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Financial Performance and Financial Distress Analysis of Seven Indonesian State-Owned Construction Companies (Case Study of ADHI, PTPP, WIKA, WSKT, PTHK, PTNK, and Abipraya)

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ABSTRACT:- This study evaluates the financial performance and health of state-owned construction companies in Indonesia from 2018 to 2023, including PT Adhi Karya, PT Pembangunan Perumahan, PT Wijaya Karya, PT Waskita Karya, PT Hutama Karya, PT Nindya Karya, and PT Brantas Abipraya. Under President Joko Widodo's administration, the construction sector has experienced significant growth with major infrastructure projects such as the construction of toll roads and the relocation of the new capital. Although these developments have enhanced accessibility and connectivity, challenges such as high debt and regulatory complexities remain. Analysis using the Altman Z-Score model and various financial ratios indicates that some companies have experienced significant declines in financial performance, while others show signs of recovery. The study also evaluates external factors affecting the industry using PESTEL analysis and Porter's Five Forces, highlighting the importance of regulatory reforms to improve the competitiveness and stability of this sector. Recommendations include debt restructuring, effective asset management, aggressive marketing strategies, and improving cash flow to strengthen the financial position of the companies. In conclusion, companies need to optimize operational efficiency and form strategic partnerships to address existing challenges and ensure long-term sustainability.

KEYWORDS – Indonesian Construction, Financial Performance, State-Owned Enterprises, Infrastructure Projects, Z-Score Analysis

I. INTRODUCTION

The construction sector plays a vital role in driving economic growth and development globally. This sector encompasses a wide range of activities, from infrastructure development to residential and commercial projects. Indonesia has experienced significant developments in the infrastructure sector during President Joko Widodo's (Jokowi) administration [10]. In recent years, various ambitious infrastructure projects have been launched, positively impacting multiple aspects of society and the national economy. One of Jokowi's administration's main focuses is improving accessibility and connectivity across Indonesia, reflected in the rapid construction of toll roads. By mid-2022, the achievement in toll road construction had reached a total of 2,500 kilometers, spread across 66 toll road sections and 46 Toll Road Business Entities (BUJT) in Java, Bali, Sumatra, Kalimantan, and Sulawesi.

In addition to toll road construction, in mid-2019, President Joko Widodo announced that Indonesia's capital would be relocated outside Java. The new capital's location includes most of the administrative areas of North Penajam Paser Regency and Kutai Kartanegara Regency in East Kalimantan Province. The construction of IKN (Indonesia's New National Capital) began in 2021, including the construction of the IKN access toll road, Sepaku Semoi dam, the state palace, and the presidential office. By the end of 2023, the progress of phase 1 construction of IKN's basic infrastructure had reached 62.55% [12] and the construction of IKN is expected to continue until 2045.

To meet these challenges, state-owned construction companies (BUMN) have become major players in Indonesia's construction industry. Several state-owned construction companies have become publicly listed on the Indonesia Stock Exchange, such as PT Adhi Karya (Persero) Tbk, PT Pembangunan Perumahan (Persero) Tbk, PT Wijaya Karya (Persero) Tbk, and PT Waskita Karya (Persero) Tbk. In addition, there are several state-owned enterprises (BUMN) that are not yet listed on the Indonesia Stock Exchange, such as PT Hutama Karya (Persero), PT Nindya Karya (Persero), and PT Brantas Abipraya (Persero). However, this massive infrastructure development has also had negative impacts. According to the Minister of State-Owned Enterprises (BUMN),

Erick Thohir, the infrastructure development still affects the debt performance of companies in the construction industry [9]. The following table shows the liabilities of state-owned construction companies from 2018 to 2023.

Table 1.1 Total Liabilities

Total Liabilities						
Company	2018	2019	2020	2021	2022	2023
ADHI	23,833,342,873,624	29,681,535,534,528	32,519,078,179,194	34,242,630,632,194	31,162,625,753,138	31,273,238,239,002
PTPP	36,233,538,927,553	41,839,415,194,726	53,408,823,346,707	55,573,843,735,084	42,791,330,842,175	41,381,651,241,880
WIKA	42,014,686,674,000	42,895,114,167,000	51,451,760,142,000	51,950,716,634,000	57,576,398,034,000	56,409,622,846,000
WSKT	95,504,462,872,769	94,237,437,630,254	89,338,541,917,315	88,140,178,639,510	83,987,631,948,080	83,994,385,906,808
PTHK	53,917,493,000,000	68,689,084,000,000	82,116,654,000,000	78,108,753,000,000	70,537,744,000,000	53,114,974,000,000
PTNK	4,178,955,546,535	4,389,685,284,611	3,968,742,832,721	3,301,697,011,036	3,355,277,780,827	-
Abipraya	3,728,431,951,813	4,481,917,969,156	4,991,331,100,988	5,241,220,978,395	6,117,507,749,543	-

Source: Annual Report, 2018-2023

To address this issue, the Ministry of State-Owned Enterprises also plans to merge these seven construction companies into three companies PT Pembangunan Perumahan (Persero) Tbk with PT Wijaya Karya (Persero) Tbk focusing on seaports and airports, PT Waskita Karya (Persero) Tbk with PT Hutama Karya (Persero) focusing on toll roads, non-toll roads, institutional buildings, and residential commercial, and the merger of PT Adhi Karya (Persero) Tbk with PT Nindya Karya (Persero) and PT Brantas Abipraya (Persero) focusing on water, rail, and other contexts [13]. Therefore, the author aims to analyze the financial performance and assess the potential financial difficulties of PT Adhi Karya (Persero) Tbk, PT Pembangunan Perumahan (Persero) Tbk, PT Wijaya Karya (Persero) Tbk, PT Waskita Karya (Persero) Tbk, PT Hutama Karya (Persero), PT Nindya Karya (Persero), and PT Brantas Abipraya (Persero) for the period from 2018 to 2023.

II. THEORITICAL FOUNDATION

2.1 P.E.S.T.L.E Analysis

This analysis is a tool used to identify or understand the external factors affecting a business. Companies can utilize PESTLE analysis to develop more effective strategies in facing the current business environment. According to Oktriwina [7], PESTLE analysis consists of six main indicators: a) Political, evaluating the company's exposure to government influence and policies; b) Economic, understanding the general economic conditions, including economic cycles (booming or recession); c) Social, encompassing demographic characteristics, norms, customs, and societal values that influence consumer behavior; d) Technological, including technological changes that may affect the company, such as innovations, digitalization, and related variables; e) Environmental, factors that can impact businesses, including climate change, environmental legislation, and other ecological considerations; f) Legal, covering legal factors that can affect businesses, such as copyright and patent laws, consumer protection, and other regulations. PESTLE analysis helps companies better understand the complex and dynamic external environment, enabling them to plan and make better decisions in managing existing challenges and opportunities.

