

ESG disclosure as a signaling mechanism linking green capabilities to competitive advantage

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ABSTRACT

This study examines whether Environmental, Social, and Governance (ESG) disclosure serves as a signaling mechanism that links green organizational capabilities to competitive advantage. Survey data were collected from 183 managers of agricultural manufacturing firms listed on the Indonesia Stock Exchange and analysed using Structural Equation Modeling. The study focuses on the relationships among Environmental Consciousness (EC), Green Intellectual Capital (GIC), ESG disclosure, and Green Competitive Advantage (GCA). The findings show that EC strengthens GIC, which then improves the quality of ESG disclosure. The results also indicate that EC and GIC affect GCA only through ESG disclosure, rather than through environmental initiatives alone. This suggests that green capabilities influence competitive outcomes mainly when they are communicated clearly to external stakeholders. Disclosure practices are often linked to better reputation and cost efficiency, but they seem to play a smaller role in product differentiation. Over time, many firms strengthen the connection between green strategies and ESG reporting by making gradual investments in reporting activities and innovation, which can improve disclosure quality, lower concerns about greenwashing, and help support efficiency.

Keywords: Environmental Consciousness; Green Intellectual Capital; ESG Disclosure; Green Competitive Advantage; Agricultural

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Introduction

Agricultural sector manufacturing companies are defined as manufacturing companies listed on the Indonesia Stock Exchange (IDX) whose main inputs and value chains depend on agricultural commodities (e.g., palm oil and pulp-based processing). The sector operates in a high-risk environment with sustainability credibility shaped by market access and legitimacy under global oversight and regulation, such as The European Union Corporate Sustainability Reporting Directive (García-Sánchez et al., 2021). In Indonesia, where manufacturing contributes around 20% of national gross domestic product (GDP), structural constraints (weak enforcement, limited incentives, green-technology gaps, and low Environmental, Social, and Governance-ESG reporting capacity) intensify the sustainability–competitiveness paradox and increase greenwashing risk (Pizzetti et al., 2021). Consequently, internal green resources, such as environmental consciousness and green intellectual capital, may not yield a green competitive advantage unless stakeholders perceive ESG disclosure as credible and trustworthy. Accordingly, this study examines ESG disclosure as a signaling/mediating mechanism that mitigates greenwashing risk and explains how internal green capabilities are converted into green competitive advantage in Indonesia’s agro-based manufacturing context.

Globally, the manufacturing sector remains a major environmental hotspot, accounting for approximately 30% of CO₂ emissions and 54% of energy consumption (United Nations Environment Programme, 2022). In Indonesia, manufacturing also plays a central economic role, contributing around 20% of GDP; however, sustainability improvements are constrained by weak enforcement, limited incentives, and persistent gaps in green technology and reporting capabilities, particularly during the transition from International Financial Reporting Standards (IFRS) S1/S2 to Indonesian Financial Accounting Standards (Ikatan Akuntan Indonesia, 2025). These constraints are especially salient for the agricultural sector's manufacturing companies' value chains, where land-use impacts are material. Commodity expansion in palm oil and pulp has been linked to the loss of approximately 3.5 million hectares of primary forest (Wijaya & Mursitama, 2023; Asian Development Bank, 2023). As deforestation-free supply chain expectations tighten, this context raises the risk that firms rely on symbolic sustainability claims, reinforcing concerns about greenwashing and weakening the credibility of ESG-related information (Organization for Economic Co-operation and Development, 2024; Pizzetti et al., 2021).

Against this background, the main problem is not only the existence of sustainability claims, but also a market that requires the credibility of the company to meet the

requirements of stakeholders, which necessitates ESG disclosure. This disclosure serves as a market signal to comply with regulations that require adequate reporting capacity. It is used to mitigate the risk of greenwashing and serves as a mechanism to enhance the company's reputation as a legitimate entity. Thus, there is a conversion of internal green resources into a green competitive advantage (Christensen et al., 2022). This challenge is particularly salient in developing-country contexts, where institutional features such as looser regulatory and stakeholder pressures and limited technological capacity may fundamentally reshape how disclosure-based mediation mechanisms operate (Zhu et al., 2023; Wijaya & Mursitama, 2023). Drawing on the Natural Resource-Based View (NRBV), internal green capabilities (environmental consciousness/awareness and green intellectual capital) should enable advantage; however, stakeholder theory suggests such capabilities generate competitive returns only when they are recognized and legitimized by stakeholders, and Signaling Theory explains why credible ESG disclosure is pivotal in reducing information asymmetry and curbing greenwashing perceptions. Despite this, the mediating role of ESG disclosure remains underexplored in emerging markets such as Indonesia, leaving a mechanism-level gap in explaining how green capabilities are translated into green competitive advantage. Accordingly, this study tests an integrative NRBV–Stakeholder–Signaling framework by positioning ESG disclosure as a strategic pathway through which firms can strengthen legitimacy, access green finance, support export expansion, reduce greenwashing risk, and build stakeholder trust (Yusoff et al., 2021).

Empirical evidence confirms that green intellectual capital significantly improves environmental performance when integrated with sustainability reporting (Yusoff et al., 2019). Additionally, ESG disclosure strengthens the relationship between green innovation and market excellence in regulated industries (Li et al., 2018). European manufacturers that combine low-carbon technology with comprehensive ESG reporting have achieved a 15-20% increase in market share (McKinsey & Company, 2023). However, the reality in Indonesia reveals that the limitations of green intellectual capacity reduce ESG disclosure to a symbolic movement that fails to create a competitive advantage (Wijaya & Mursitama, 2023), as its implementation is unstructured and disconnected from reporting (Yousaf, 2021). As a result, agricultural producers are prioritizing traditional productivity over green differentiation (Pizzetti et al., 2021), maintaining a symbolic ESG rather than a strategic status (Christensen et al., 2022). This reveals three critical gaps, namely: the limitations of ESG disclosure as a mediator for competitive advantage (Li et al., 2018), an inadequate understanding of environmental awareness and green intellectual capital interacting strategically but ignoring

the role of innovation in intellectual capital (Yousaf, 2021); and the scarcity of research in developing countries that face technological limitations and weak infrastructure (Mensah, 2019). This study addresses the gap by examining ESG disclosure as a mediator in this underexplored context.

This research has a unique and dual urgency, namely: first, it answers the pressing dilemma of Indonesia's agricultural manufacturing sector, which supports 20% of GDP but is sandwiched between traditional productivity demands and global sustainability pressures, exacerbated by deforestation, technology gaps, weak regulation, and low ESG capacity at 12% of companies. By examining the relationship between internal drivers (Environmental Consciousness, Green Intellectual Capital) and external transparency (ESG Disclosure), this study provides a strategic roadmap for creating a green competitive advantage, thereby enhancing competitiveness while aligning with environmental and economic objectives. Second, this study introduces novelty through an integrative model that expands the NRBV by including the dimensions of sustainability and signaling (Signaling Theory). This model positions green intellectual capital and ESG disclosure as crucial intangible resources (Saeidi et al., 2024), goes beyond traditional NRBV focus on tangible assets (Barney et al., 2021), and investigates ESG disclosure as a mediator that transforms internal resources into positive market signals (Christensen et al., 2022). By focusing on the context of Indonesia's emerging markets, this study fills a critical gap in the literature, which has been dominated by research in Europe or America (Christensen et al., 2022), while uncovering unique challenges, including technology and regulatory gaps.

