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CARBON EMISSION DISCLOSURE, INTELLECTUAL CAPITAL, CAPITAL STRUCTURE ON FINANCIAL PERFORMANCE AND FIRM VALUE

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ABSTRACT

Purpose: The purpose of this study was to determine the effect of Carbon Emission Disclosure, Intellectual Capital, Capital Structure on Financial Performance and Firm Value.

Methodology/approach: The research method used for this study is quantitative method. The method analysis of this study is multiple linear regression using SPSS 26.

Findings: The results show that Carbon Emission Disclosure has a significant effect on Financial Performance and Firm Value, Intellectual Capital has no effect on Financial Performance and Firm Value, Capital Structure has a significant effect on Financial Performance and Firm Value.

Practical implications: This study provides implications for companies as material for consideration and knowledge of the factors that can influence Financial Performance and Firm Value.

Originality/value: The originality of this study is to combine Carbon Emissions Disclosure, Intellectual Capital, and Capital Structure with Financial Performance and Firm Value. Using five years of data and the latest SPSS analysis, this study uniquely focuses on Indonesian companies in the context of local regulations, thus providing fresh and comprehensive insights

Keywords: Carbon Emission Disclosure; Capital Structure; Financial Performance; Firm Value; Intellectual Capital

ABSTRAK

Tujuan penelitian: *Tujuan penelitian ini adalah untuk mengetahui pengaruh Carbon Emission Disclosure, Intellectual Capital, Struktur Modal terhadap Kinerja Keuangan dan Nilai Perusahaan.*

Metode/pendekatan: *Metode penelitian yang digunakan untuk penelitian ini adalah metode kuantitatif. Metode analisis dari penelitian ini adalah regresi linier berganda dengan menggunakan SPSS 26.*

Hasil: *Hasil penelitian menunjukkan bahwa Carbon Emission Disclosure berpengaruh signifikan terhadap Kinerja Keuangan dan Nilai perusahaan, Intellectual Capital tidak berpengaruh terhadap Kinerja Keuangan dan Nilai Perusahaan, Struktur Modal berpengaruh signifikan terhadap Kinerja Keuangan dan Nilai Perusahaan*

Implikasi praktik: *Penelitian ini memberikan implikasi bagi perusahaan sebagai bahan pertimbangan dan pengetahuan mengenai faktor-faktor yang dapat mempengaruhi Kinerja Keuangan dan Nilai Perusahaan.*

Orisinalitas/kebaharuan: *Orisinilitas penelitian ini adalah menggabungkan Pengungkapan Emisi Karbon, Modal Intelektual, dan Struktur Modal dengan Kinerja Keuangan dan Nilai Perusahaan. Dengan menggunakan data selama lima tahun dan analisis SPSS terbaru, penelitian ini secara unik berfokus pada perusahaan-perusahaan di Indonesia dalam konteks peraturan lokal, sehingga memberikan wawasan yang segar dan komprehensif.*

Kata kunci: *Carbon Emission Disclosure; Capital Structure; Financial Performance; Firm Value; Intellectual Capital*

INTRODUCTION

The main objective of a company is to enhance its financial performance, as this reflects its financial success. Strong financial performance typically leads to greater benefits for shareholders. Nevertheless, alongside business expansion, various environmental challenges have emerged, with climate change being a major concern. Since the industrial revolution in 1850, the growing reliance on fossil fuels has been a leading contributor to greenhouse gas emissions, which play a significant role in driving climate change (Ratmono et al., 2021).

In Indonesia, carbon emission disclosure has not been widely adopted by companies because it is still voluntary(Witri Astiti & Wirama, 2020). Additionally, many companies perceive the costs associated with disclosing carbon emissions as an extra financial burden, which leads

to a lack of comprehensive reporting on their emissions (Meiyana & Aisyah, 2019). Driven by the pursuit of capital and maximum profit, some companies continue to overlook the environmental and social impacts of their production processes (Meiyana & Aisyah, 2019). However, disclosing carbon emissions can build trust among shareholders and the public by showing that the company is capable of reducing or even eliminating the negative environmental effects caused during its operations. As a result, consumers are more likely to continue purchasing the company's products, leading to more stable or even increased profitability.

The Global Carbon Project's latest report indicates that global carbon emissions in 2022 remained at record-high levels, and in 2021, Indonesia was ranked 10th among the world's largest carbon emitters (Ismoyo, 2022). Although Indonesia has pledged to cut carbon emissions by 26% by 2020, equivalent to around 0.67 gigatons, the implementation of this commitment has been weak. This is largely due to the fact that carbon emission disclosure remains voluntary, resulting in inconsistent reporting practices among companies (Ratmono et al., 2021). This study adopts legitimacy theory as the foundation for carbon emission disclosure. Legitimacy theory aims to safeguard a company's value from unforeseen events, particularly those arising from gaps in value perceptions or legitimacy (Ratmono et al., 2021). One approach to bridging these legitimacy gaps is through environmental reporting (Perera et al., 2019). In this context, the study uses legitimacy theory to show how companies demonstrate social responsibility by voluntarily disclosing their carbon emissions. According to the theory, organizations are integral parts of society and must therefore adhere to prevailing social norms. Previous studies have yielded mixed results regarding the impact of carbon emission disclosure on financial performance. Research by (Emmanuel et al., 2023; Khairunisa & Pohan, 2022) found a positive relationship between carbon emission disclosure and financial performance. Conversely, (Bedi & Singh, 2024) reported a negative effect, while (Situmorang & Yanti, 2020) concluded that carbon emission disclosure has no significant impact on profitability, one of the key indicators of financial performance.