2.2 Porter's Five Analysis

This analysis is a strategic framework used by companies to evaluate the attractiveness of an industry and the level of competition within it. By analyzing these forces, companies can identify opportunities to gain competitive advantage and develop strategies to reduce risks. According to Pratama [8], Porter's Five Forces Analysis theory is very important to understand how companies utilize external factors to achieve competitive advantage in their industry. The Porter's five forces model is as follows; a) Threat of New Entrants, this model evaluates how easily new competitors can enter the market. High entry barriers, such as large capital requirements, strong brand loyalty, and government regulations, protect the profits of existing companies from the threat of new entrants; b) Bargaining Power of Buyers, this model assesses the bargaining power possessed by consumers in the market. Consumers with strong bargaining power can demand higher quality products or lower prices, which can negatively impact the profitability of the business; c) Bargaining Power of Suppliers, this model can impact businesses if they control key resources or inputs. Suppliers with significant bargaining power can raise prices or lower the quality of goods, which affects the profitability of the companies they supply. Their power is influenced by the availability of alternative sources and the uniqueness of their products or services; d) Threat of Substitute Products or Services, this model considers the existence of alternative products or services that can fulfill the same needs as those offered by the company. A high threat of substitute

products can limit a company's ability to set prices and maintain profitability; and e) Rivalry Among Existing Competitors, this model looks at the intensity of competition in the industry. High levels of competition can lead to price wars, decreased profits, and increased costs for businesses. By understanding Porter's Five Forces, companies can design more effective strategies to face competition and take advantage of opportunities in the industry, while minimizing risks that can disrupt their business operations and sustainability.

2.3 Financial Performance

Financial performance is an evaluation of a company's financial health over a specific period, measuring the efficiency of resource management to generate revenue [5]. Key indicators such as Return on Assets (ROA), Return on Equity (ROE), net profit, and earnings per share are used to assess a company's financial stability. That financial performance can be measured through increased profitability, production capacity, sales growth, and effective use of capital and financial resources [6].

1. Profitability Ratios these ratios evaluate a company's ability to generate profit and assess the effectiveness of its management [3]. The main indicators include:
   - **Return on Equity (ROE)**, which measures the efficiency of shareholder equity usage. ROE is calculated as:
   $$ROE = \frac{Net\ Income}{Shareholders\ Equity}\ x\ 100\%$$
   - **Return on Investment (ROI),** which indicates the return on the total assets utilized by the company. ROI is calculated as:
   $$ROI = \frac{EBIT + Depreciation}{Total\ Assets - Fixed\ Assets}\ x\ 100\%$$
2. Liquidity Ratios, these ratios measure a company's ability to meet short-term obligations [1]. The main indicators include:
   - **Current Ratio,** which calculates the company's ability to settle its short-term liabilities:
   $$Current\ ratio = \frac{Current\ Assets}{Current\ Liabilities}\ x\ 100\%$$
   - **Cash Ratio**, which assesses the amount of cash available to pay off debt:
   $$Cash\ ratio = \frac{Cash + Cash\ Equivalent}{Current\ Assets}\ x\ 100\%$$
3. Activity Ratios, these ratios measure the effectiveness of a company's use of its assets to generate revenue [11]. The main indicators include:
   - **Collection Period**, which indicates the time required to receive payments from receivables:
   $$Collection\ Period = \frac{Average\ Accounts\ Receivable}{Sales\ Revenue}\ x\ 365\ days$$
   - **Total Asset Turnover**, which measures the efficiency of total asset usage:
   $$Total\ Asset\ Turnover = \frac{Sales\ Revenue}{Total\ Assets}\ x\ 100\%$$
4. **Inventory Turnover**, a ratio that indicates how frequently the funds invested in inventory are cycled through over a period [3] The main indicators include:
   $$Inventory\ Turnover = \frac{Average\ Inventory}{Sales\ Revenue}\ x\ 365\ days$$
5. Solvency Ratios, these ratios assess a company's ability to meet its long-term obligations [2]. The main indicator is:
   - **Total Equity to Total Assets**, which measures the proportion of equity relative to total assets:
   $$Total\ Equity\ to\ Total\ Asset = \frac{Total\ Equity}{Total\ Assets}\ x\ 100\%$$

2.4 Weighted Financial Ratio

Weighted financial ratio is an assessment method that uses certain weights to calculate the results of various financial ratios to assess the company's financial health [3]. These ratios include profitability, liquidity, activity, and solvency ratios. These weights are used to determine the financial health rating of each company per year, in accordance with the Regulation of the Minister of SOEs No. KEP-100/MBU/2002 [4]. The following are the maximum weights used to assess the non-infrastructure category.

Table 2.1 Total Maximum Weight

Indicators	Non-Infra
Return on Equity (ROE)	20
Return on Investment (ROI)	15
Cash Ratio	5
Current Rtio	5
Collection Period	5
Days in inventory	5
Total Asset Turnover	5
Total Equity to Total Asset Ratio	10

Source: Keputusan Menteri BUMN No. KEP-100/MBU/2002

Description:

Return on Equity (ROE)

ROE measures the net profit after tax in relation to shareholders' equity. It assigns values ranging from 20 points for ROE > 15% to 0 points for negative ROE. This ratio indicates how effectively the company utilizes its equity and serves as a reference for stakeholders when making strategic decisions [3].

Return on Investment (ROI)

ROI indicates the return on total assets utilized by the company. Values range from 15 points for ROI > 18% to 1 point for negative ROI. ROI reflects the overall productivity of the company's funds [3].

Cash Ratio

Cash Ratio evaluates the amount of cash available to cover short-term debt. Values range from 5 points for a cash ratio ≥ 35% to 0 points for a cash ratio < 5% [3].

Current Ratio

Current Ratio measures the company's ability to meet short-term liabilities. Values range from 5 points for a current ratio ≥ 125% to 0 points for a current ratio < 90% [3].

Collection Period

Collection Period indicates the time taken to receive payments from receivables. Values range from 5 points for a collection period ≤ 60 days to 0 points for a period > 300 days. This ratio reflects efficiency in receivables collection [3].

Inventory Turnover

Inventory Turnover shows how often inventory is converted into sales. Values range from 5 points for turnover ≤ 60 days to 0 points for turnover > 300 days. This ratio reflects inventory management effectiveness [3].

Total Asset Turnover

Total Asset Turnover measures the efficiency of asset utilization in generating sales. Values range from 5 points for turnover ≥ 20% to 0 points for turnover ≤ 0% [3]

2.5 Financial Distress

Financial distress is a condition where a company is unable to generate sufficient revenue or profit to meet its financial obligations. financial distress occurs when a company or individual fails to produce sufficient income or profit. A precarious financial condition that precedes bankruptcy or liquidation. Understanding financial distress offers several advantages for companies:

1. Preventing Bankruptcy: It allows company management to take immediate action to prevent potential bankruptcy.
2. Alternative Solution: Companies can pursue alternative solutions such as mergers or acquisitions to meet obligations, pay off debts, and improve corporate governance.
3. Early Warning System: Financial distress serves as an early warning system indicating the possibility of future bankruptcy.