The purpose of the study was to analyze the influence of Environmental Consciousness (EC) and Green Intellectual Capital (GIC) on Green Competitive Advantage (GCA) mediated by ESG Disclosure (ED) in agricultural manufacturing companies on the IDX. Theoretically, this study expands the NRBV frameworks through integration with Signaling Theory (Christensen et al., 2022) and Stakeholder Theory (Barney & Harrison, 2020), proving that ESG disclosure functions as a full mediator that transforms internal green resources into competitive advantage through credible signaling mechanisms (Pizzetti et al., 2021). Empirical findings reveal that environmental consciousness and green intellectual capital have a significant impact on green competitive advantage when communicated through transparent ESG reporting, with green intellectual capital being the strongest driver of ESG disclosure. In practical terms, this study offers strategic implications for companies to integrate green investment with reporting capacity, as well as for regulators in building a supportive ecosystem through the implementation of mandatory reporting standards, strategic

incentives, and capacity-building programs (Wijaya & Mursitama, 2023; Adhikara, 2018). The proposed conceptual model not only describes the mechanism for achieving a green competitive advantage in the context of emerging markets but also provides policy recommendations to strengthen national ESG practices.

Literature Review

Integrating The Natural Resource-Based View (NRBV), Legitimacy Theory, and the Knowledge-Based View (KBV) in ESG Disclosure

This study uses NRBV as a grand theory that states that a company's sustainable competitive advantage, especially in the agricultural sector that depends on natural resources, is built through the development of three successive capabilities: pollution prevention, product management, and sustainable development (Hart, 1995). From this perspective, environmental consciousness operates through the lens of legitimacy theory and institutional theory, where stakeholder pressures and institutional norms create a legitimacy gap that forces companies to increase transparency through ESG disclosure as a strategic response (Deegan, 2023). Meanwhile, green intellectual capital is understood through KBV and intellectual capital theory, where green knowledge structured in three components—human, structural, and relational capital—must be codified and externalized through a substantive ESG reporting process (Yusliza et al., 2020). In the context of Indonesian agricultural companies facing increasing global pressures and sustainability regulations, ESG disclosure helps show their environmental and social commitments clearly to external stakeholders.

As a mediating variable, ESG disclosure serves as a credible signal within the framework of signalling theory, thereby reducing information asymmetry between companies and stakeholders, particularly global investors who are becoming increasingly selective regarding sustainability practices (Christensen et al., 2022). These signals, when credible and substantive, provide market rewards in the form of lower capital costs, increased consumer loyalty, and a stronger reputation, which collectively form a green competitive advantage. Directly, green intellectual capital contributes to a competitive advantage through the dynamic capabilities view, where green knowledge enables companies to develop adaptive and innovative capabilities, creating product differentiation and process efficiency (Chen et al., 2020). Similarly, high environmental consciousness facilitates a competitive advantage through proactive environmental strategies and a first-mover advantage in adopting green technologies, as described in stakeholder theory (Barney & Harrison, 2020). This theoretical

integration reveals that ESG disclosure is not merely a reporting tool, but a strategic transmission mechanism that links internal capabilities with external competitive advantages.

The Relationship of Environmental Consciousness (EC) to ESG Disclosure

Hypothesis 1, which states the influence of EC on ESG disclosure, can be explained through the integration of legitimacy theory, stakeholder theory, and signalling theory in the context of institutional pressure. High environmental consciousness in Indonesian agricultural companies—driven by both internal management and external stakeholder pressure—creates a legitimacy gap, where companies must adapt their operations to evolving social norms related to environmental sustainability (Deegan, 2023). ESG disclosure serves as a mechanism of strategic legitimacy, demonstrating the company's conformity to stakeholder expectations while maintaining a social license to operate, which is critical to business continuity in sectors vulnerable to environmental controversies, such as agriculture (Boiral et al., 2025). When ESG information is shared, environmental practices can be seen more clearly by groups such as investors, customers, and regulators. In this situation, understanding tends to improve, and some information gaps are reduced over time (Hsu et al., 2021). Trust in the firm may then grow gradually, which can support its reputation rather than change it immediately (Platonova et al., 2018). Previous work also points out that companies treating environmental issues as part of routine management often move toward greener strategies, including clearer ESG reporting, instead of using disclosure only as a formal requirement (Singh et al., 2020). The study by Garcia-Sanchez (2021) reinforces this, showing that companies with high EC tend to disclose ESG information comprehensively, thereby improving their reputation and competitiveness. Thus, environmental consciousness encourages ESG disclosure to meet stakeholder expectations, thereby strengthening the company's competitive position.

H₁: Environmental consciousness has a positive effect on ESG disclosure.

The Relationship between Environmental Consciousness (EC) and Green Intellectual Capital (GIC)

Hypothesis 2, which posits that EC has a positive impact on GIC, receives strong theoretical support from the NRBV frameworks. EC serves as a fundamental driver that meets the Valuable, Rare, Inimitable, Non-substitutable (VRIN) criteria (Barney et al., 2021), acting as a critical intangible organizational resource for the development of green intellectual assets (Hart, 1995). Mechanistically, EC strengthens managerial commitment to

codify environmental values into routines through training, knowledge sharing, and formalized environmental management systems, which directly builds the firm's green human, structural, and relational capital. This deep commitment to embedding sustainability into the organization's culture sparks the transformation of abstract consciousness into concrete intellectual assets. As revealed by Hameed et al. (2020), EC triggers the formation of green human capital through improving employee skills in managing resources efficiently.

Furthermore, this awareness encourages investment in green structural capital, which is realized through the adoption of environmental management systems and low-emission technologies (Yusoff et al., 2019). From a relational perspective, Hsu et al. (2021) found that companies with high EC scores tend to build stronger green relational capital by proactively networking with sustainable suppliers. Empirical evidence from the Indonesian context, as presented by Latan et al. (2018), confirms a positive correlation between EC and green innovation. As such, the EC acts as a critical catalyst within the NRBV framework, transforming it into three components of the GIC: green knowledge (human capital), structural capital systems, and relational capital, which collectively become the foundation of the transition to a circular economy.

H₂: Environmental consciousness has a positive effect on green intellectual capital.

The Relationship of Green Intellectual Capital (GIC) with ESG Disclosure

Hypothesis 3, which states that GIC has a positive effect on ESG disclosure, is supported by the integration of NRBV framework and Signalling Theory. Through the lens of NRBV, GIC, which includes knowledge, skills, and innovation systems, is a strategic intangible asset that meets the criteria of VRIN (Barney et al., 2021). These assets allow companies to create environmentally friendly technologies and efficient production processes, thereby contributing to improved environmental performance through human resource development and green innovation (Hameed et al., 2020). However, the impact of GIC on competitive advantage does not occur directly. This is where Signalling Theory (Deegan, 2023) plays a role in explaining the mechanism. Companies with strong GICs have the capacity to produce more credible and high-quality ESG data. Mechanistically, firms with stronger GIC are better able to institutionalize ESG data-generation routines, such as materiality assessment, key performance indicator's definition, data verification, and cross-functional reporting, which improves the completeness, consistency, and auditability of disclosed ESG information. This data is then disclosed through structured ESG reports as a verifiable signal to the market (Gaonkar & Moeen, 2023). From a signalling perspective, higher-quality and more verifiable

disclosure is costly to imitate without such knowledge assets, making ESG disclosure a more credible signal of underlying green capabilities rather than a purely symbolic narrative. Accordingly, GIC is expected to influence ESG disclosure not only in terms of volume but also in terms of disclosure quality, thereby strengthening stakeholder confidence and reducing scepticism about greenwashing. These signals aim to reduce information asymmetry, attract ESG-oriented investors (Yusoff et al., 2019), and differentiate companies from competitors (Ricciardi et al., 2022). Thus, ESG disclosure serves as a strategic tool and a crucial channel that transforms green intangible intellectual assets (GICs) into a measurable and visible competitive advantage to stakeholders, while realizing the strategic value of GICs in the market.