Apart from Carbon Emission Disclosure, another factor that can influence a company's financial performance is intellectual capital. Intellectual capital provides essential information for investors to evaluate a company's capabilities. In the era of the Fourth Industrial Revolution, rapid advancements in technology and information have intensified business competition, pushing companies to innovate in order to survive. As technology continues to evolve, business owners are becoming increasingly aware of the critical role intellectual capital plays in enhancing financial performance and building competitive advantages. When managed effectively, intellectual capital can generate added value for the company. In Indonesia, awareness of intellectual capital emerged following the issuance of PSAK No. 19 (revised 2011) concerning intangible assets. Despite this, the application of intellectual capital in Indonesian companies remains limited, and research on the subject is still relatively new (Chandra & Agnes, 2021). Nonetheless, intellectual capital is crucial for achieving strong financial performance, as it allows key resources—such as human talent and technology—to be utilized more efficiently and effectively. According to Resource-Based Theory, intellectual capital qualifies as a unique resource capable of creating a competitive edge, thus contributing to value creation and serving as a foundation for strategic initiatives aimed at improving a company's financial performance (Wijayani, 2017). Empirical evidence from Febriany (2019) supports the idea that intellectual capital positively impacts financial performance. However, this finding contrasts with research by Wijayani (2017), which found no significant effect of intellectual capital on financial performance as measured by return on assets (ROA).

Another factor that can influence financial performance, in addition to Carbon Emission Disclosure and Intellectual Capital, is capital structure. Capital structure represents a critical decision for financial managers, as it plays a key role in maximizing company profits and enhancing financial performance. Since business operations inherently rely on capital, securing adequate funding becomes a fundamental aspect of running a business. Companies require capital, and one of the main challenges lies in determining the source of that capital—whether it comes from internal or external providers (Tambunan & Prabawani, 2018). To meet capital needs, businesses may turn to long-term loans or issue new shares. These sources of funding are often used to support plans for expanding production capacity, which typically involves long-term debt (Romadhoni & Sunaryo, 2017). Thus, capital structure refers to the proportion between long-term debt and equity within a company.

The capital structure in this study is measured using the Debt to Equity Ratio (DER), which reflects the level of financial risk within a company. A higher DER indicates a greater reliance on debt financing compared to equity, thus signaling higher financial risk (Widyantari & Yadnya, 2017). Capital structure plays a vital role in financial decision-making, where financial managers must determine the most appropriate structure to achieve optimal financial performance. The capital structure influences the cost of capital—the cost that a company must pay to those who invest their funds in the business. According to research by Ningsih & Utami (2020) DER significantly impacts a company's financial performance. Conversely, (Ritonga et al., 2021) found that DER has a negative and insignificant effect on return on assets (ROA).

In addition to financial performance, firm value reflects investor perceptions of how well management operates the company. A higher firm value indicates not only trust in the company's current performance but also confidence in its future prospects. Maximizing firm value is essential, as it aligns with the goal of increasing shareholder wealth, which is the core objective of any company (Kurniasih & Ruzikna, 2017). Firm value is often associated with stock prices, where a higher stock price implies a higher company valuation.

Carbon Emission Disclosure is one factor that can influence firm value, as it serves as an indicator of a company's commitment to addressing global warming caused by greenhouse gas emissions during operations. Such disclosures can reassure investors about the company's low investment risk, potentially boosting stock prices and, consequently, firm value. Based on signaling theory Darussalam & Herawaty (2019) , companies send signals to investors about management's outlook through disclosures. Transparent environmental reporting enhances the reliability of company reports, generating a positive response from investors who are more likely to invest in companies with consistent environmental transparency (Kelvin et al., 2017). Rahmanita (2020) also concluded that Carbon Emission Disclosure has a positive and significant effect on firm value. However, this finding contrasts with studies by (Najah, 2012 ; Zuhrufiyah & Anggraeni, 2019) , which found that disclosures made through the Carbon Disclosure Project had no impact on firm value.

In Intellectual Capital, as disclosed in annual reports, can also influence firm value. In today's highly competitive, globalized, and technologically advanced environment, companies are forced to adapt and revise their business strategies. Afrianita (2021), notes that businesses have shifted from labor-based models to knowledge-based operations, highlighting the strategic role of Intellectual Capital in creating added value. According to Resource-Based Theory, companies can achieve and sustain a competitive edge through valuable, rare, inimitable, and non-substitutable resources Purnomo (2011) This theory emphasizes the efficient and effective management of resources to drive competitive advantage. Skilled

resources enable companies to outperform competitors and achieve superior performance. Research by Utami (2020) found that Intellectual Capital does not influence firm value, while (Devi et al., 2017) reported a positive and significant relationship between Intellectual Capital disclosure and firm value.

Capital structure is another factor that can influence firm value, in addition to Carbon Emission Disclosure and Intellectual Capital. This can be illustrated by the decline in the average stock prices of companies listed in the LQ45 index during the period from July to September 2017, which was reportedly triggered by capital outflows. Nevertheless, financial performance data released by companies for the first half of 2017 also played a role in the movement of LQ45 stock prices, making the decline appear justifiable (Putri, 2017) A similar event occurred from October 10 to 13, 2022, when foreign investors withdrew approximately IDR 4.22 trillion from the Indonesian capital market, causing the rupiah to depreciate by 0.9% (Kurniawan, 2022). These occurrences indirectly impact firm value, as it is often assessed through stock price fluctuations in the capital market—movements that can be influenced by investment outflows linked to capital structure decisions. Previous studies have shown mixed findings regarding the impact of capital structure on firm value. For example, (Amro & Asyik, 2021) found that capital structure does have an effect on firm value, while other studies by (Oktaviani et al., 2019 ; Irawan & Nurhadi, 2019 ; Oktrima, 2017) concluded that capital structure has no significant influence on firm value.

Therefore, this study aims to examine whether Carbon Emission Disclosure, Intellectual Capital, and Capital Structure influence financial performance, as measured by Return on Assets (ROA), and firm value, as measured by Price to Book Value (PBV). The novelty of this research compared to previous studies lies in the inclusion of additional independent variables (Intellectual Capital and Capital Structure) as well as the dependent variable (Firm Value). Moreover, this study uses more recent data over a longer period—spanning five years—and employs SPSS as the analytical tool. This research extends the study conducted by (Khairunisa & Pohan, 2022) by incorporating new variables into the analysis..

Khairunisa & Pohan (2022) found that Carbon Emission Disclosure significantly impacts financial performance, as indicated by Return on Sales (ROS). In contrast, (Situmorang & Yanti, 2020) reported that carbon emission disclosure does not influence profitability, a key indicator of a company's financial performance. Febriany (2019) demonstrated that Intellectual Capital positively affects financial performance, whereas Wijayani (2017) found no significant relationship between Intellectual Capital and ROA. Furthermore, Ningsih & Utami (2020) concluded that the Debt to Equity Ratio (DER) significantly influences financial performance, while (Ritonga et al., 2021) found that DER has a negative and statistically insignificant effect on ROA.