Thus, early identification of financial distress is key to avoiding bankruptcy and maintaining the financial health of the company

2.6 Financial Health Ranking

The Ministry of State-Owned Enterprises (BUMN) has developed a framework for assessing company health, outlined in Table 2.10 "Guidelines for Company Health Rating." Based on the Minister of State-Owned Enterprises Decision number KEP-100/MBU/2002, this table classifies companies into three main categories: "Healthy," "Less Healthy," and "Unhealthy." Each category corresponds to a Total Score (ST) obtained. These guidelines reflect a commitment to enhancing transparency and better corporate governance, as well as encouraging state-owned enterprises to achieve and maintain optimal financial performance.

Table 2.2 Company Health Rank Guideline

Category	Rank	Total Score (ST)
Healthy	AAA	ST > 95
	AA	80 < ST ≤ 95
	A	65 < ST ≤ 80
Less Healthy	BBB	50 < ST ≤ 65
	BB	40 < ST ≤ 50
	B	30 < ST ≤ 40
Unhealthy	CCC	20 < ST ≤ 30
	CC	10 < ST ≤ 20
	C	ST ≤ 10

Source: Keputusan Menteri BUMN no. KEP-100/MBU/2002

2.7 Altman Z-Score

The Altman Z-Score is a bankruptcy prediction method developed by Edward I. Altman using Multivariate Discriminant Analysis. This method has a high accuracy rate, reaching 95%, and is used to identify potential bankruptcy in companies by combining several financial ratios into a discriminant formula. Altman identified five financial ratios that, when combined, can distinguish between companies at risk of bankruptcy and those that are not. The initial Z-Score formula proposed by Altman in 1967 is as follows:

$$Z - \text{Score}\ (1967) = 1{,}2X_1 + 1{,}4X_2 + 3{,}3X_3 + 0{,}6X_4 + 1{,}0X_5$$

Altman developed the Z-Score model to assess the bankruptcy risk of companies. This model uses five variables: working capital to total assets (X1), retained earnings to total assets (X2), earnings before interest and taxes to total assets (X3), market value of equity to book value of total liabilities (X4), and sales to total assets (X5). The Z-Score is categorized as follows:

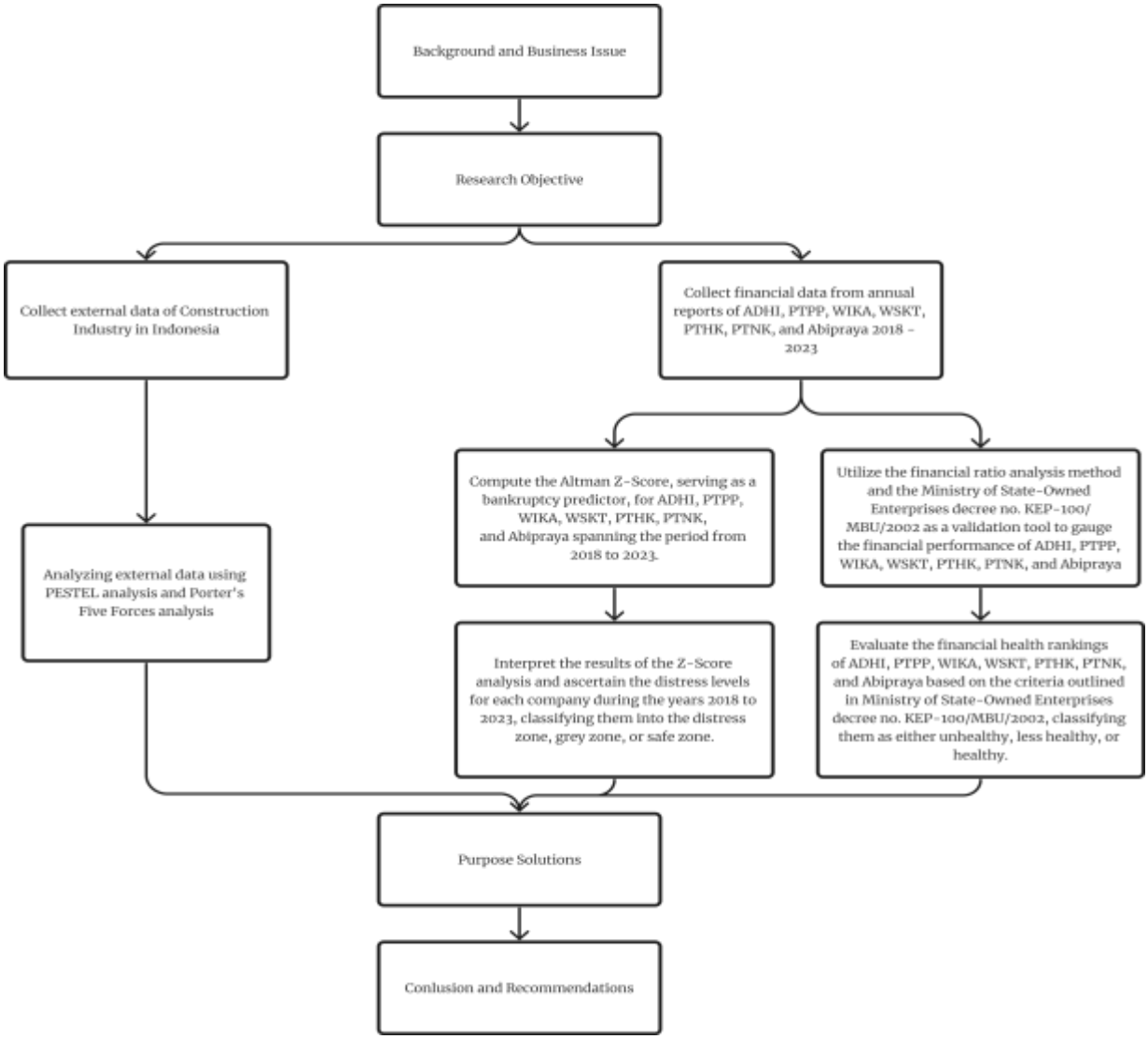
- Z > 2,99: The company is in the "safe" zone with a low risk of bankruptcy.
- 1,81 < Z < 2,99: The company is in the "grey" zone with uncertain bankruptcy risk.
- Z < 1,81: The company is in the "danger" zone with a high risk of bankruptcy.

Altman also updated his model for private and non-manufacturing companies, which are more relevant for various types of companies. In the 1983 model for private companies, the market value of equity (X4) is replaced with the book value of shareholders' equity. The Z-Score categories in this model are:

- Z > 2,9: "Safe" zone with a low risk of bankruptcy.
- 1,23 < Z < 2,9: "Grey" zone with uncertain bankruptcy risk.
- Z < 1,23: "Danger" zone with a high risk of bankruptcy.