H₃: Green intellectual capital has a positive effect on ESG disclosure.

The Relationship of Environmental Consciousness (EC) with Green Competitive Advantage (GCA)

Hypothesis 4, which posits that EC has a positive impact on GCA, is supported by the integration of the NRBV and Stakeholder Theory. Through the lens of NRBV, EC is positioned as a strategic resource that meets the criteria of VRIN (Barney et al., 2021). These resources allow companies to develop unique environment-based capabilities through dedicated resource allocation, organizational culture development, and continuous innovation (Hart, 1995). Top management's commitment to increasing R&D allocations for green technologies, as revealed by Latan et al. (2022), is a manifestation of this transformation of awareness into tangible capabilities. Stakeholder Theory (Freeman, 1984) complements this by explaining that EC enables companies to meet the demands of diverse stakeholders, ranging from investors to green consumers, thereby creating competitive differentiation in the market. Empirical support is demonstrated by García-Sánchez et al. (2021), who found that EC improves GCA through operational efficiency and product differentiation. This finding is also supported in the Indonesian context (Wijaya & Mursitama, 2023). EC is expected to strengthen GCA by enabling firms to identify material environmental risks and opportunities earlier, redesign processes to reduce waste and energy intensity, and accelerate eco-innovation—capabilities that translate into lower costs and stronger differentiation. From a stakeholder-based perspective, these gains are more likely to be sustained when EC is communicated through credible and consistent ESG disclosure, because disclosure reduces information asymmetry and protects firms from scepticism about greenwashing, which can erode competitive returns. However, Hart (1995) notes that the effectiveness of EC is highly

dependent on the organization's capacity to transform awareness into concrete actions, which in this study is accommodated by the ESG disclosure mediator variable.

H₄: Environmental consciousness has a positive effect on green competitive advantage.

The Relationship between ESG Disclosure and Green Competitive Advantage (GCA)

Hypothesis 5, which states that ESG disclosure has a positive effect on GCA, is supported by the integration of signalling theory and stakeholder theory. Through the lens of signalling theory (Deegan, 2023), ESG disclosure serves as a credible signal that communicates the company's sustainability performance to the market, thereby reducing information asymmetry and building trust (Barney & Harrison, 2020). These signals, which include efforts to reduce emissions and energy efficiency, not only meet regulatory demands but also positively correlate with increased market share, as consumers choose products from transparent companies (Pizzetti et al., 2021). From the perspective of stakeholder theory (Freeman, 1984), this disclosure practice allows companies to meet the expectations of a wide range of stakeholders, including investors and governments. Meeting these expectations strengthens the company's reputation as a responsible business, which in turn reduces reputational and litigation risks. A study by García-Sánchez et al. (2021) confirms that companies with comprehensive ESG disclosure experience increased access to green financing and ease of building strategic partnerships with sustainable suppliers. Thus, ESG disclosure transforms from a mere reporting tool to a strategic instrument for achieving competitive differentiation, utilizing signalling mechanisms to build legitimacy in the eyes of stakeholders, ultimately realizing GCA.

H₅: ESG disclosure has a positive impact on green competitive advantage.

The Relationship of Green Intellectual Capital (GIC) with Green Competitive Advantage (GCA)

Hypothesis 6, which states that GIC has a positive effect on GCA, is theoretically firmly rooted in the NRBV. Through the lens of NRBV, GIC, which includes green human capital, green structural capital, and green relational capital, is positioned as a strategic resource that meets the criteria of VRIN (Barney et al., 2021). This bundle of green, knowledge-based intellectual assets enables companies to develop sustainable innovations and unique operational efficiencies, thereby forming the basis of competitive differentiation in the market, particularly in the natural resource-based sector (Hart, 1995). Empirical support for this logic is shown by Yusoff et al. (2019), who found that companies with high GIC tend to

have superior environmental performance and green competitiveness in the Southeast Asian market (Yusoff et al., 2019), as well as Hameed et al, who proved that green structural capital (such as green technology patents) significantly increase the competitive advantage based on the environment (Hameed et al., 2020). However, the effectiveness of the transformation of GIC into GCA does not occur in a vacuum. Yusoff et al. (2021) emphasize that the effectiveness of GIC is highly dependent on institutional factors, such as regulation and market readiness. This context is particularly relevant for testing on the Indonesia Stock Exchange, where sustainability practices are still evolving, implying that the direct relationship between GIC and GCA may require the presence of mediator or moderator factors, such as regulatory pressures or ESG reporting capacity, to be optimally realized.

H₆: Green intellectual capital has a positive effect on green competitive advantage.

The Mediating Role of ESG Disclosure

Hypotheses 7 and 8, which test the mediating role of ESG disclosure in the relationship between EC and GIC and their impact on GCA, can be explained through a comprehensive theoretical integration. Based on the NRBV concept, EC and GIC are strategic internal resources that meet the criteria of VRIN (Barney et al., 2021). EC, as the foundation of organizational awareness, encourages the formation of GIC through investment in the development of sustainable work competencies, management systems, and stakeholder networks (Rehman et al., 2021). However, these internal resources are intangible and require a transformation mechanism to be recognized by the market. This is where Signalling Theory (Deegan, 2023) explains the crucial role of ESG disclosure as a mediator. Transparent ESG disclosures serve as credible signals that communicate the strategic value of the EC and GIC to external stakeholders (Grewal et al., 2021). Through this mechanism, ESG disclosure transforms internal potential into measurable competitive advantage by building a green reputation, improving operational efficiency through rigorous internal audits, and facilitating access to sustainable financing (Drempetic et al., 2020). Thus, ESG disclosure acts as a strategic bridge that connects the internal dimensions of NRBV with external recognition through signalling mechanisms.