Previous research by Lee & Cho (2023) also concluded that Carbon Emission Disclosure has a significantly positive effect on firm value. In the Indonesian context, such disclosure enhances firm value by offering a competitive advantage. However, in Australia, the same practice does not yield a significant impact due to the high associated costs, which increase company expenses and reduce cash flow. Furthermore, carbon emission disclosure in Indonesia remains largely voluntary and is still not widely adopted (Kurnia et al.,2021). Both international and regional studies support the view that carbon emissions negatively affect firm value. For instance, research by Saka & Oshika (2014) found a negative correlation between carbon emissions and market equity value, while carbon management disclosures were positively associated with firm value. Notably, this positive effect was more pronounced in companies with higher emission levels. On the other hand, studies by (Najah, 2012 ;

Zuhrufiyah & Anggraeni, 2019) present contrasting findings, suggesting that Carbon Emission Disclosures submitted through the Carbon Disclosure Project do not significantly influence firm value.

The study conducted by Utami (2020) found that Intellectual Capital had no significant impact on firm value. In contrast, other research, such as that by (Devi et al., 2017) ; Çam & Özer, 2022) , indicated that Intellectual Capital (IC) disclosure has a positive and significant effect on firm value. However, the study by Çam & Özer, 2022), faced certain limitations—many companies failed to disclose sufficient information related to IC, resulting in limited data availability for analysis. This constraint affected the precision of measurement and the interpretation of the findings. Similarly, previous studies have reported mixed results regarding the influence of capital structure on firm value. For example, research by Amro & Asyik (2021) and Almahadin & Oroud (2020) concluded that capital structure has a significant effect on firm value. Meanwhile, other studies by (Oktaviani et al., 2019 ; Irawan & Nurhadi, 2019 ; Oktrima, 2017) found no such effect. A notable limitation of the study by Almahadin & Oroud (2020) was its sample, which consisted solely of 213 companies listed on the Amman Stock Exchange (ASE) during the 2013–2017 period. This limited scope may not accurately represent conditions in other sectors or countries, making the results less applicable to different markets or economies. To address these limitations, the current study focuses on the food and beverage industry, where companies have demonstrated a relatively high level of Intellectual Capital disclosure. According to (Boedi et al., 2022) , the disclosure rate in this sector is 78.6%, indicating a stronger commitment to transparency regarding IC-related information.

Current research on the factors affecting carbon emission disclosure and financial performance has produced mixed results, which serves as one of the motivations for this study. Carbon emission disclosure is seen as a strategy to gain public trust and legitimacy. Such transparency can foster greater confidence and legitimacy in financial decision-making, in contrast to the hidden costs of environmental degradation Emmanuel et al., 2023. According to research by Kelvin et al., (2017) , carbon emission disclosure—such as reporting total energy consumption and the use of renewable energy—offers substantial benefits not only for the preservation of natural ecosystems and the quality of life for present and future generations, but also for the sustainability of companies. Organizations with strong environmental management practices tend to gain greater trust from shareholders and consumers. Legitimacy theory suggests that organizations are embedded within society and must therefore align with its social norms (Khairunisa & Pohan, 2022). This theory implies that companies are driven to ensure their actions are publicly accepted. When companies face legitimacy challenges, they are more likely to increase disclosure to demonstrate their commitment to sustainability, thereby maintaining their legitimacy Emmanuel et al., 2023. Adopting environmentally friendly practices also provides a competitive edge and attracts investor interest (Okpala & Iredele, 2019). In line with this theory, companies are encouraged to uphold values and norms that are socially acceptable, helping to build customer loyalty and, in turn, increase profitability and financial performance.

Supporting this view, research by

Marietza & Hatta (2021) found that Carbon *Emission Disclosure* has a positive and significant impact on Financial Performance, as measured by

H1 : *Carbon Emission Disclosure* affects financial performance.

Both tangible and intangible assets are recognized as potential strategic resources. The resource-based view highlights the value of these assets, emphasizing their role in contributing to a company's competitive advantage (Riahi-Belkaoui, 2003). Intellectual Capital refers to the unique and valuable knowledge within an organization. Its classification as a strategic asset stems from its potential impact on company performance. As the capabilities of human resources improve, companies are expected to experience better performance, which in turn can lead to increased profitability. This aligns with Resource-Based Theory, which focuses on how companies can effectively and efficiently manage their internal resources to gain a competitive edge (Febriany, 2019). A higher level of Intellectual Capital is believed to enhance a company's financial performance, driven by the strength of its competitive advantage. These findings are consistent with the studies by (Wijayani, 2017 ; Febriany, 2019), both of which concluded that Intellectual Capital has a positive influence on Return on Assets (ROA).

H2 : *Intellectual Capital* (IC) affects financial performance.

The ability of management to effectively balance the capital structure—whether through external sources such as debt or internal financing—plays a crucial role in influencing a company's financial performance (Rahman, 2020). According to the Trade-Off Theory, companies weigh the tax advantages of debt financing against the potential costs of financial distress or bankruptcy (Brigham & Houston, 2010). Companies that completely avoid debt or rely solely on it for operations are often viewed unfavorably. Within the framework of Trade-Off Theory, if a company's capital structure is below the optimal level, taking on additional debt can enhance firm value. However, once the structure exceeds the optimal point, further debt will negatively affect the company's value (Ariawan & Solikahan, 2022). Therefore, the most effective strategy involves balancing both types of financing. Strong management performance in efficiently managing capital structure leads to improved financial outcomes for the company.This is supported by research from (Ningsih & Utami, 2020) , which found that capital structure, as measured by the Debt to Equity Ratio (DER), significantly affects financial performance (ROA). Similarly, findings from Samour et al. (2024) offer valuable insights for policymakers, highlighting the importance of developing capital structure strategies that benefit both companies and their shareholders.

H3 : Capital structure affects financial performance.