In this research, Altman's initial model will be used to detect signs of bankruptcy in companies.

III. RESEARCH METHODOLOGY



Gambar 3.1 Conceptual Framework
Sumber: Author, 2024

This study combines qualitative and quantitative approaches to evaluate the financial conditions of state-owned construction companies in Indonesia from 2018 to 2023. Data was collected through company annual reports and reliable external sources. The data analysis methods used include:

1. Altman Z-Score: This method is used to predict the likelihood of company bankruptcy by classifying companies into high, medium, and low risk zones based on a score calculated from financial data. The Altman Z-Score is particularly useful in assessing the financial distress of a company, helping stakeholders understand the financial health and potential risks involved.
2. Financial Ratio Analysis: This involves calculating and comparing key financial ratios such as liquidity, solvability, profitability, and activity against industry standards, referring to KEP-100/MBU/2002. Financial ratio analysis provides insights into a company's operational efficiency, financial stability, and performance compared to industry norms, offering a detailed look at the company's financial status.
3. PESTEL and Porter's Five Forces: These are used to assess external factors affecting the construction industry, providing insights into broader industry trends and challenges. The PESTEL analysis examines the Political, Economic, Social, Technological, Environmental, and Legal factors that could impact the industry, while Porter's Five Forces analysis helps understand the competitive landscape and market dynamics, including threats of new entrants, bargaining power of suppliers and buyers, threats of substitute products, and industry rivalry.

By integrating these methodologies, the study aims to offer a comprehensive view of the financial landscape and strategic positioning of state-owned construction firms within the evolving market context in Indonesia.

IV. RESEARCH RESULTS

4.1 P.E.S.T.L.E Analysis

4.1.1 Politics

The construction industry in Indonesia is a significant economic sector that contributed about 10% to the national GDP in 2023. Various policies, including the National Strategic Projects (NSP), have been launched by the government to support this sector, with investments reaching IDR 1.519 trillion. However, this sector faces political and economic challenges such as complex bureaucracy and rampant corruption. The permitting process in Indonesia takes an average of 191 days, longer than neighboring countries like Malaysia. Frequent regulatory changes also pose a hurdle, adding uncertainty for investors, such as the revision of laws related to land use and construction permits in 2022, which caused project delays and increased costs. Political stability and regulatory certainty are crucial for promoting growth and sustainability in Indonesia's construction industry, thus the government needs to enhance the investment climate through simplification of bureaucracy, increased transparency, and strengthening of the legal framework.

4.1.2 Economic

In 2023, Indonesia's construction industry faced complex economic challenges but still showed positive growth prospects. The sector contributed about 9.92% to the national GDP in the first quarter of 2024 and employed over 7 million workers, making it one of the largest contributors to job creation. The Indonesian government continued its significant investment commitment in infrastructure through the National Strategic Projects (NSP) with an investment value reaching IDR 5,746.4 trillion by 2024. However, the industry also faced challenges such as a global economic slowdown and fluctuations in construction material prices, especially cement and steel, due to international supply chain disruptions and global market uncertainty, which increased construction costs. Steel prices rose by 12% in the first half of 2024 compared to the same period the previous year. Tighter monetary policies with an increase in the benchmark interest rate to 6.25% at the beginning of 2024 to control inflation led to higher borrowing costs and financing for construction projects, resulting in delays or the need for refinancing of some major projects. Despite this, the construction sector remains attractive to investors, particularly with tax incentive policies for investments in remote areas and the continually growing housing market potential.

4.1.3 Social

In 2024, the construction industry in Indonesia plays a crucial role in social dynamics, significantly impacting the lives of the community. In addition to contributing to economic growth and creating jobs for over 7 million people, particularly workers from rural areas and small towns, this sector also helps reduce the unemployment rate, which stands at 5.8%. The development of basic infrastructure like roads, bridges, and public facilities enhances mobility and accessibility, while major projects such as affordable housing and new health facilities improve social welfare. However, the sector also faces significant social challenges, including inadequate working conditions, low safety standards, low wages, and gender inequality. Other social issues include the impact of major project developments that often lead to forced relocations and land conflicts. To address these issues, the government issued new policies in 2024 to enhance transparency and public participation in project planning. Overall, with a more inclusive approach to social aspects, the construction sector in Indonesia has the potential to continue making a sustainable positive impact on society.

4.1.4 Technology

In 2024, the construction industry in Indonesia underwent a significant technological transformation that offers tremendous opportunities to enhance efficiency and reduce environmental impact. The adoption of modular and prefabrication construction technologies allows building components to be produced in factories and assembled on-site, speeding up construction times, reducing waste by up to 30%, and lowering project costs by up to 20%. Building Information Modeling (BIM) technology is increasingly used, integrating all project data into a single digital platform, which improves the efficiency of planning and project management and reduces the risk of errors and additional costs. The use of BIM can reduce project costs by up to 15% and accelerate project completion by up to 20%. The introduction of automation and robotics technologies is also beginning to show real impact, such as the use of drones for land mapping and robots for construction tasks, which increase work precision and efficiency and reduce the risk of workplace accidents. Additionally, the use of environmentally friendly construction technologies, such as recycled materials and low-carbon technologies,

is on the rise, with concrete examples like the use of green concrete supporting Indonesia's target to reduce emissions by 29% by 2030 as committed in the Paris Agreement.

4.1.5 Environmental

In 2024, the construction industry in Indonesia faced significant challenges in managing its environmental impact. The sector is heavily dependent on natural resources and contributes substantially to environmental degradation. Massive construction activities, including the development of large-scale infrastructure, have increased the use of building materials such as cement and steel, whose production results in high carbon emissions. The industry accounts for about 25% of the national carbon emissions, generating more than 150 million tons of CO2 per year. Other environmental impacts include deforestation and land use changes that reduce forest cover and disrupt local ecosystems, threatening the sustainability of biodiversity. Construction projects in Kalimantan and Sumatra have led to the loss of primary forests crucial for the conservation of endemic and rare species. The construction industry also generates a large amount of building waste, often poorly managed, including hazardous materials like asbestos and other chemicals that can contaminate soil and water. In 2024, it is estimated that about 29 million tons of construction waste will be produced, with only about 20% being recycled or managed sustainably. Poor waste management poses potential environmental contamination and health risks to surrounding communities. Another challenge is the significant water usage by the construction sector, particularly for concrete mixing and dust control, which increases pressure on already limited water resources, especially in drought-prone areas like Java and Bali. In 2024, the construction industry's water consumption is expected to reach 1.5 billion cubic meters, raising the risk of water shortages for local residents and natural ecosystems.