The emphasis on integrating stakeholder theory complements this mediation framework. Pressure from stakeholders, including investors, consumers, and regulators, creates an imperative for companies to not only own green resources but also demonstrate them in an accountable manner (Freeman, 1984). ESG disclosure serves as a strategic response to these pressures by building social legitimacy and market trust (Drempetic et al., 2020). In the

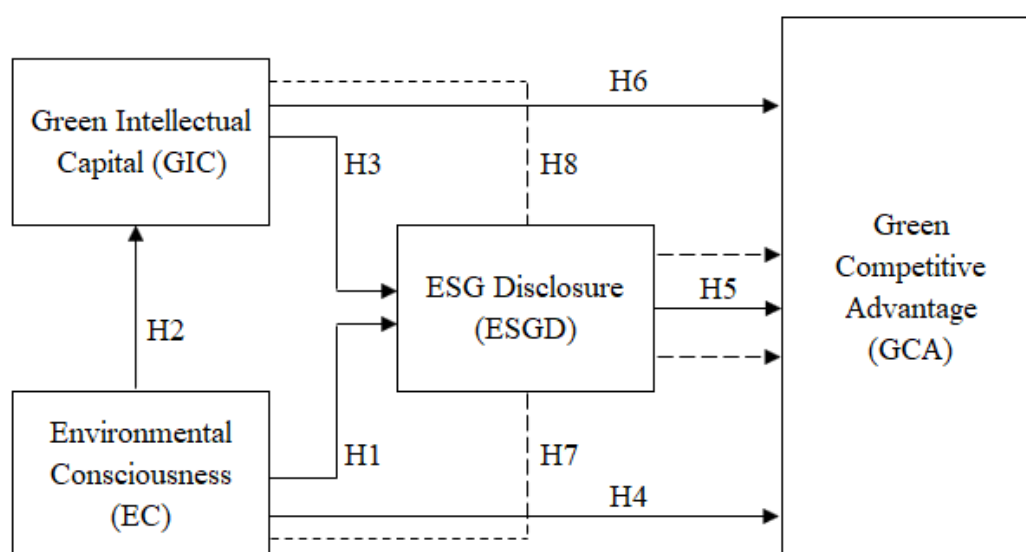
context of H₇, high EC encourages a more comprehensive quality of ESG disclosure, which is then positively responded to by stakeholders through increased reputation and loyalty, thereby realizing GCA. For H₈, the strong GIC provides substantive content for ESG disclosure, where green intellectual capabilities are transformed into credible market signals regarding the company's sustainability commitments. The interaction between stakeholder pressure (Stakeholder Theory) and the signalling mechanism (Signalling Theory) creates a positive cycle where ESG disclosure not only reflects internal capabilities but also strengthens them by attracting external resources and minimising regulatory risks. Thus, the integration of these three theories forms a coherent mediation model, where ESG disclosure serves as a catalytic mechanism that transforms green resources (NRBV) into a market signal (Signalling Theory), meeting the expectations of stakeholders (Stakeholder Theory) to achieve a sustainable competitive advantage.

H₇: ESG disclosure increases the influence of environmental consciousness on green competitive advantage.

H₈: ESG disclosure increases the influence of green intellectual capital on green competitive advantage.

Figure 1 shows how green-related capabilities inside a firm are connected to competitive outcomes, with ESG disclosure (ESGD) acting as a linking element. Environmental Consciousness (EC) reflects how far a firm pays attention to environmental responsibility and takes it seriously in its activities. This awareness is expected to help build Green Intellectual-

Figure 1. Research Framework



Capital (GIC), such as green knowledge, skills, and organisational practices, while also encouraging firms to disclose ESG information. GIC, in turn, supports sustainability efforts and can contribute to competitive performance. In this framework, ESGD plays a key role because it allows internal environmental efforts to be communicated to external stakeholders. When this information is shared, green awareness (GC) and knowledge do not remain internal, but are translated into signals that can support legitimacy and market positioning. As a result, competitive advantage is influenced not only directly, but also through the way EC and GIC are reflected in ESGD.

Methods

This study examines the perceptions of company unit managers in Indonesia's agricultural sector regarding sustainable frameworks in ESG disclosure. This research is explanatory causality, with field surveys for data collection. The time horizon is a one-shot study. The unit of analysis is the individual manager. The results of the respondents' answers were validated through in-depth interviews using the Dolphin method, allowing for the drawing of valid conclusions. The data analysis technique employed structural equation modelling (SEM) with the AMOS program, as well as the analysis of perceptual data aggregation at the Company Level through integration with the External ESG Score (Refinitiv). Refinitiv's actual ESG score was used as an objective comparator to measure good or bad signals, validating and complementing perception data. The ESG Score indicated the company's sustainability performance with values ranging from 0 to 100. A higher score signifies better performance. A score above 70 is often considered very good, a score of 50–70 is considered quite good, while a score below 50 indicates that the company needs significant improvement in handling ESG risks. The ESG score of the highest agricultural sector issuers is 42.54, with the highest score reaching 76.14. The average value of the ESG score is transformed into a Likert scale according to ESG disclosure to express good or bad signals. The research subjects comprised senior and middle managers of companies in the agricultural sector of the manufacturing industry, who served as a source of information.

The research population consisted of all company unit managers in the agricultural sector of the manufacturing industry listed on the Indonesia Stock Exchange (IDX). Agricultural sector manufacturing company proxies were managers involved in operational activities, research and development, marketing support, human resource support, and environmental protection. In addition, Hair et al. (2019) described how the sample size was calculated using a method proposed, where the number of indicators (n) was multiplied by a factor of 5 to 10.

Table 1. Variable Operations

Variables	Dimensions	Indicator
Environmental Consciousness (EC) is a company's attitude of environmental awareness that is reflected in the commitment of management and employees to integrate sustainability principles into the organization's operational strategy and culture (Latan et al., 2018)	Environmental Commitment	Budget allocation, formal environmental policies, and top management participation
	Environmental Awareness	Employee training, internal campaigns, stakeholder involvement
	Environmental Innovation	Environmentally friendly product development, adoption of clean technology
Green Intellectual Capital (GIC) is a company's Intellectual Assets that support green innovation and practices, encompassing sustainability-oriented human resources, systems, and relational networks (Hameed et al., 2020; Yusoff et al., 2019)	Green Human Capital	Employee skills in waste management, sustainability training
	Green Structural Capital	Environmental management system, green innovation database, green patents
	Green Relational Capital	Partnership with green suppliers /customers, participation in sustainability forums
ESG disclosure (ESGD) is the perception of a company's level of transparency in disclosing environmental, social, and governance performance through annual reports, sustainability reports, or public platforms. (Pizzetti et al., 2021; García-Sánchez et al., 2020)	Environmental Disclosure	Disclosure of carbon emissions, use of renewable energy, and waste management
	Social Disclosure	CSR programs, employee health and safety, and community involvement
	Governance Disclosure	Anti-corruption policies, diversity of the board of directors, and sustainability audits.
	ESG Score	ESG risk management
Green Competitive Advantage (GCA) is the perception of a company's competitive advantage obtained through green product differentiation, sustainable operational efficiency, or a positive reputation in the eyes of stakeholders (Hart, 1995; Hsu et al., 2021)	Product Differentiation	Market share of green products, eco-label certification.
	Cost Efficiency	Reduction of energy/waste costs, optimization of resources.
	Market Reputation	Customer loyalty, ESG ratings, and access to green finance.

The issuer's population consisted of 960 individuals with 36 indicators, as can be seen from Table 1. Thus, the sample size required ranges from 180 to 360 manager respondents. However, using maximum likelihood estimates (MLE), the number of samples needed was between 100 and 200. The analysis unit was the individual department manager of the agricultural sector company. The sampling method used was a proportional random sample

based on the subsector of the agricultural company. The company's sub-sectors comprised plantation companies, agro-industrial companies, and agricultural support industry companies. About 300 questionnaires were distributed to unit managers at agriculture companies from the manufacturing industry listed on the IDX. Of the 300 questionnaires sent, 203 were returned, with 183 deemed valid for analysis. Thus, 183 respondents were obtained, representing 61% of the questionnaire distributed, which was considered sufficient for further study.