Carbon Emission Disclosure not only impacts financial performance but also influences firm value. This aligns with signaling theory, which suggests that companies convey positive information as a signal of their success in business operations (Alfayerds & Setiawan, 2021). By publishing sustainability reports, companies can show investors that they have strong future prospects, thereby increasing investor interest. Efforts to reduce carbon emissions also serve as a form of disclosure that indicates the company is actively managing environmental risks (Bahriansyah & Lestari Ginting, 2022). Such positive signals are likely to be well-received by stakeholders, particularly shareholders, fostering greater investor trust and potentially leading to higher firm value and stock prices. This perspective is also supported by stakeholder theory introduced by (Freeman & Reed, 1983 , which emphasizes that a company should not operate solely for its own benefit but should also create value for its stakeholders. Consistent with this view, Rahmanita (2020) found that Carbon Emission Disclosure has a significant positive effect on firm value.

H4 : Carbon *Emission Disclosure* affects firm value.

Intellectual Capital also plays a significant role in influencing firm value. Often described as an intangible asset, Intellectual Capital provides companies with a unique competitive

advantage that is difficult for competitors to replicate (Aulia et al., 2020). According to stakeholder theory, when company management effectively utilizes resources—including intangible assets—it enhances the company's value and contributes to strong long-term performance, thereby supporting stakeholders in making informed investment decisions (Pramesti et al., 2024). Intellectual Capital encompasses the knowledge, skills, and expertise held by an organization, its professionals, or intellectual communities. It is generally composed of three main elements: human capital, customer (or relational) capital, and organizational capital. Companies with high levels of Intellectual Capital are believed to have a greater capacity to generate value and improve overall corporate prosperity. The more effectively a company manages its Intellectual Capital, the better positioned it is to excel in its industry and increase its firm value (Aulia et al., 2020; Pramesti et al., 2024).

H5*: Intellectual Capital* affects firm value.

Capital structure, represented by the Debt to Equity Ratio (DER), is used as an independent variable to measure the proportion between a company's debt and equity. A higher DER indicates a greater reliance on debt financing, which can be seen as favorable. However, a lower ratio suggests a higher level of owner-contributed funding, offering more security for lenders in the event of losses or asset depreciation (Oktrima, 2017). Such conditions may lead to reduced investor confidence and a reluctance to invest in the company.The balancing theory of capital structure aims to find an optimal mix between debt and equity, weighing the advantages of debt financing against its potential downsides (Kristianti, 2018). According to (Amro & Asyik, 2021), companies with a high proportion of debt are considered more financially risky. This elevated risk can prompt investors to pull out their investments, leading to a drop in the company's stock price. Their research also indicates that capital structure influences firm value—where a higher level of debt within the capital structure increases the company's risk in fulfilling long-term obligations, which can ultimately reduce the firm's value.

H6 : Capital structure affects firm value.

METHOD

This research employs a quantitative approach, which involves the extensive use of numerical data. The data utilized in this study are secondary data, specifically annual reports of companies listed on the Indonesia Stock Exchange (IDX), obtained through the official website (www.idx.co.id) and the IDX gallery at Universitas Muhammadiyah Sidoarjo. The population and sample of the study consist of manufacturing companies in the food and beverage sub-sector listed on the IDX during the 2017–2021 period.

The focus on the food and beverage industry is based on the sector's relatively high level of intellectual capital disclosure, with a disclosure rate of 78.6%, suggesting a strong tendency for transparency in reporting intellectual capital (Boedi et al., 2022).

The sampling technique used in this study is purposive sampling, which involves selecting samples based on specific considerations and criteria that align with the research problems and objectives. The criteria used for determining the sample include the following:

Research Sample Criteria	**Total**
Food and beverage sub-sector manufacturing companies listed on the IDX in 2022	42
1) *Food and beverage* companies that have published annual reports for 5 consecutive years from 2017-2021.	20
2) *Food and beverage* companies that use rupiah currency units.	(0)

Table 1. Sample Criteria

3) *Food and beverage* companies did not experience losses during 2017-2021.	(5)
4) *Food and beverage* companies that do not disclose *corporate social responsibility in* 2017-2021	(0)
Research Sample	15
Observation Period	x5
Total Observation Data	75

Source: Summarized by the researcher

The dependent variables in this research are financial performance and firm value, while the independent variables include Carbon Emission Disclosure, Intellectual Capital, and Capital Structure. Financial performance is measured using the profitability ratio Return on Assets (ROA), which indicates how effectively a company's management utilizes its assets to generate profit (Pramesti et al., 2024)

Firm value is assessed using the Price to Book Value (PBV) ratio. PBV reflects the net asset value attributable to shareholders for each share owned. A higher PBV suggests stronger company prospects. For investors who lack confidence in projected cash flows, book value offers a reliable and simple basis for comparison (Kusumaningrum & Iswara, 2022).

Carbon Emission Disclosure is evaluated using an index developed by (Choi et al., 2013) which is based on the disclosure framework provided by the Carbon Disclosure Project (CDP)—an independent, non-profit organization that supplies data on global climate change issues (Firmansyah et al., 2023).

Intellectual Capital is measured using the Value Added Intellectual Coefficient (VAIC) method. VAIC relies on data from company financial reports, allowing for easy data collection without requiring external sources, and evaluates how efficiently companies generate added value from their intellectual resources (Svanadze & Kowalewska, 2015)

Capital Structure is assessed through the Debt to Equity Ratio (DER), as it indicates a company's capacity to meet its obligations using its own capital. DER is a key indicator in determining capital structure decisions that influence a firm's financial strategy and overall value (Permatasari, 2019). Below is the operational variable table:

Variables	Definition	Indicator	Scale
Financial Performance (Y1)	The company's financial performance is an indicator of the company's success in generating profits (Millah et al., 2020). Financial performance in this study is measured using the *Return On Assets* (ROA) ratio. ROA is a ratio that measures the company's ability to generate profits available to shareholders using the assets owned by the company. (Kristianti, 2018).	ROA $= \frac{\text{Net Profit After Tax}}{\text{Total Assets}}$ x 100% (Febriany, 2019)	Ratio