4.1.6 Legal

In 2024, the construction industry in Indonesia operates within an increasingly complex and dynamic legal framework, reflecting the government's efforts to improve regulation and oversight. The significant implementation of the Omnibus Law (Job Creation Law) has simplified the permitting process, reducing the number of permits from 50 to about 20 and shortening the process from six months to three months to enhance the efficiency and competitiveness of the national construction sector. Despite these improvements, legal challenges such as land ownership rights and disputes remain significant barriers, often impeding construction projects, with more than 200 cases of land disputes reported in 2024. Regulations related to occupational safety and health standards have also become stricter, including mandatory accident reporting, provision of personal protective equipment, and safety training for workers, though implementation is still hindered by inadequate supervision and industry awareness. The Anti-Corruption Law has tightened the scrutiny of the tender processes and project execution, with several major projects delayed due to corruption investigations, indicating that corruption remains a major challenge. Additionally, the enforcement of regulations promoting the use of environmentally friendly building materials and green technologies has been strengthened to reduce carbon emissions and achieve sustainable development goals, where projects that do not comply with new environmental standards may face legal sanctions such as hefty fines and project permit revocations.

4.2 Porter's Five Analysis

4.2.1 Threat of New Entrants: Moderate

The threat of new entrants in the Indonesian construction industry is moderate. While simpler regulations and government incentives slightly lower entry barriers, substantial capital investment and regulatory complexity remain significant challenges. Established companies benefit from economies of scale and strong reputations, which provide competitive advantages and hinder the entry of new competitors.

4.2.2 Bargaining Power of Suppliers: High

The bargaining power of suppliers in the Indonesian construction industry is very high due to the reliance on a few key suppliers for essential materials such as steel and cement. Major suppliers like PT Semen Indonesia and PT Krakatau Steel dominate the market and have the power to influence prices. Dependence on specialized equipment and supply chain disruptions further strengthen suppliers' power, increasing the risk of project delays and cost increases.

4.2.3 Bargaining Power of Buyer: Medium to High

The bargaining power of buyers in the Indonesian construction industry ranges from medium to high, depending on the scale of the project and the buyer's knowledge. Large-scale government projects and corporate clients have significant influence over prices and contract terms. Improved access to market information has enhanced buyers' ability to negotiate and secure better deals. Broad competition among contractors provides numerous alternatives for buyers, strengthening their bargaining power.

4.2.4 Threat of Substitute Products: Low to Medium

The threat from substitute products in the Indonesian construction industry is low to medium. Traditional construction methods and materials like concrete and steel remain dominant, though alternative materials like green concrete and engineered wood are gaining attention. Innovations in modular and prefabricated construction offer potential substitutes by reducing construction time and costs, but their adoption is still limited compared to conventional methods.

4.2.5 Industry Rivalry: High

Competition within the construction industry in Indonesia is very high, marked by fierce competition among many companies. The market includes major players like PT Wijaya Karya and numerous small to medium-sized contractors, creating a highly competitive environment. Companies compete aggressively on price, quality, and project completion times, especially for large-scale public infrastructure projects. Market saturation in urban areas further intensifies competition, prompting some companies to seek opportunities in less developed regions.

4.3 Financial Performance Analysis

4.3.1 Return on Equity

Table 4.1 Return on Equity

Return on Equity (%)						
	2018	2019	2020	2021	2022	2023
ADHI	10	10	0	2	2	3
PTPP	12	7	2	3	2	1
WIKA	12	14	2	1	0	-82
WSKT	16	4	-56	-12	-12	-35
PTHK	21	9	-6	-4	-1	2
PTNK	18	13	3	4	6	-
Abipraya	23	16	2	3	7	-

Source: Author, 2024

The table presents the Return on Equity (ROE) data for seven construction companies over six years, from 2018 to 2023. ROE, a key indicator of financial performance, measures how effectively a company uses shareholders' equity to generate profits. For most companies, there is a notable trend of declining ROE, suggesting increasing difficulties in generating returns on equity. ADHI and PTNK maintain relative stability, indicating consistent performance with moderate fluctuations. Conversely, companies like WIKA and WSKT exhibit significant volatility, with WIKA's ROE plummeting to -82% in 2023, signaling potential financial distress or operational inefficiencies. PTHK also shows negative ROE since 2020 but has slightly recovered to a positive value by 2023. Abipraya shows a stable performance, though data for the last year is missing. This overall decline in ROE highlights potential challenges within the construction sector, impacting investor confidence and indicating a need for strategic adjustments to improve profitability and sustainability.

4.3.2 Return on investment

Table 4.2 Return on Investment

Return on Investment (%)						
	2018	2019	2020	2021	2022	2023
ADHI	3%	4%	1%	2%	2%	1%
PTPP	9%	4%	2%	2%	2%	1%
WIKA	5%	6%	1%	36%	1	-13%
WSKT	5%	1%	-9%	-1%	-1%	-4%
PTHK	4%	3%	-1%	-1%	1%	3%
PTNK	8%	7%	5%	6%	7%	-
Abipraya	20%	16%	11%	11%	11%	-

Source: Author, 2024

This table shows the Return on Investment (ROI) for seven construction companies from 2018 to 2023. ROI measures the efficiency of investments by looking at the profits generated from the total investment. ADHI shows stability with a peak value of 4% in 2019 and a low of 1% in 2023. PTPP is also fluctuating, from 9% in 2018 down to 1% in 2023. WIKA experienced significant fluctuations, from 36% in 2021 down to -13% in 2023. WSKT has been on a negative trend since 2020, reaching -4% in 2023. PTHK was also negative in 2020-2021, but slightly recovered to 3% in 2023. PTNK is more stable with positive ROI, from 8% in 2018 to 7% in 2022. Abipraya is consistently above 10% each year, although data for 2023 is unavailable

4.3.3 Current Ratio

Table 4.3 Current Ratio

Current Ratio (%)						
	2018	2019	2020	2021	2022	2023
ADHI	134	124	111	102	120	114
PTPP	141	137	121	112	121	116
WIKA	154	139	109	101	110	80
WSKT	118	109	67	156	158	99
PTHK	87	101	55	106	205	227
PTNK	123	120	125	117	118	-
Abipraya	129	126	134	124	120	-

Source: Author, 2024

This table shows the Current Ratio of seven construction companies from 2018 to 2023. The Current Ratio measures a company's ability to meet its short-term obligations with its current assets. ADHI decreased from 134% in 2018 to 114% in 2023, reflecting a moderate improvement in liquidity. PTPP remained stable, although it fell from 141% in 2018 to 116% in 2023. WIKA dropped significantly from 154% in 2018 to 80% in 2023, indicating a decline in the ability to meet short-term obligations. WSKT fluctuated from 118% in 2018, fell to 67% in 2020, then rose to 158% in 2022, and dropped again to 99% in 2023. PTHK declined to 55% in 2020, then significantly increased to 227% in 2023. PTNK was stable with slightly fluctuating ratios from 123% in 2018 to 118% in 2022, with no data available for 2023. Abipraya remained stable from 129% in 2018 to 120% in 2022, also without data for 2023. These companies generally have adequate capabilities to meet their short-term obligations, although some need to improve their liquidity managemen.