Table 2. Demographic Profiles

Profiles		Frequency	Percentages (%)
Gender	Male	119	65
	Female	64	35
Age	25 – 35 years old	18	10
	36 – 45 years	110	60
	46 – 55 years old	55	30
Education	Bachelor	27	15
	Master	156	85
Length of work	5 – 10 years	73	40
	11 – 20 years	92	50
	> 20 years old	18	10
Position	Operational Manager	55	30
	Financial Manager	46	25
	Environmental/CSR Manager	55	30
	Other Managers	27	15

Table 3. Eligibility Criteria for Data Quality and Goodness of Fit-GoF Index (SEM)

Instrument Criteria	Cut-off Value	GoF Index	Cut-off Value
Data normality test	$-1.96 \leq x \leq +1.96$	Prob of Significant	≥ 0.05
Multicollinearity test (Covariance Determinant)		Chi-Square	Expected small
Cronbach α	Value > 0.6	RMSEA	≤ 0.08
Composite reliability	Value > 0.7	GFI	≥ 0.90
$\sqrt{\text{AVE}}$	Value > 0.5	TLI	≥ 0.95
Average Variance Extracted (AVE)	Value > 0.5	CFI	≥ 0.95
Fornell-Larcker criterion	Diagonal value > the correlation value between constructs	AGFI	≥ 0.90
		CMIN/DF	≤ 2.00
		Effective size	Big Influence
		Explanatory power of R^2	Big Influence

Table 4. Normality Testing Result

Variables	Minimum	Maximum	Skew	Critical Ratio	Kurtosis	Critical Ratio
EC	0.8200	1.6000	0.5642	1.0072	0.7724	1.136
GIC	1.1100	5.0000	-0.4760	-1.4927	-0.2853	-0.807
ESGD	1.9000	5.0000	-0.4803	-1.3161	0.0616	0.718
GCA	2.0000	5.0000	-0.4962	-1.2029	-0.5711	-1.453
Multivariate					1.3437	1.2372

Table 5. Discriminant Validity (Fornell-Larcker Criterion)

Construct	EC	GIC	ESG	GCA
EC	0.784			
GIC	0.255	0.777		
ESGD	0.386	0.548	0.727	
GCA	0.329	0.401	0.460	0.820

Table 6. Data Quality Test

Code	Item Measurements	Loadings	AVE	Cronbach α	Composite Reliability
EC	Environment Consciousness		0.924	0.865	0.939
	Environmental Commitment	0.78			
	Budget allocation	0.84			
	Formal environmental policies	0.77			
	Top management participation	0.80			
	Environmental Awareness	0.75			
	Employee training	0.83			
	Internal campaigns	0.76			
	Stakeholder involvement	0.87			
	Environmental Innovation	0.82			
	Environmentally friendly product development	0.89			
	Adoption of clean technology	0.88			
GIC	Green Intellectual Capital		0.936	0.893	0.949
	Green Human Capital	0.78			
	Employee skills in waste management	0.80			
	Sustainability training	0.77			
	Green Structural Capital	0.74			
	Environmental management system	0.80			
	Green innovation database	0.77			
	Green patents	0.79			
	Green Relational Capital	0.81			
	Partnership with green suppliers /customers	0.89			
	Participation in sustainability forums	0.85			

Table 6. Data Quality Test (Continued)

Code	Item Measurements	Loadings	AVE	Cronbach α	Composite Reliability
ESGD	ESG Disclosure		0.919	0.883	0.937
	Environmental Disclosure	0.73			
	Disclosure of carbon emissions	0.89			
	Use of renewable energy	0.73			
	Waste management	0.75			
	Sosial Disclosure	0.75			
	CSR programs	0.81			
	Employee health and safety	0.83			
	Community involvement	0.76			
	Governance Disclosure	0.70			
	Anti-corruption policies	0.78			
	Diversity of the board of directors	0.80			
	Sustainability audits	0.74			
	ESG Score Risk	0.76			
GCA	Green Competitive Advantage		0.936	0.89	0.947
	Product Differentiation	0.85			
	Market share of green products	0.99			
	Eco-label certification.	0.95			
	Cost Efficiency	0.79			
	Reduction of energy/waste costs	0.81			
	Optimization of resources.	0.87			
	Market Reputation	0.82			
	Customer loyalty	0.85			
	ESG ratings	0.93			
	Access to green finance	0.87			

Table 2 summarises the main characteristics of the respondents in this study. Most participants are in the 36–45 age group, which accounts for around sixty percent of the sample, followed by respondents aged 46–55. Only a small proportion fall within the 25–35 age range. The sample is largely male, although female respondents also make up a notable share. In terms of experience, the majority have spent more than a decade in their current field, with many reporting between 11 and 20 years of work experience. Educationally, most respondents hold a master's degree, while a smaller group completed undergraduate study. The respondents also come from a range of managerial roles, including operational, environmental or CSR, and financial management positions, indicating that the data were obtained from individuals involved in different aspects of organisational decision making. All respondents are drawn from the agricultural manufacturing sector, ensuring that the sample is fully aligned with the research context.

Furthermore, several checks were carried out to ensure the quality of the data before the main analysis. These checks included tests of data normality, an examination of possible multicollinearity, and assessments of validity and reliability. Convergent validity was evaluated using the Average Variance Extracted (AVE), while discriminant validity was assessed through the Fornell–Larcker criterion. After these steps, structural equation modelling was performed using AMOS, which was used for both confirmatory factor analysis and structural model testing. The overall fit of the model was then assessed by referring to commonly accepted guidelines in the literature, following the criteria suggested by Hair (2019), as summarised in Table 3.

Tables 4, 5, and 6 together demonstrate the adequacy of the data and measurement model used in this study. Table 4 shows that all constructs exhibit acceptable univariate and multivariate normality, as the skewness and kurtosis critical ratios fall within recommended thresholds, indicating that the data are suitable for SEM analysis. Table 5 reports the data quality assessment, where all indicator loadings exceed 0.70, the Average Variance Extracted (AVE) values are above 0.50, and both Cronbach's α and composite reliability values surpass 0.70, confirming strong convergent validity and internal consistency across constructs. Table 6 further supports the robustness of the measurement model, as the square roots of AVE for each construct are greater than the corresponding inter-construct correlations, thereby establishing adequate discriminant validity and confirming that each construct captures a distinct concept within the model.

Table 7 reports the descriptive statistics for the main variables in this study. EC has a mean score of 3.83, while GIC records a mean of 3.70, suggesting that awareness of sustainability issues and green-related capabilities are reasonably well developed. ESGD shows a lower average score of 3.20, indicating that disclosure practices exist but are still developing. GCA has the highest mean value at 4.03, reflecting strong perceived competitive benefits. In addition, the average ESG disclosure score of 61.97 based on Refinitiv data points to a relatively strong ESG signal, suggesting that many firms have made a solid start in managing ESG-related risks. This value is then transformed into an interval scale using the Method of Successive Interval.

Result and Discussion

Table 6 illustrates that environmental consciousness, green intellectual capital, and ESG disclosure all have a substantial impact on achieving a green competitive advantage. The goodness-of-fit criteria used in the structural model of this study meet all the standard

thresholds set by Hair et al. (2019). The structural model is supported by a significant probability value of 0.658 (above 0.05), an RMSEA of 0.062 (below 0.08), GFI, AGFI, TLI, and CFI values all above 0.90, which are at excellent levels and meet the cut-off values. In addition, a low CMIN/DF value indicates a parsimonious model. The Covariance determinant is 0.0463, indicating a positive value above 0, so it is free of multicollinearity. Meanwhile, testing hypotheses 1, 2, 3, 4, 7, and 8 was accepted ($p < 0.05$), while hypotheses 5 and 6 were rejected ($p > 0.05$).