Company Value (Y2)	Firm value can be measured by *Price Book Value* (PBV), which is a ratio that compares the value of shares according to the market with the share price based on the *book value* used by investors and analysts to determine the fair value of a stock. (Amro & Asyik, 2021). Firm value can provide maximum shareholder returns if the company's share price increases. The higher the share price, the higher the wealth of the shareholders.	PBV $= \frac{\text{Market Price per Share}}{\text{Book Value per Share of Common Stock}}$ (Aulia et al., 2020)	Ratio
Carbon Emission Disclosure (X1)	Carbon Emissions Disclosure is the extent of carbon emissions disclosure. Scoring each disclosure item *(Carbon Emissions Disclosure Checklist)* with a dichotomous scale. The maximum score is 18, while the minimum score is 0. Each item is worth 1 so that if the company fully discloses the item in its report then the company's score is 18, then add up the scores of each company. Carbon emission disclosure items are shown in table 3 by (Choi et al., 2013)	CED $= \frac{(\Sigma di)}{M}$ x 100% Description: CED = carbon emission disclosure / *Carbon Emission* Disclosure Σdi = total of all scores 1 obtained by the company M = maximum total items that can be disclosed (18 items) (Cholida & Kawendar, 2020)	Ratio
Intellectual Captial (X2)	*Intellectual Capital* is an intangible asset that plays an important role in increasing the competitiveness of the company and is also used effectively to maximize the company's profits. VAIC is a suitable method for measuring intellectual capital because all data	1. *Value Added Capital Employed:* VACA = *Value Added / Capital Employed* 2. *Value Added Human Capital:* VAHU = *Value Added / Human Capital* 3. STVA *(Structural Capital Value Added):* STVA = *Structural Capital / Value Added*	Ratio

	used in this method is based on observed and verifiable accounting data. (Mariyantini & Putri, 2018).	4.*Value Added Intellectual Coefficient:* VAIC™ = VACA + VAHU + STVA (Santiani, 2018)
Capital Structure (X3)	Capital structure is the result of the use of financial *leverage*. *Leverage* is a measurement of total debt divided by total assets used to control the effects of debt payments on company performance. (Rahman, 2020). *Debt to Equity Ratio* (DER) is a ratio to measure the company's ability to recover debt costs through its own capital (Amro & Asyik, 2021).	DER = $\frac{\text{Total Liabilities}}{\text{Total Equity}}$ x 100% (Kristianti, 2018) Ratio

Table 2. Operational Variables

Source: Summarized by the researcher

Category	Item	Description
Climate change: *Risk and* opportunity	CC1	Assessment or description of risks (specific and general regulations) related to *climate change* and decisions taken to manage these risks.
	CC2	An assessment or description of the current (and future) financial, business and opportunity implications of *climate change*.
Greenhouse Gas (GHG) Emissions	CHG1	*Methodology description* used to calculate *greenhouse gas emissions* (e.g. GHG protocol or ISO).
	CHG2	Existence of external verification of GHG *emissions quantity* accounting by whom and on what basis
	CHG3	Total *greenhouse gas emissions* (metric tons CO2-e) generated.
	CHG4	Disclosure of scope 1 and 2, or 3 direct GHG emissions.
	CHG5	Disclosure of GHG emissions by origin or source (e.g. coal, electricity, etc.).
	CHG6	Disclosure of GHG emissions by facility or segment level.
	CHG7	Comparison of GHG emissions with previous years.
Energy Consumption (EC)	EC1	*Total energy consumption* (e.g. tera-joules or Peta-joules).
	EC2	Calculation of energy used from renewable resources.
	EC3	Disclosure by type, facility or segment.
Greenhouse Gas *Reduction and Cost* (RC or *Reduction and Cost*)	RC1	Details of the plan or strategy to reduce GHG emissions.

	RC2	Breakdown of current GHG emission reduction target levels and emission reduction targets.
	RC3	*Emissions reduction* and the *costs* or savings achieved to date as a result of the emissions reduction plan.
	RC4	Future emission costs that are taken into account in *capital expenditure planning.*
Accountability of Emission Carbon (AEC)	ACC1	An indication that the board (or other executive body) has responsibility for actions related to *climate change.*
	ACC2	Description of the mechanism by which the board (or other executive body) reviews the company's progress with regard to *climate change.*

Table 3. Carbon Emissions Disclosure Checklist

Source: (Choi et al., 2013)

This study applies an analytical method to test the proposed hypotheses by utilizing multiple regression analysis (a type of multivariate analysis). To support the data processing, the researchers employed the SPSS (Statistical Product and Service Solution) software version 26. The analytical model used in this study is as follows:

$KK = \alpha + \beta_1 CED + \beta_2 IC + \beta_3 SM + e$
$NP = \alpha + \beta_1 CED + \beta_2 IC + \beta_3 SM + e$
Description:
NP = Enterprise Value
KK = Financial Performance
CED = *Carbon Emission Disclosure*
IC = *Intellectual Capital*
SM = Capital Structure
E= *Standard error*

RESULT AND DISCUSSION

Descriptive Statistics

Descriptive statistics provide a summary or general overview of the data, including measures such as the mean (average), standard deviation, variance, as well as the maximum and minimum values. The descriptive statistical results for this study are presented in the following table:

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Carbon Emissin Disclosure (X1)	75	.00	.44	.0844	.13754
Intellectual Capital (X2)	75	5.24	112.46	28.0216	23.80164
Capital Structure (X3)	75	.12	1.66	.6176	.38423
Financial Performance (Y1)	75	.00	.53	.1085	.09007
Company Value (Y2)	75	.58	29.66	4.3400	5.65363
Valid N (listwise)	75				

Table 4. Descriptive Statistics of Financial Performance (Y1) and Company Value (Y2)

Source: SPSS Output

Descriptive statistics offer a summary of the data by highlighting key measures such as the mean, standard deviation, variance, and the minimum and maximum values. The descriptive statistics for the variables in this study are presented in Table 4.

This study includes a sample of 75 companies. The average value of Carbon Emission Disclosure is relatively low at 0.0844, indicating that only a small number of companies provide disclosures on their carbon emissions. This result is consistent with the limited adoption of carbon emission reporting within the food and beverage sub-sector.