4.3.4 Cash Ratio

Table 4.4 Cash Ratio

Cash Ratio (%)						
	2018	2019	2020	2021	2022	2023
ADHI	13	11	8	10	15	16
PTPP	23	22	22	20	17	13
WIKA	32	23	31	19	14	10
WSKT	116	19	4	31	7	6
PTHK	31	38	50	75	82	79
PTNK	12	11	6	12	16	-
Abipraya	31	31	29	34	30	-

Source: Author, 2024

The table presents the Cash Ratio for seven construction companies from 2018 to 2023. The Cash Ratio is a liquidity metric that measures a company's ability to pay off its short-term liabilities with its cash and cash equivalents. ADHI's Cash Ratio slightly declined from 13% in 2018 to 8% in 2020, then gradually improved to 16% in 2023, indicating modest enhancement in cash liquidity. PTPP maintained relatively stable cash ratios, with a slight drop from 23% in 2018 to 13% in 2023, reflecting consistent but diminishing cash reserves. WIKA experienced fluctuations, peaking at 32% in 2018 but decreasing to 10% in 2023, indicating a reduction in cash available to cover short-term liabilities. WSKT's ratio shows significant volatility, dropping to 4% in 2020 but rising to 31% in 2021 before declining to 6% in 2023, suggesting inconsistent cash management. PTHK's ratio significantly improved from 31% in 2018 to 75% in 2021 and slightly decreased to 79% in 2023, demonstrating strong cash liquidity. PTNK's ratio remained relatively low and stable, fluctuating around 12%, with data unavailable for 2023. Abipraya maintained consistent cash liquidity, around 31% to 34%, though data for 2023

is missing. Overall, these companies show varying levels of cash liquidity, with PTHK and Abipraya demonstrating stronger cash positions compared to others like WIKA and WSKT, which indicate potential challenges in cash management.

4.3.5 Collection Period

Table 4.5 Collection Period

Collection Period (Days)						
	2018	2019	2020	2021	2022	2023
ADHI	78	93	101	86	80	124
PTPP	149	159	82	117	111	123
WIKA	63	60	48	46	48	54
WSKT	28	41	80	87	45	55
PTHK	7	21	17	10	9	15
PTNK	18	18	14	10	7	-
Abipraya	40	52	66	89	83	-

Source: Author, 2024

The table shows the Collection Period for seven construction companies from 2018 to 2023. The Collection Period, measured in days, indicates how long it takes for a company to collect payments from its customers. ADHI's collection period increased from 78 days in 2018 to 124 days in 2023, indicating a slower collection process. PTPP's period fluctuated, peaking at 159 days in 2019 and reducing to 82 days in 2020, before rising again to 123 days in 2023, reflecting inconsistency in payment collection. WIKA consistently decreased its collection period from 63 days in 2018 to 46 days in 2021 but increased slightly to 54 days in 2023, showing improved but variable efficiency in collecting receivables. WSKT's period saw significant fluctuations, starting at 28 days in 2018, peaking at 87 days in 2021, and then decreasing to 55 days in 2023. PTHK maintained a relatively short and stable collection period, around 10 days, although it increased slightly to 15 days in 2023. PTNK's period was short and decreased from 18 days in 2018 to 7 days in 2022, showing efficient collection practices, with no data for 2023. Abipraya experienced variability, from 40 days in 2018 to 89 days in 2021, but data for 2023 is missing. Overall, the data indicates varied efficiency in collection practices across these companies, with some showing significant improvement while others, like ADHI and PTPP, facing challenges in reducing their collection periods

4.3.6 Total Asset Turnover

Table 4.6 Total Asset Turnover

Total Asset Turnover (%)						
	2018	2019	2020	2021	2022	2023
ADHI	52	42	28	29	34	50
PTPP	48	42	30	30	33	35
WIKA	53	44	24	164	28	34
WSKT	39	26	15	12	16	11
PTHK	41	29	21	15	15	16
PTNK	109	95	66	90	83	-
Abipraya	89	58	38	38	50	-

Source: Author, 2024

The table provides the Total Asset Turnover ratios for seven construction companies from 2018 to 2023. The Total Asset Turnover ratio measures a company's efficiency in using its assets to generate sales revenue, expressed as a percentage. ADHI's ratio decreased from 52% in 2018 to a low of 28% in 2020 but improved to 50% in 2023, indicating a gradual recovery in asset utilization. PTPP maintained relatively stable performance, with a slight drop from 48% in 2018 to 30% in 2020, and a moderate recovery to 35% in 2023. WIKA showed significant variability, peaking at 164% in 2021, indicating very efficient asset use that year, but falling back to 34% by 2023. WSKT's ratio dropped steadily from 39% in 2018 to a low of 11% in 2023, reflecting declining asset efficiency. PTHK's ratio also declined from 41% in 2018 to 15% in 2021 but showed a slight recovery to 16% in 2023. PTNK maintained high efficiency, though it fluctuated, starting at 109% in 2018, dropping to 66% in 2020, and slightly increasing to 83% by 2022. Abipraya's ratio decreased from 89% in

2018 to 38% in 2021, recovering to 50% in 2022, with no data available for 2023. Overall, the table reflects varied levels of asset utilization efficiency among these companies, with some like WIKA and PTNK showing significant fluctuations, while others like ADHI and PTPP exhibit more consistent but lower performance.

4.3.7 Total Inventory Turnover

Table 4.7 Total Inventory Turnover

Total Inventory Turnover (Days)						
	2018	2019	2020	2021	2022	2023
ADHI	102	114	213	236	188	103
PTPP	68	94	220	238	196	189
WIKA	70	92	217	224	204	185
WSKT	38	52	95	130	102	140
PTHK	5	12	13	17	12	7
PTNK	7	11	15	19	25	-
Abipraya	14	29	32	28	15	-

Source: Author, 2024

Total Inventory Turnover measures the average number of days it takes for a company to sell its entire inventory. ADHI's turnover period increased significantly from 102 days in 2018 to 236 days in 2021, indicating a slower inventory turnover, but it improved to 103 days in 2023, reflecting better efficiency. PTPP also saw an increase from 68 days in 2018 to a peak of 238 days in 2021, with a slight improvement to 189 days in 2023. WIKA's turnover period similarly increased from 70 days in 2018 to 224 days in 2021 and then improved to 185 days in 2023. WSKT's turnover period rose from 38 days in 2018 to 130 days in 2021, before increasing further to 140 days in 2023, indicating slower inventory movement. PTHK maintained a low turnover period, although it rose slightly from 5 days in 2018 to 17 days in 2021, before decreasing to 7 days in 2023, showing efficient inventory management. PTNK had a stable turnover period with a slight increase from 7 days in 2018 to 19 days in 2021, with no data available for 2023. Abipraya's turnover period increased from 14 days in 2018 to 32 days in 2020, but it decreased to 15 days in 2022, with no data for 2023. Overall, the table indicates that most companies experienced a slower inventory turnover in the middle years but saw some improvement toward the end of the period. However, companies like PTHK and PTNK showed consistently efficient inventory management.