The results of this study reveal a significant explanatory power of the model (R^2) for endogenous variables. An R^2 value for ESG disclosure of 0.358 indicates that environmental consciousness and green intellectual capital together explain 35.8% variance in ESG disclosure. Meanwhile, the R^2 value for green competitive advantage is 0.792, indicating that environmental consciousness, green intellectual capital, and ESG disclosure collectively explain 79.2% of the variance in green competitive advantage. This suggests that the proposed model possesses very strong predictive power, particularly in describing the green competitive advantage variable. On the other hand, the contribution of each exogenous variable to the endogenous variable can be calculated as the effect size (f^2). The f^2 value for EC against is 0.386, indicating that EC's contribution to ESGD has a small to medium effect. The f^2 value for the GIC path to ESGD of 0.548 indicates a greater effect than EC, highlighting the role of the main predictor of ESGD disclosure. A value of f^2 for the ESGD path to GCA of 0.460 indicates that ESG disclosure has a significant effect in explaining GCA, consistent with its role as a full mediator.

The results indicate a positive relationship between environmental awareness and ESG disclosure (H_1), suggesting that firms with higher levels of environmental awareness tend to provide more comprehensive ESG reporting. Higher environmental awareness strengthens ESG disclosure by encouraging stronger sustainability governance and more systematic ESG data generation routines. Thus, increasing the completeness and consistency of the information reported. Key indicators of environmental awareness include budget allocation for environmental programs, formal sustainability policies, and top management participation in green initiatives, which consistently drive greater transparency. This result is supported by the acquisition of the ESG Agricultural Index score on the IDX, which grew significantly from 2023 to 2025, rising from 56.86 to 57.84 and then to 64.60 in 2025 (Katadata Insight Center, 2025). The ESG index results exceed 50, indicating that the agricultural sector is making significant progress in disclosure.

Table 6. Structural Model Results and Hypothesis Testing

Hypothesis	Estimate	S. E	C. R	<i>p</i> -value	Decision
H ₁ EC → ESGD	0.386	0.082	4.757	0.001**	Accepted
H ₂ EC → GIC	0.255	0.093	2.783	0.003**	Accepted
H ₃ GIC → ESGD	0.548	0.071	6.431	0.003**	Accepted
H ₄ ESGD → GCA	0.460	0.051	12.005	0.000**	Accepted
H ₅ EC → GCA	0.526	0.062	8.67	0.072	Rejected
H ₆ GIC → GCA	0.307	0.075	4.297	0.120	Rejected
	Estimate	Direct	Indirect	<i>p</i> -value	
H ₇ EC → ESGD → GCA	0.329	0.072	0.230	0.04**	Accepted
H ₈ GIC → ESGD → GCA	0.401	0.091	0.200	0.02**	Accepted

Square Multiple Correlation (R²): ESGD = 0.358; GCA = 0.793; Covarian determinant matrix = 0. 0463
Model Structural: Chi-Square = 1.15 ; P* sig. = 0.658 [Fit above 0.05]; RMSEA = 0.062; GFI = 0.999; TLI = 0.936; CFI = 0.977

Note: The hypothesis is accepted with *p*-value < 0.05 **, the model is accepted with *p*-value > 0.05*

Firms with strong environmental commitments tend to provide detailed disclosures on waste management, carbon emissions, and renewable energy adoption. These findings align with the environmental commitment and environmental innovation dimension, where management's dedication serves as a key catalyst for integrating green practices into ESG reporting (Latan et al., 2018). The results are supported by the Natural Resource-Based View Theory (Hart, 1995), which posits that environmental awareness, as an intangible resource, creates a competitive advantage through transparent ESG disclosure. Simultaneously, stakeholder theory (Freeman, 1984) asserts that pressure from investors and consumers encourages companies to increase ESG transparency as a form of social legitimacy (García-Sánchez et al., 2020). These results have implications for signalling perspectives. ESG disclosures serve as credible market signals that reduce information asymmetry and reduce greenwashing scepticism by making a company's environmental commitments more verifiable by external stakeholders (Deegan, 2023; Grewal et al., 2021). This relationship is particularly prominent in the context of Indonesia's agricultural manufacturing sector, where equitable reporting and disclosure capabilities, as well as increased greenwashing risks, lead companies to become environmentally conscious and rely on ESG disclosures to demonstrate credibility and secure legitimacy from stakeholder pressure. These results support the research studies of Platonova et al. (2018) and García-Sánchez et al. (2020), which suggest that environmentally conscious companies adopt comprehensive ESG reporting to meet

market expectations and enhance the quality of disclosure, particularly under stringent regulations. Collectively, these findings reinforce that ESG disclosure is not only an accountability mechanism but also a strategic tool for building market trust amid increasing sustainability demands (Yusoff et al., 2019).

The results indicate that environmental consciousness has a positive effect on green intellectual capital (H₂). High levels of environmental awareness within organizations significantly support the development of green intellectual capital, particularly green human capital. Commitment from top management, dedicated budgets for environmental programs, and employee green training emerge as key drivers. Environmental consciousness further strengthens green intellectual capital by institutionalising green knowledge through structured training, cross-functional knowledge sharing, and formalised environmental management processes, enabling green competencies to accumulate systematically over time. Simultaneously, the environmental innovation dimension, reflected in the development of eco-friendly products and the adoption of clean technology, directly strengthens green structural capital. These results align with the research instruments of Latan, confirming that an environmentally-oriented organizational culture is foundational for developing sustainability-based intellectual assets (Latan et al., 2018). The findings support the Natural Resource-Based View Theory (Hart, 1995), which provides a robust theoretical foundation, positing that environmental awareness embedded in organizational culture creates unique capabilities manifested as green intellectual capital. Because these routines and sustainability-oriented stakeholder ties are path-dependent and embedded in organizational culture, the resulting Green Intellectual Capital becomes more difficult to imitate, reinforcing NRBV's capability-formation logic beyond a purely descriptive link. This is corroborated by Hameed, who found that environmentally conscious companies invest more in developing green employee skills and environmental management (Hameed et al., 2020). Yusoff et al. (2019) further affirm that top management's environmental commitment is pivotal in transforming environmental knowledge into strategic intellectual assets. Reinforcing this, Latan et al. (2018) show that environmental consciousness also fosters strategic relationships with sustainability-oriented stakeholders, thereby enhancing green relational capital. In Indonesia's agricultural context, this integration is increasingly vital due to mounting global pressure for sustainable business practices (Wijaya & Mursitama, 2023).