Intellectual Capital displays significant variability, ranging from 5.24 to 112.46, with an average of 28.0216, reflecting considerable differences in intellectual capital levels among companies.

Capital Structure, represented by the Debt-to-Equity Ratio (DER), has a mean of 0.6176. The standard deviation of 0.38423 suggests moderate variation in how companies structure their capital.

Financial performance, measured by the ratio of net income after tax to total assets (ROA), has an average of 0.1085, indicating that the companies generally exhibit modest profitability.

Firm Value, measured using the Price-to-Book Value (PBV) ratio, ranges widely from 0.58 to 29.66. The average PBV is 4.3400, accompanied by a relatively high standard deviation of 5.65363, pointing to considerable differences in firm value across the sample.

Normality Test

The purpose of the normality test is to assess whether the residuals in the regression model follow a normal distribution. This study employs the Kolmogorov-Smirnov statistical test to evaluate the normality of the residuals. A residual distribution is considered normal if the Asymp. Sig (asymptotic significance) value is greater than 0.05. The results of the normality test in this study are presented in the following table:

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		75
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	.12384768
Most Extreme Differences	Absolute	.085
	Positive	.085
	Negative	-.074
Test Statistic		.085
Asymp. Sig. (2-tailed)		.200[c,d]

Table 5. One-Sample KolmogrovSmirnov Test Financial Performance (Y1)

Source: SPSS Output

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		75
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	.84627611
Most Extreme Differences	Absolute	.087
	Positive	.087
	Negative	-.070
Test Statistic		.087
Asymp. Sig. (2-tailed)		.200[c,d]

Table 6. One-Sample KolmogrovSmirnov Test Company Value (Y2)

Source: SPSS Output

Referring to Table 5, the Kolmogorov-Smirnov statistic for Financial Performance (Y1) is 0.085. The normality test results show an Asymp. Sig (2-tailed) value of 0.200, which is greater than 0.05. This indicates that the regression model for Financial Performance is normally distributed. Similarly, Table 6 for Firm Value (Y2) shows a Kolmogorov-Smirnov statistic of 0.087. The Asymp. Sig (2-tailed) value is also 0.200, which exceeds the 0.05 threshold. Thus, the regression model for Firm Value is also considered to follow a normal distribution.

Multicollinearity Test

The purpose of the multicollinearity test is to identify whether there is a correlation among the independent variables in the model. This test is applicable only when the study involves more than one independent variable. The results of the multicollinearity test are presented in the following table:

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Carbon Emissin Disclosure (X1)	.936	1.069
	Intellectual Capital (X2)	.931	1.074
	Capital Structure (X3)	.977	1.024

Table 7. Multicollinearity of Financial Performance (Y1)

a. Dependent Variable: Y1

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Carbon Emissin Disclosure (X1)	.936	1.069
	Intellectual Capital (X2)	.931	1.074
	Capital Structure (X3)	.977	1.024

Table 8. Multicollinearity of Company Value (Y2)

a. Dependent Variable: Y2

The results of the Multicollinearity Test show that the Variance Inflation Factor (VIF) values are 1.069 for Carbon Emission Disclosure, 1.074 for Intellectual Capital, and 1.024 for

Capital Structure. Since all VIF values are below 10, this indicates that there is no significant correlation among the independent variables. Therefore, it can be concluded that multicollinearity is not present in the regression model.

Heteroscedasticity Test

The heteroscedasticity test is conducted to determine whether there is a variance inconsistency in the residuals across observations within the regression model. This study applies the Glejser method to perform the test. The results of the heteroscedasticity test are presented below:

Coefficients[a]

Model		Sig.
1	(Constant)	.014
	CED	.200
	IC	.504
	SM	.156

a. Dependent Variable: ABS_RES

Table 9. Heteroscedasticity Test of Financial Performance (Y1)

Coefficients[a]

Model		Sig.
1	(Constant)	.003
	CED	.365
	IC	.385
	SM	.299

a. Dependent Variable: ABS_RES

Table 10. Heteroscedasticity Test of Company Value (Y2)

Based on Table 9, the significance values for variables X1, X2, and X3 in relation to the dependent variable Y1 are all greater than 0.05. Similarly, Table 10 shows that the significance values for X1, X2, and X3 with respect to the dependent variable Y2 are also above 0.05. These results indicate that there are no signs of heteroscedasticity in the regression model.

Autocorrelation Test

The purpose of the autocorrelation test is to assess whether there is a correlation between the residuals (disturbance terms) in the current period and those in previous periods. The outcomes of the autocorrelation test are presented in the following table:

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.187[a]	.035	-.006	.09034	.803
a. Predictors: (Constant), SM, CED, IC					
b. Dependent Variable: KK					

Table 11. Autocorrelation of Financial Performance (Y1)

Table 12. Autocorrelation of Company Value (Y2)

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.512[a]	.262	.231	4.95682	.614

a. Predictors: (Constant), SM, CED, IC

b. Dependent Variable: NP

Referring to Table 11, the Durbin-Watson (DW) value for Financial Performance (Y1) is 0.803. Since the DW value falls within the acceptable range of -2 to +2, it indicates that there is no autocorrelation present in the regression model. Similarly, Table 12 shows a DW value of 0.614 for Firm Value (Y2), which also lies within the -2 to +2 range. This suggests that the regression model for Firm Value does not exhibit autocorrelation.

Test R

The R-squared test is conducted to assess the extent of the relationship between the dependent and independent variables, as reflected by the adjusted R-squared value. The results of this test are presented in the following table:

Table 13. Test R Financial Performance (Y1)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.478[a]	.729	.628	6.53056

a. Predictors: (Constant), SM, CED, IC

Table 13 shows that the Adjusted R Square value for Y1 (Financial Performance) is 0.628, or 62.8%. This indicates that the independent variables—Carbon Emission Disclosure (X1), Intellectual Capital (X2), and Capital Structure (X3)—account for 62.8% of the variation in Financial Performance. The remaining 37.2% is influenced by other factors not included in the regression model.