4.3.8 Total Equity to Total Asset

Table 4.8 Total Equity to Total Asset

Total Equity to Total Asset (%)						
	2018	2019	2020	2021	2022	2023
ADHI	21	19	15	14	22	23
PTPP	31	29	26	26	26	27
WIKA	29	31	24	160	23	15
WSKT	23	24	16	15	15	12
PTHK	16	25	28	41	55	69
PTNK	27	28	28	33	31	-
Abipraya	30	29	25	25	23	-

Source: Author, 2024

The table presents the Total Equity to Total Asset ratio for seven construction companies from 2018 to 2023. This ratio measures the proportion of a company's assets that are financed by shareholders' equity, indicating financial stability and leverage. ADHI's ratio declined from 21% in 2018 to 14% in 2021, suggesting increased reliance on debt financing, but it improved to 23% by 2023. PTPP maintained a stable ratio around 26-31%, indicating a consistent balance between equity and debt financing. WIKA showed a dramatic peak at 160% in 2021, which might reflect an unusual financial restructuring or asset revaluation, before dropping back to 15% in 2023, indicating high volatility in its financial structure. WSKT's ratio decreased from 23% in 2018 to 12% in 2023, showing a significant shift towards debt financing. PTHK's ratio improved significantly from 16% in 2018 to 69% in 2023, reflecting increased financial stability and lower reliance on debt. PTNK maintained a stable ratio around 27-33%, indicating consistent financial leverage, although data for 2023 is

missing. Abipraya's ratio remained relatively stable around 23-30%, showing a balanced use of equity and debt, with no data for 2023. Overall, the table highlights varying degrees of financial leverage among these companies, with some, like PTHK, showing improved equity financing, while others, like WSKT, increasingly rely on debt.

4.4 Financial Health Analysis

Tabel 4.9 Financial Health ADHI, PTPP, WIKA, WSKT

Company	2018	2019	2020	2021	2022	2023
ADHI	28	38	22	19	15	13
	40%	54%	31%	27%	21%	19%
	B	BBB	B	CCC	CCC	CC
	Less Healthy	**Less Healthy**	**Less Healthy**	**Unhealthy**	**Unhealthy**	**Unhealthy**
PTPP	40	29	16	16	20	12
	57%	41%	23%	23%	29%	17%
	BBB	BB	CCC	CCC	CCC	CC
	Less Healthy	**Less Healthy**	**Unhealthy**	**Unhealthy**	**Unhealthy**	**Unhealthy**
WIKA	25	50	21	35	15	16
	36%	71%	30%	50%	21%	23%
	B	A	CCC	BB	CCC	CCC
	Less Healthy	**Healthy**	**Unhealthy**	**Less Healthy**	**Unhealthy**	**Unhealthy**
WSKT	46	24	11	20	22	19
	66%	34%	16%	29%	31%	27%
	A	B	CC	CCC	B	CCC
	Healthy	**Less Healthy**	**Unhealthy**	**Unhealthy**	**Less Healthy**	**Unhealthy**

Source: Author, 2024

This table presents a comparison of the financial health of four Indonesian construction companies from 2018 to 2023, showing a significant declining trend across all metrics. ADHI, PTPP, WIKA, and WSKT all experienced declines in numerical scores, financial health percentages, credit ratings, and health classifications from "Less Healthy" to "Unhealthy." For example, ADHI shows a reduction in score from 28 to 13 and a downgrade from a B to CC rating, while PTPP dropped from 40 to 12 with a rating decline from BBB to CC. WIKA and WSKT followed similar patterns, reflecting the increasing financial difficulties these companies faced over the period. This trend highlights the rising financial stress and challenges faced by the Indonesian construction industry in maintaining financial stability in recent years.

Tabel 4.10 Financial Health PTHK, PTNK, Abipraya

Company	2018	2019	2020	2021	2022	2023
PTHK	49	46	28	33	35	40
	70%	66%	40%	46%	50%	56%
	A	A	B	BB	BB	BBB
	Healthy	**Healthy**	**Less Healthy**	**Less Healthy**	**Less Healthy**	**Less Healthy**
PTNK	54.25	49.25	36.75	43	46.5	-
	78%	70%	53%	61%	66%	-
	A	A	BBB	BBB	A	-
	Healthy	**Healthy**	**Less Healthy**	**Less Healthy**	**Healthy**	-
Abipraya	66	65	42	44	49	-
	95%	93%	60%	63%	70%	-
	AA	AA	BBB	BBB	A	-
	Healthy	**Healthy**	**Less Healthy**	**Less Healthy**	**Healthy**	-

Source: Author, 2024

The table displays the financial health over six years (2018-2023) of three companies: PTHK, PTNK, and Abipraya. For PTHK, the numerical score shows fluctuation, beginning at 49 in 2018, dropping to 28 in

2020, then gradually increasing to 40 by 2023. The financial health percentage follows a similar trend, decreasing initially but recovering to 56% in 2023. The company's credit rating and health classification remain relatively stable with a slight decrease in healthiness over time. PTNK starts with a score of 54.25 and experiences a decrease until 2021, then stabilizes slightly higher in 2022. Its percentage and credit rating display a modest recovery post-2020 downturn, while its health status dips and returns to 'Healthy' in 2022. Abipraya, beginning with the strongest financial metrics among the three, shows a marked decline in both numerical score and percentage by 2020 but stabilizes at healthier levels than the other companies by 2023. Its credit rating declines from AA to A with a varying health classification but remains relatively strong. Overall, each company exhibits initial declines in financial health with partial recoveries by the end of the observed period, reflecting the challenges and recoveries within their financial management strategies.

4.5 Financial Distress Analysis

Table 4.11 Financial Distress

Financial Distress						
Company	2018	2019	2020	2021	2022	2023
ADHI	1.12	0.93	0.58	0.47	0.69	0.76
	Grey Zone	**Distress Zone**	**Distress Zone**	**Distress Zone**	**Grey Zone**	**Distress Zone**
PTPP	1.16	1.03	0.69	0.59	0.65	0.59
	Grey Zone	**Distress Zone**	**Distress Zone**	**Distress Zone**	**Distress Zone**	**Distress Zone**
WIKA	1.31	1.23	0.62	2.41	0.47	-0.02
	Grey Zone	**Grey Zone**	**Distress Zone**	**Grey Zone**	**Distress Zone**	**Distress Zone**
WSKT	0.90	0.56	-0.20	0.29	0.22	-0.15
	Distress Zone	**Distress Zone**	**Distress Zone**	**Distress Zone**	**Distress Zone**	**Distress Zone**
PTHK	0.70	0.65	0.22	0.54	1.04	1.73
	Distress Zone	**Distress Zone**	**Distress Zone**	**Distress Zone**	**Distress Zone**	**Grey Zone**
PTNK	1.78	1.63	1.26	1.59	1.50	-
	Grey Zone	**Grey Zone**	**Grey Zone**	**Grey Zone**	**Grey Zone**	-
Abipraya	1.86	1.45	0.98	0.98	1.09	-
	Grey Zone	**Grey Zone**	**Grey Zone**	**Distress Zone**	**Grey Zone**	-

