agency conflicts and optimize financial strategies reflecting the narrative's emphasis on process optimization and effective resource utilization. Similarly, Davydov et al. [61] find that bank debt can positively influence firm profitability and market valuation suggesting that judicious management of debt enhances a firm's ability to efficiently allocate resources. Thirdly, Barboni's [62] study on flexible microfinance contracts underscores the importance of adaptable repayment strategies in improving business outcomes and managing operational costs effectively. This flexibility in debt repayment aligns with the narrative's point that effective debt management policies enable companies to focus more on optimizing operational processes and controlling costs. Fourth, Angeletos and Lian [63] and Lin's [64] explore the broader macroeconomic implications of debt management strategies including the role of public debt in alleviating credit friction and the efficiency gains from optimal loan-to-value ratios. These studies provide a macroeconomic perspective that supports the narrative's assertion that well-structured debt management practices can contribute to the overall financial and operational efficiency of companies.

The utilization of big data technology in management decision-making has great potential to have a positive and significant impact on the operational efficiency and effectiveness of a company's sustainable business strategy. First, data availability is key. Companies have wide access to various sources of relevant and big data for decision-making. Data relevant to the company's business is available in large volumes and the company has adequate infrastructure to manage and store big data. Furthermore, data analysis becomes an important cornerstone. Companies use sophisticated data analysis techniques to extract insights from big data. Big data analysis helps companies identify business trends and opportunities and the results of data analysis are actively used in strategic decision-making. Integration between data and management decisions is of the essence. Data and insights from big data are used in an integrated manner in the management decision-making process. The company's management decisions are based on comprehensive data analysis and the company applies big data analysis to formulating and evaluating business strategies. The positive impact of using big data technology is then reflected in three main aspects: Operational efficiency, sustainable business strategy and sustainable innovation. In terms of operational efficiency, the company's operational processes run efficiently and with minimal obstacles. Company resources such as manpower and equipment are used effectively and the company has policies that support the efficient use of resources. Operational cost controls are actively implemented to maintain efficiency with effective cost monitoring to identify potential savings. Meanwhile, the application of big data technology has also

influenced sustainable business strategies. The company has a strong focus on sustainability aspects, including environmental, social and economic. Sustainability is integrated into the company's business objectives as part of its long-term strategy with active involvement in sustainable innovation and adoption of sustainable technologies in business processes. Finally, an effective sustainability measurement and reporting system ensures that the sustainability impact of the company's operations is well measured and informs strategic decision-making. Thus, the utilization of big data technology in management decision-making not only impacts operational efficiency but also becomes a pillar in achieving strategic goals related to sustainability and innovation within the company.

Operational efficiency and the effectiveness of sustainable business strategies are closely linked to the financial performance of a company. When a company's operational processes run efficiently without significant bottlenecks, it leads to reduced time and costs in every aspect of operations. The implementation of policies that support the efficient use of resources such as manpower and equipment is also key to maximizing the use of and continuously managing resources to improve efficiency. Furthermore, actively controlling operational costs is an important step in maintaining efficiency. With an effective cost monitoring process, companies can identify possible savings potential. Cost policies designed to achieve operational efficiency also support these measures. The operational efficiency realized then serves as the foundation for the success of the company's sustainable business strategies. The focus on sustainability aspects such as environmental, social and economic becomes an integral part of the company's long-term business strategy. The integration of sustainability into business objectives and active involvement in sustainable innovation and environmentally friendly technologies are manifestations of the company's commitment to sustainable business practices. When companies engage in sustainable innovation to improve products and services and reduce environmental impacts, this not only contributes to sustainability, but also to operational efficiency. The adoption of sustainable technologies in business processes plays an important role in efficient use of resources and more cost-effective production processes. In addition, effective sustainability measurement and reporting are key to ensuring that the sustainability impacts of company operations are measurable and can be used as strategic information. This data and information related to corporate sustainability can influence strategic decision-making that will ultimately affect overall financial performance. Thus, operational efficiency resulting from good management of operational processes and the effectiveness of sustainable business strategies have a close relationship with the company's financial performance. Measures taken to improve operational efficiency and promote sustainability in business can positively and significantly affect a company's financial performance.