Table 14. Test R Company Value (Y2)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.577[a]	.333	.247	7.50195

a. Predictors: (Constant), SM, CED, IC

In Table 14, the Adjusted R Square value for Y2 (Firm Value) is 0.247, or 24.7%. This indicates that the independent variables—Carbon Emission Disclosure (X1), Intellectual Capital (X2), and Capital Structure (X3)—explain 24.7% of the variation in Firm Value. The remaining 75.3% is attributed to other variables not included in the model.

T test

The T-test is used to evaluate whether each independent variable has a partial (individual) effect on the dependent variable. The results of the T-test analysis are presented in the following table:

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
		B	Std. Error	Beta			Description
1	(Constant)	.245	.037		6.645	.000	
	CED (X1)	.083	.007	.818	12.018	.000	Accepted
	IC (X2)	.000	.000	.034	.505	.615	Rejected
	SM (X3)	.050	.019	.178	2.614	.011	Accepted

Table 15. Financial Performance T Test (Y1)

a. Dependent Variable: KK

Based on the results in Table 15, where Y1 represents Financial Performance, the significance values show that Carbon Emission Disclosure (X1) has a value of 0.000 < 0.05 and Capital Structure (X3) has a value of 0.011 < 0.05, indicating that both variables have a significant effect on Financial Performance. In contrast, Intellectual Capital (X2) has a significance value of 0.615 > 0.05, suggesting that it does not have a significant impact on Financial Performance.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
		B	Std. Error	Beta			Description
1	(Constant)	1.436	.471		3.052	.003	
	CED (X1)	.655	.089	.606	7.375	.000	Accepted
	IC (X2)	-.005	.004	-.113	-1.375	.173	Rejected
	SM (X3)	1.272	.246	.425	5.163	.000	Accepted

Table 16. Company Value T Test (Y2)

a. Dependent Variable: NP

Based on the results in Table 16, where Y2 represents Firm Value, the significance values for Carbon Emission Disclosure (X1) and Capital Structure (X3) are both 0.000 < 0.05, indicating that these two variables have a significant effect on Firm Value. Meanwhile, the significance value for Intellectual Capital (X2) is 0.173 > 0.05, which means this variable does not have a significant impact on Firm Value.

Multiple Linear Regression Test

Conducting the classical assumption test is essential to ensure that the regression model is accurate and representative. Based on Tables 14 and 15, multiple linear regression analyses were performed using the SPSS 26 software, and the following results were obtained:

KK = 0.245 + 0.083 CED + 0.000 IC + 0.050 SM

The constant value of 0.245 indicates that when Carbon Emission Disclosure (X1), Intellectual Capital (X2), and Capital Structure (X3) are all equal to zero, the predicted value of Financial Performance (Y1) is 0.245. The regression coefficient for Carbon Emission Disclosure (X1) is 0.083, which means that if all other independent variables remain unchanged, a 1% increase in Carbon Emission Disclosure will result in a 0.01 increase in Financial Performance. This positive coefficient suggests a direct relationship—higher levels of carbon disclosure are associated with improved financial performance. The regression coefficient for Intellectual Capital (X2) is 0.000. This indicates that, assuming other variables

are held constant, a 1% increase in Intellectual Capital will lead to a 0.01 rise in Financial Performance. Although the coefficient is minimal, it still reflects a positive connection between Intellectual Capital and Financial Performance. The coefficient for Capital Structure (X3) is 0.050, meaning that a 1% increase in Capital Structure, with other variables constant, results in a 0.01 increase in Financial Performance. This again reflects a positive correlation, indicating that better capital structure management contributes to enhanced financial performance.

NP = 1.436 + 0.655 CED - 0.005 IC + 1.272 SM

The constant value of 1.436 indicates that if the values of Carbon Emission Disclosure (X1), Intellectual Capital (X2), and Capital Structure (X3) are all zero, then the predicted value of Company Value (Y2) is 1.436. The regression coefficient for Carbon Emission Disclosure (X1) is 0.655, meaning that with all other variables held constant, a 1% increase in Carbon Emission Disclosure will lead to a 0.01 increase in Company Value. This positive coefficient suggests a direct relationship—greater disclosure of carbon emissions tends to enhance firm value. The coefficient for Intellectual Capital (X2) is -0.005, indicating that if the other variables remain constant, a 1% increase in Intellectual Capital will result in a 0.01 decrease in Company Value. The negative sign shows an inverse relationship—higher Intellectual Capital is associated with a decline in firm value in this model. The regression coefficient for Capital Structure (X3) is 1.272, implying that if other independent variables are held constant, a 1% increase in Capital Structure will raise Company Value by 0.01. This positive coefficient indicates a direct relationship, where a stronger capital structure contributes to higher company value.

DISCUSSION

Carbon Emission Disclosure on Financial Performance

Hypothesis 1, which states that Carbon Emission Disclosure influences Financial Performance, is supported by the findings. Disclosing carbon emissions raises a company's awareness of its environmental impact and financial performance. The process of compiling carbon emission disclosures prompts companies to monitor and evaluate their emissions more closely. This encourages the development of management accounting strategies aimed at addressing risks, costs, and opportunities related to climate change. As a result, companies are able to identify opportunities for cost efficiency, particularly through resource and raw material savings (Ladista et al., 2023). Efforts to reduce carbon emissions can lead to improved financial outcomes. The positive effects stem from the competitive edge gained by companies that implement carbon reduction initiatives (Bedi & Singh, 2024). Specifically, businesses that successfully lower their carbon footprint can reduce energy and operational costs through energy-efficient practices or the adoption of green technologies. These cost savings contribute directly to increased profitability. Furthermore, companies that are active in environmental efforts often attract more investment, especially from stakeholders who place a high value on sustainability. These findings are consistent with previous research by (Khairunisa & Pohan, 2022 ; Marietza & Hatta, 2021), which also concluded that Carbon Emission Disclosure has a positive impact on Financial Performance.