Source: Author, 2024

The table provides an overview of the financial distress levels experienced by several companies from 2018 to 2023, indicating a significant fluctuation in financial stability. For ADHI, the scores generally declined, indicating worsening conditions as they moved frequently into the "Distress Zone" after 2019. PTPP and WSKT consistently remained in the "Distress Zone" after initial appearances in 2019 and 2020 respectively, highlighting ongoing financial challenges. WIKA exhibited a sudden increase in 2021 but deteriorated sharply afterward, entering the "Distress Zone" by 2023. PTHK and PTNK fluctuated between "Distress" and "Grey Zones," suggesting periodic financial stress. Abipraya, initially starting strong, witnessed a decline into the "Distress Zone" by 2021, stabilizing slightly in 2022 but still within challenging zones. Overall, the data reflects a pattern of financial instability with varying degrees of severity across these companies, emphasizing the volatile nature of their economic environments.

4.6 Business Solutions

A. Debt Restructuring

Debt restructuring is a vital approach for companies in financial distress, where renegotiating terms with creditors can significantly alleviate financial burdens. This may include extending repayment periods, reducing interest rates, or partial debt forgiveness. Additionally, converting debt into equity is another strategic move. This not only decreases immediate financial obligations by replacing them with equity but also aligns the interests of creditors with the long-term success of the company, thus improving its financial stability and credit profile.

B. Asset Management

Effective asset management involves identifying and liquidating unproductive assets to free up capital and streamline operations. This strategy enhances liquidity and focuses the company's efforts on its core business areas. Further, the proceeds from these sales can be reinvested into more profitable ventures, thereby boosting operational efficiency and revenue. This strategic cycle of selling and reinvesting aids in maintaining a healthy balance sheet and fostering sustainable growth.

C. Aggressive Sales and Marketing Strategies

Implementing aggressive sales and marketing strategies is crucial for capturing opportunities in strategic government projects. This includes strengthening company branding through digital marketing, developing robust government relations, and participating in public-private partnerships. Such strategies enhance visibility and credibility among stakeholders, improving the company's chances of securing lucrative contracts and establishing itself as an industry leader.

D. Improving Cash Flow

Improving cash flow is paramount for maintaining the financial health of a company. Strategies like better receivables management, which involves implementing strict credit policies and efficient invoicing systems, help in accelerating cash inflows. Simultaneously, inventory optimization through just-in-time practices and regular assessments ensures that resources are not tied up unnecessarily, thus preserving liquidity and operational flexibility.

V. CONCLUSION

The financial performance and health of Indonesian state-owned construction companies from 2018 to 2023 depict varying degrees of stability and distress. Companies like PT Adhi Karya and PT Pembangunan Perumahan have experienced a decline in profitability and liquidity, indicating significant financial challenges. In contrast, PT Hutama Karya and PT Nindya Karya show signs of financial recovery and robust health. Other companies, such as PT Wijaya Karya and PT Waskita Karya, display high volatility in financial metrics, suggesting ongoing financial distress largely due to high leverage and operational inefficiencies.

VI. RECOMMENDATIONS

As the construction sector continues to evolve in response to economic, political, and technological changes, the need for effective, forward-looking recommendations becomes increasingly crucial. Recommendation aims to provide strategic guidance to enhance government policies, management practices, and future research directions, addressing specific challenges that have been identified throughout the industry. Each recommendation is designed to build on the sector's strengths and address its vulnerabilities, fostering a more robust, efficient, and sustainable construction industry in Indonesia.

For Indonesian Government:

A. Streamlining regulatory procedures is essential to reduce the complexity and duration of permitting processes, which currently hinder project initiation and completion in the construction sector. The government should focus on reducing the number of required permits and processing times, which can significantly accelerate project timelines and lower costs. Implementing digital platforms for permit applications can further enhance transparency, reduce administrative burdens, and improve overall efficiency in the regulatory process.
B. Corruption continues to be a significant barrier in the construction industry, leading to increased project costs and delays. To combat this, the government should implement stringent anti-corruption measures that enhance transparency in bidding and project implementation. This includes establishing more rigorous monitoring mechanisms and imposing stricter penalties for corrupt practices. By doing so, the government can create a fairer and more competitive business environment, ultimately benefiting the construction sector and the economy.
C. Political instability and frequent policy changes create significant uncertainty for investors in the construction sector. To mitigate this, the government should establish a stable policy framework that ensures consistent implementation of infrastructure policies, regardless of political changes. Developing long-term infrastructure plans with bipartisan support can help reassure investors and encourage sustained investment, fostering a more predictable and supportive environment for infrastructure development.

For Companies Management:

A. High financial leverage and liquidity issues present significant risks to the construction sector. To mitigate these risks, management should focus on strengthening financial stability by reducing debt levels, enhancing equity financing, and ensuring adequate liquidity. Regularly reviewing and adjusting financial strategies to align with market conditions and company goals will help create a more resilient financial foundation, capable of weathering economic fluctuations and supporting long-term growth.
B. Operational inefficiencies, such as fluctuations in asset utilization and inventory management, can hinder a company's performance. To address this, management should implement robust project management practices that optimize resource allocation and improve asset turnover. Regularly monitoring operational performance metrics and making data-driven adjustments will enhance efficiency, leading to better project outcomes and improved overall performance.
C. Limited resources and capabilities can significantly hinder project success. To overcome these limitations, management should form strategic partnerships with other companies, government agencies, and research institutions. These partnerships can facilitate knowledge sharing, resource pooling, and the exchange of expertise, leading to improved project outcomes and fostering innovation within the construction sector.

For Indonesian Academicians:

A. The construction industry requires more sustainable approaches to mitigate its environmental impact. Future research should investigate sustainable construction practices, including the use of green materials, effective waste management, and energy-efficient building techniques. Analyzing the cost-benefit ratio and long-term benefits of these practices will support the development of strategies that balance environmental sustainability with economic viability.
B. Regulatory changes frequently create uncertainty and impact project execution in the construction industry. Future research should examine the effects of recent regulatory changes, such as the Omnibus Law and land use regulations, on the industry's performance. Understanding how these changes influence project costs, timelines, and investment decisions will help stakeholders navigate regulatory landscapes more effectively and mitigate associated risks.
C. There is a limited understanding of the broader economic impacts of large-scale infrastructure projects. Future research should assess the economic impact of National Strategic Projects (PSN) on local and national economies, focusing on job creation, regional development, and overall economic growth. Evaluating the return on investment and the socio-economic benefits of these projects will provide critical insights for future infrastructure planning and policy development.

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