5. Conclusion

It is important to recognize that smart financial management, the application of advanced information technology, optimal operational efficiency and a commitment to sustainable strategies and innovation are key foundations for a company's long-term success. According to a managerial perspective, prudent debt management and data-driven decision-making are key to maintaining financial stability. This requires a deep understanding of financial structure, debt policy, and the use of big data technology to support effective decision-making. Operational efficiency is also an important aspect of optimally using resources to achieve high productivity.

5.1. Theoretical Implication

According to a theoretical point of view, attention to firm value, financial strategy and the impact of sustainability and innovation are the main concerns in understanding how the success of a company can be achieved. Theories related to operational efficiency, data-driven decision-making, sustainability and innovation also provide a rich view of the importance of these factors in the context of corporate management. Thus, the integration of prudent managerial practices with relevant theoretical concepts is key to creating an optimal environment for the growth and sustainability of a company. All these aspects work together to create a solid foundation for the company's long-term success.

5.2. Managerial Implication

The emphasis on effective debt management is crucial for the financial stability of the company. Serious attention is needed to the debt structure, debt repayment policy and debt utilization policy to manage financial resources wisely. The application of big data technology is also an important point in management decision-making. Companies need to invest in adequate infrastructure to manage and analyze data carefully to support informed decision-making. Operational efficiency is a key focus in resource utilization and business processes. The company should strive to optimize the use of resources and closely monitor operational costs to maintain efficiency. Commitment to sustainability and continuous innovation are important aspects of achieving a long-term competitive advantage. The integration of sustainability and innovation strategies into the company's products and services will have a positive impact on strengthening its position in the market. From a theoretical point of view, the financial aspects of the company include capital structure, dividend policy, and risk management that affects the value of the company. The wise management of debt and equity plays an important role in achieving optimal firm value. The use of big data technology is also a theoretical foundation for data-driven management decision-making. Data integration and in-depth analysis are key to formulating the right business strategies and decisions. The theory of operational efficiency and sustainability highlights the importance of operational optimization and the implementation of sustainability to reduce waste and negative environmental and social impacts. While the theory of innovation and competitiveness emphasizes that sustainable innovation can be an important resource in creating long-term competitive advantage for companies. Thus, careful management implementation, appropriate use of technology, a focus on operational efficiency and a commitment to sustainability and innovation are important keys to achieving long-term success from both managerial and theoretical perspectives.

6. Limitations and Future Research Agenda

Future research in the field of corporate management should focus on further exploring the relationship between smart financial management, advanced information technology, operational efficiency, sustainable strategies and innovation. One area of research should aim to deepen our understanding of how companies can effectively manage their debt and make data-driven decisions to maintain financial stability. This research should delve into topics such as financial structure, debt policy and the use of big data technology to support decision-making processes. By gaining a better understanding of these areas, managers can make informed and prudent decisions that contribute to the long-term success of their companies. Another important area of research should focus on operational efficiency and resource utilization. This research should investigate strategies and techniques that can help companies optimize their use of resources and achieve high productivity. By identifying best practices in resource management, companies can enhance their operational efficiency and ultimately improve their overall performance. Sustainability and innovation are also critical factors for companies seeking long-term success. Future research should explore the impact of sustainability and innovation on firm value and competitiveness. This research should examine how companies can integrate sustainability and innovation strategies into their products and services to strengthen their position in the market. Additionally, research should investigate the theoretical foundations of sustainability and innovation highlighting the importance of these factors in creating a sustainable competitive advantage. Overall, future research should aim to bridge the gap between theoretical concepts and practical managerial practices. By integrating theoretical frameworks with real-world applications, researchers can provide valuable insights for managers seeking to create an optimal environment for their companies' growth and sustainability.

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