The findings also indicate that green intellectual capital is positively related to ESG disclosure (H₃). Firms that have stronger green human, structural, and relational capital generally report ESG information more extensively across environmental, social, and

governance aspects. Practices such as sustainability training for employees, the use of low-emission technologies, and cooperation with environmentally oriented stakeholders appear to support richer and more detailed ESG reporting. A stronger GIC enables firms to institutionalize ESG data-generation routines, such as materiality assessment, KPI tracking, cross-functional data integration, and internal verification, thereby making disclosed information more consistent and auditable. Specifically, investments in green patents and innovation databases (Green Structural Capital) provide companies with robust environmental performance data, enabling more transparent reporting (Hameed et al., 2020; Yusoff et al., 2019). These findings are theoretically grounded in the Natural Resource-Based View (Hart, 1995), which posits GIC as a valuable, rare, and inimitable intangible asset that creates competitive advantage through credible ESG disclosure, and signaling theory (Deegan, 2023), which asserts that companies use comprehensive ESG reporting to signal their commitment to sustainability to the market (Grewal et al., 2021). Empirical research supports this, with Hsu showing that high-GIC companies produce more detailed ESG reports, particularly regarding environmental performance and green innovation (Hsu et al., 2021). Similarly, Yusoff et al. (2019) found that GIC significantly elevates sustainability reporting quality, especially under regulatory pressure. In the Indonesian setting, this matters because uneven green infrastructure and reporting capacity mean that firms with stronger GIC can compensate through internal ESG data systems and supply-chain collaboration, enabling them to meet transparency demands more effectively (Yusoff et al., 2019; Wijaya & Mursitama, 2023).

Hypothesis 4 testing confirms that ESG disclosure has a positive effect on Green Competitive Advantage (GCA), revealing a significant positive relationship. An indicator analysis revealed that environmental disclosure, encompassing carbon emissions and waste management, made the largest contribution (38%) to GCA, followed by Social Disclosure, which includes CSR programs and community engagement, at 32%. Governance disclosure, covering anti-corruption policies and board diversity, accounted for 30%. An intriguing finding is that companies with high ESG disclosure scores tend to perform better on the market-reputation dimension than on product differentiation, suggesting that such disclosure is more effective for building corporate reputation than for creating tangible product distinctions. This pattern suggests that ESG disclosure creates competitive gains primarily through a fast-moving reputational signalling channel, whereas product differentiation typically requires substantive eco-innovation and longer investment cycles; therefore, disclosure alone is unlikely to generate a tangible product-based advantage. These results are

well-supported by Signalling Theory (Deegan, 2023), which posits that ESG disclosure acts as a positive signal to the market about a company's sustainability commitment, and Stakeholder Theory (Freeman, 1984), which emphasizes the importance of meeting stakeholder expectations. A study by García-Sánchez et al. (2020) in Europe found a strong positive relationship between ESG disclosure and GCA, while research by Wijaya and Mursitama (2023) in Indonesia revealed that this impact is most significant when coupled with strong stakeholder pressure. These findings are contextualized by the Indonesian Ministry of Environment and Forestry's 2023 report, which states that only 12% of manufacturing companies have an integrated ESG reporting system, and are consistent with Wijaya, who identifies greenwashing practices as a major obstacle to the effectiveness of ESG disclosure in creating a substantive competitive advantage (Wijaya & Mursitama, 2023).

The analysis indicates that environmental awareness does not have a significant direct effect on green competitive advantage (H_5). Although companies demonstrate strong environmental commitment and high levels of employee awareness, their performance on environmental innovation—such as developing environmentally friendly products and adopting clean technologies—remains limited. This reveals that, in the context of Indonesian manufacturing, internal green resources alone are insufficient to achieve a competitive advantage. Environmental Awareness with a strong foundational mindset often fails to translate into real market differentiation without signals of legitimacy, ESG disclosure, and challenges exacerbated by gaps in environmental innovation, as well as a prevailing focus on traditional productivity (Wijaya & Mursitama, 2023; Pizzetti et al., 2021). The gap between awareness and adoption of green practices, exemplified by insufficient budget allocation for low-carbon technology research and development (Latan et al., 2020), explains this failure. In addition, companies in Indonesia's agricultural sector still prioritize traditional productivity over innovative green strategies (Pizzetti et al., 2021), making Environmental Awareness inadequate to outperform competitors. The insignificant findings of this direct influence, which may contrast with those in developed countries, can be attributed to several Indonesian contextual factors. Institutionally, regulatory pressures and weak market incentives (Organization for Economic Co-operation and Development, 2024) do not compel companies to directly translate green awareness and knowledge into a genuine competitive advantage. Culturally, prioritizing traditional productivity and short-term approaches (Pizzetti et al., 2021) can hinder the transformation of environmental commitments into innovative products. These findings align with Natural Resource-Based Views (Hart, 1995) and Stakeholder Theory (Freeman, 1984), suggesting that Environmental Awareness, as an intangible

resource, requires mediation mechanisms such as ESG disclosure or green innovation to translate into profits. Studies by García-Sánchez in Europe and Wijaya in Indonesia confirm that Environmental Awareness only has a significant impact on Green Competitive Advantage when combined with organizational capabilities or regulatory pressures (García-Sánchez et al., 2021; Wijaya & Mursitama, 2023). This is consistent with Latan et al. (2020), who found that 60% of manufacturing companies in emerging markets fail in this transformation due to technological and infrastructure constraints (Latan et al., 2020; Asian Development Bank, 2023). Thus, these findings reinforce the argument that Environmental Awareness must be supported by complementary factors, such as government policies or investments in green intellectual capital, to achieve a competitive impact (Yusoff et al., 2021).

The results show that green intellectual capital does not have a significant effect on green competitive advantage (H_6). Analysis of indicators reveals that while green human capital (employee skills) and green structural capital (management systems) are moderately developed, green relational capital, particularly in collaboration with green suppliers, remains very weak, contributing only 23%. Green intellectual capital, despite its potential, remains a less leveraged asset. Its weak direct impact underscores critical shortcomings, particularly in green relational capital (e.g., collaboration with sustainable suppliers) and the strategic integration of green innovation into core business models, highlighting significant gaps in green execution capability (Hsu et al., 2021; Asian Development Bank, 2023). This indicates that companies in Indonesia's agricultural sector have been unable to establish a comprehensive, sustainable business network (Wijaya & Mursitama, 2023). These findings suggest that green innovations, such as clean technology patents, have not been strategically integrated into core business models, resulting in GICs' inability to create significant product differentiation (Hsu et al., 2021). This gap between intellectual capabilities and operational implementation is exacerbated by the lack of government incentives to develop green supply chains (Asian Development Bank, 2023). The insignificant findings of this direct influence, which may contrast with those in developed countries, can be attributed to several Indonesian contextual factors. Institutionally, regulatory pressures and weak market incentives (Organization for Economic Co-operation and Development, 2024) do not directly compel companies to convert green knowledge into a tangible competitive advantage.

Culturally, prioritizing traditional productivity and short-term approaches (Pizzetti et al., 2021) can hinder the transformation of environmental commitments into innovative products. The results align with the Natural Resource-Based View Theory (Hart, 1995), which posits

that GIC requires strong institutional support to translate into a competitive advantage. Studies by Yusoff et al. (2021) in Malaysia and García-Sánchez et al. (2023) in Europe confirm that GICs only have an impact on GCA if they are supported by strict regulations and market demand for green products. Research by Latan et al. (2020) found that 65% of manufacturing companies struggle to turn GICs into market advantages due to inadequate infrastructure. This finding is consistent with a 2023 report by the Ministry of Environment and Forestry, which shows that only 15% of companies have a structured green collaboration system. This study thus strengthens the argument that GICs require mediators, such as ESG disclosures and a supportive business ecosystem, to create a competitive impact (Grewal et al., 2021).