Intellectual Capital on Financial Performance

Hypothesis 2, which proposes that Intellectual Capital has an impact on Financial Performance, is not supported and therefore rejected. The findings indicate that Intellectual Capital does not influence financial performance in this study. A company's strong financial

performance does not necessarily reflect the effective use of intellectual capital, and similarly, poor financial performance does not automatically imply a lack of intellectual capital (Subagyo & Lahagu, 2014). This suggests that, among the food and beverage sub-sector companies examined, intangible assets such as Intellectual Capital have not been effectively or efficiently leveraged to enhance financial performance. One possible reason is that Intellectual Capital is not yet considered a core element within these companies, resulting in suboptimal resource management and utilization. Additionally, management may lack awareness or understanding of the strategic importance of managing and applying intellectual capital, leading to underperformance in its implementation (Hermawan et al., 2021). Due to this lack of optimization, the value created from intellectual capital remains limited and does not contribute significantly to improving the company's financial outcomes (Ramadhani & Sulistyowati, 2023) These findings are consistent with those of (Wijayani, 2017), who also concluded that Intellectual Capital does not significantly affect Financial Performance.

Capital Structure on Financial Performance

Hypothesis 3, which suggests that Capital Structure has an impact on Financial Performance, is accepted. In line with trade-off theory, firms aim to achieve an optimal capital structure by balancing the risk of financial distress with the tax advantages gained from interest deductions on debt (Ricca et al., 2021). Capital Structure plays a crucial role in shaping a company's financial performance, as the composition and quality of financing directly influence the company's overall financial health (Ningsih & Utami, 2020). A higher capital structure can contribute positively to financial performance by ensuring that the company has adequate funding to support its operations, maintain capital reserves, and achieve its business goals, all while meeting its debt obligations (Hasti et al., 2022). Effective management of capital structure allows for more efficient resource allocation, which in turn enhances the company's ability to improve financial outcomes. These findings align with previous research by (Rahman, 2020), which also concluded that Capital Structure has a significant effect on Financial Performance.

***Carbon Emission Disclosure* on** Company **Value**

Hypothesis 4, which states that Carbon Emission Disclosure influences Firm Value, is supported by the results. Based on signaling theory, when a company discloses its carbon emissions, it communicates a positive message to investors and stakeholders, demonstrating its commitment to environmental responsibility and sustainable business practices. This positive signal can enhance the company's image and credibility, ultimately increasing its attractiveness to investors and contributing to higher firm value (Dewi & Budiadnyani, 2024). Requests for information from external stakeholders, such as investors, can shape their perceptions and lead to changes in a company's market price, which reflects its overall value (Nguyen et al., 2018). The inclusion of carbon emission disclosures in sustainability reports acts as a signal to stakeholders and can influence investor decisions when selecting companies for investment. These findings are consistent with the study by (Rahmanita, 2020), which also concluded that Carbon Emission Disclosure has a significant impact on Firm Value.

***Intellectual Capital* to Company Value**

Hypothesis 5, which proposes that Intellectual Capital affects Firm Value, is rejected. This indicates that Intellectual Capital does not have a significant influence on Firm Value in this study. The results suggest that the market tends to place greater emphasis on a company's profitability and other fundamental indicators rather than its intellectual assets (Hallauw & Widyawati, 2021). One possible explanation is that company management may not view Intellectual Capital as a key driver of firm value. This aligns with the findings of Putri &

Widyawati (2019) which show that companies and investors often do not give sufficient attention to Intellectual Capital when evaluating performance. The lack of detailed information on intellectual capital in financial disclosures may lead investors to rely more heavily on readily available indicators, such as stock price, when assessing firm value. These findings are consistent with previous research by Utami (2020) and (Hallauw & Widyawati, 2021), both of which also concluded that Intellectual Capital does not significantly affect Firm Value.

Capital Structure on Firm Value

Hypothesis 6, which states that Capital Structure has an impact on Firm Value, is supported by the findings. Companies experiencing significant business growth typically require large amounts of capital, leading them to seek additional external financing to support expansion. In the long run, companies with strong business development potential are likely to generate substantial returns for investors, thereby enhancing the company's value (Mahanani & Kartika, 2017). This is consistent with the trade-off theory, which suggests that firms aim to maintain a balance between debt and equity in their capital structure. A well-managed capital structure, especially in companies with promising growth, contributes to higher profitability and ultimately boosts firm value. These results align with previous studies by (Amro & Asyik, 2021 ; Oktrima, 2017), which also concluded that Capital Structure significantly influences Firm Value.

CONCLUSION

Based on the results of the study, the following conclusions can be drawn: Carbon Emission Disclosure has a significant impact on financial performance among Food and Beverage Subsector Manufacturing Companies listed on the Indonesia Stock Exchange (IDX) for the period 2017–2021. This is because disclosure of carbon emissions increases company awareness regarding their carbon footprint and overall financial performance. A positive signal from such disclosures indicates the company's active role in addressing climate change, which can attract consumers and, in turn, enhance financial performance.

Intellectual Capital does not significantly influence financial performance in the same group of companies. This may be due to the fact that Intellectual Capital is not yet considered a core component by company management, leading to its ineffective use as a strategic resource for gaining competitive advantage and improving financial outcomes.

Capital Structure has a significant effect on financial performance. An increase in debt within the capital structure can enhance financial performance, provided it is managed effectively and remains within optimal levels. Properly managed capital structure contributes positively to the company's future financial growth.

Carbon Emission Disclosure also significantly affects Firm Value. When disclosed in sustainability reports, it acts as a signal to stakeholders and can influence investor decisions. This increased investor interest contributes to a rise in firm value.

Intellectual Capital does not have a significant effect on Firm Value. This may be because management prioritizes tangible investments over abstract assets like Intellectual Capital. Investors also tend to focus more on physical assets and financial indicators rather than intellectual resources when evaluating company value.

Capital Structure shows a significant influence on Firm Value. The use of debt, if managed within reasonable limits, can lead to increased firm value. Therefore, companies must carefully determine their optimal level of debt to ensure it positively contributes to their value.

Although this research was conducted following scientific procedures, it has some limitations. The sample is restricted to manufacturing companies in the food and beverage sub-sector listed on the IDX from 2017 to 2021, which may limit the generalizability of the findings.

Suggestions for future research include: Considering additional variables to identify which factors most significantly influence financial performance and firm value, thus providing a more comprehensive analysis. Expanding the sample to include companies from other sectors or extending the time frame to obtain broader and more reliable insights. Utilizing alternative data analysis tools or software to enhance the robustness of the results.

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