Finally, the analysis demonstrates that ESG disclosure plays a mediating role in linking environmental awareness to green competitive advantage (H₇). Environmental awareness contributes to competitive advantage both directly (direct effect = 0.329) and indirectly by enhancing the quality of ESG disclosure. Analysis of indicators reveals that the dimension of Environmental Commitments, through budget allocations and formal policies, is highly correlated with comprehensive environmental disclosure regarding emissions and waste management, which in turn enhances the market reputation. Data shows that companies with an ESG score of 61.97 show good value by generating a 25% more comprehensive ESG disclosure, a 15-20% increase in green reputation, and access to sustainable financing. Although companies have already conducted ESG reporting, the quality and depth of disclosure remain limited, particularly in the social and governance aspects. So, the company has not been fully able to turn it into a credible market signal. These results are theoretically based on the Natural Resource-Based View (Hart, 1995), which frames Environmental Awareness as a resource that is converted into ability through formal disclosure, and Signalling Theory (Grewal et al., 2021), where disclosure signifies commitment. Empirical support comes from García-Sánchez et al. (2023), who found ESG disclosures mediated 35% of Environmental Awareness effects in emerging markets, and Wijaya and Mursitama (2023), who confirmed this mediation was most effective under regulatory pressures in Indonesia's manufacturing sector. However, the effectiveness of mediation in Indonesia is limited by a lack of reporting capacity and the fact that only 12% of companies have integrated ESG systems, as well as the prevalence of greenwashing practices (Zhu et al., 2023).

The mediating role of ESG disclosure in the relationship between green intellectual capital and green competitive advantage (H₈) is supported. These findings indicate that companies with robust GICs enhance their GCAs through transparent ESG disclosures.

Analysis of indicators reveals that Green Human Capital (employee sustainability training) contributes 38% to the quality of social disclosure, while green structural capital (environmental management system) has the most significant impact on Environmental Disclosure, including carbon emission reporting. Green Relational Capital affects 17% of governance disclosures. Companies with high GIC scores produce 25% more comprehensive ESG reports than peers with low scores, leading to an 18% increase in Market Reputation and a 12% increase in cost efficiency. Companies with an ESG score of 61.97 show a fairly good value by producing a 25% more comprehensive ESG disclosure, a 15-20% increase in green reputation, and access to sustainable financing. Although companies have already conducted ESG reporting, the quality and depth of disclosure remain limited, particularly in the social and governance aspects. So, the company has not been fully able to turn it into a credible market signal. These results are in line with Signalling Theory (Grewal et al., 2021), which posits that ESG disclosure transforms intangible GICs into credible market signals of sustainability commitment. Empirical support comes from Yusoff et al. (2021), who found ESG disclosures mediated a 30% effect of GICs on environmental performance in Southeast Asian manufacturing, and Hsu et al. (2023), who reported a 22% increase in green market share for companies that transparently disclose green patents. In Indonesia, this mediation is most effective under regulatory pressure (Wijaya & Mursitama, 2023). However, emerging market challenges persist, with only 15% of Indonesian companies having an integrated ESG system in place and frequent symbolic disclosures resulting from weak standards (World Economic Forum, 2025).

Conclusion and Suggestion

This study revealed that ESG disclosure plays a full mediating role, transforming environmental consciousness and green intellectual capital into green competitive advantage. Key findings suggest that internal green resources do not directly impact competitive advantage; rather, they must be communicated through a credible signaling mechanism, such as transparent ESG reporting. Empirically, environmental consciousness and green intellectual capital have been shown to significantly improve the quality of ESG disclosure, which in turn has a positive impact on green reputation building and cost efficiency. However, their influence on product differentiation remains limited. These findings expand the NRBV framework by integrating stakeholder theory and signaling theory, positioning ESG disclosure as a strategic mechanism for converting green resources into positive signals for the market. However, in the Indonesian context, the effectiveness of this mediation faces

several constraints, including a low reporting capacity, with only 12-15% of companies having an integrated ESG system, which is often accompanied by greenwashing practices, and weak regulatory incentives. Implicitly, supportive policies and sustainable investments are necessary to maximize the role of ESG disclosure as a catalyst for a sustainable green competitive advantage.

This study has several limitations that need to be acknowledged. First, the findings from the sample focusing on the agricultural manufacturing sector on the IDX may not be fully applicable to other sectors, such as finance or mining, due to their unique operational and supply chain characteristics. Second, the cross-sectional (one-time) nature of the study cannot capture the dynamic journey of a company in building a green competitive advantage, which typically takes years to mature fully. Third, data sourced from risk managers' perception questionnaires may contain bias, such as a tendency to provide answers that are considered good, and may not fully describe ESG implementation at the field level. Fourth, even if the measurement tools used have been tested to be valid and reliable, these perception-based measurements remain proxy-based and may be less robust than objectively verified ESG performance data. Finally, contextual challenges in Indonesia, such as limited reporting capacity, inadequate supporting infrastructure, and greenwashing practices, may hinder the practical implementation of the study's recommendations. However, these challenges are fundamental reasons why research like this is important.

Based on the findings, practical recommendations for regulators are first to build a concrete supporting ecosystem. Key steps include implementing mandatory ESG reporting standards and aligning with global frameworks (such as IFRS) to ensure credibility, supported by strategic incentives, including tax breaks, access to green financing, and ease of licensing. Second, capacity building through training and mentoring is urgent, considering that there are still a few companies with an integrated ESG system. Third, law enforcement against greenwashing practices is also needed to maintain the integrity of the system. Meanwhile, future research is suggested to enrich the methodological approach. Expanding the scope of the sector, using longitudinal studies, and applying mixed methods will provide a more dynamic and in-depth picture. From a theoretical perspective, future research can test how institutional pressure (Institutional Theory) affects the strengthening or weakening of the relationship between ESG disclosure and green competitive advantage, as well as explore the configuration of green intellectual capital that enables the formation of dynamic capabilities. The introduction of moderator variables such as the level of green competition or market orientation, as well as the refinement of measurement by integrating objective ESG data

(such as scores from rating agencies), will further enrich the understanding of the mechanisms for achieving sustainable green competitive advantage.

This research contributes, specifically, to theoretically expanding the framework of the Natural Resource-Based View (NRBV) through the integration of signaling theory and stakeholder theory. The key finding that ESG disclosure acts as a full mediator extends the traditional NRBV by demonstrating that internal green resources (Environmental Consciousness and Green Intellectual Capital) must be credibly communicated to the market through transparent signals to be realized as a green competitive advantage. This positions ESG disclosure not just as a reporting tool, but as a strategic mechanism and dynamic capability that transforms the potential into a market-recognized "good news" signal. Second, practically, these implications demand a concrete strategy: companies must integrate green investments with transparent reporting, allocate dedicated budgets for ESG innovation and reporting capacity, and invest in green relational capital. Third, for regulators, it is necessary to build a supporting ecosystem through the implementation of mandatory reporting standards aligned with the global framework, the provision of strategic incentives such as tax relief, and the implementation of training programs to enhance reporting capacity.

Disclosure The Use of AI Technologies

During the preparation of this work, the author(s) used Grammarly-AI to translate, paraphrase, and correct the grammar. After using these tools/services, the author(s) reviewed and edited the content as needed and take full responsibility for the final content of the publication.

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