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ESG Information Credibility and Retail Investors' Allocation Intention: The Roles of Sustainability Awareness and Greenwashing Perception

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ABSTRACT

Purpose – This study examines the relationship between ESG information credibility and retail investors' ESG investment allocation intention, considering sustainability awareness and greenwashing perception as potential mediators.
Design/methodology/approach – A quantitative cross-sectional survey was conducted among Indonesian retail investors from January to April 2026. Data were analyzed using PLS-SEM with SmartPLS 4, including direct, indirect, serial mediation, and predictive analyses using PLSpredict.
Finding/Results – ESG information credibility is positively associated with investment allocation intention, sustainability awareness, and greenwashing perception. Sustainability awareness positively relates to greenwashing perception but not significantly to allocation intention. Unexpectedly, greenwashing perception positively relates to allocation intention. Mediation through sustainability awareness is insignificant, whereas mediation through greenwashing perception and serial mediation are statistically significant. However, these indirect associations do not confirm the hypothesized mechanisms because key relationships differ from their predicted directions.
Originality/Value – This study highlights the complex relationships among ESG credibility, sustainability awareness, greenwashing perception, and investment intentions. It challenges conventional assumptions about greenwashing as an investment deterrent and emphasizes the distinction between statistical mediation and theoretical confirmation, providing directions for further research on investor behavior and ESG information exposure. intentions.

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1. Introduction

Environmental, social, and governance (ESG) considerations have become increasingly relevant in investment decisions as investors are asked to look beyond short-term financial returns and consider the broader environmental and social consequences of business activities. This development has also increased the importance of ESG-related information in financial markets. For individual investors, ESG information can provide additional signals about a firm's sustainability practices, risks, and long-term prospects. Experimental evidence shows that providing ESG information can change retail investors' portfolio choices, with investors allocating a larger share of their portfolios to stocks when ESG information is available (Janz et al., 2023). Similarly, recent evidence indicates that retail investors do value sustainability characteristics in investment products, although their responses depend strongly on how sustainability information is presented and perceived (Breuer & Lehnhoff, 2026). These findings suggest that ESG information can influence investment behavior, but the availability of information alone may not be sufficient to encourage investors to allocate capital to ESG-oriented assets.

The central issue is therefore shifting from whether ESG information is available to whether investors consider that information credible. ESG information is useful only when investors believe that it is sufficiently accurate, comparable, and trustworthy. This concern has become particularly important because ESG reporting remains heterogeneous across firms and information providers. Investors may encounter differences in ESG ratings, disclosure formats, measurement approaches, and the level of assurance supporting sustainability claims. Recent evidence shows that investors continue to perceive substantial credibility problems in sustainability reporting. PwC's 2023 Global Investor Survey, for example, found that 94% of surveyed investors believed that corporate sustainability reporting contained unsupported claims, while 85% indicated that reasonable assurance would increase their confidence in sustainability reporting. More recent experimental evidence also shows that retail investors reduce their willingness to pay for sustainable investment products when they are informed about limitations in the underlying sustainability assessment, suggesting that credibility is an important condition for translating sustainability information into investment preferences (Breuer & Lehnhoff, 2026).

This credibility problem becomes more complicated when investors suspect greenwashing. Greenwashing refers broadly to situations in which organizations communicate a more favorable environmental or sustainability image than is supported by their actual practices. In financial markets, perceived greenwashing can create uncertainty about whether ESG claims reflect genuine sustainability performance or strategic communication. This matters because investors may not simply respond to the positive content of ESG information; they may also evaluate whether the information appears credible and consistent with corporate actions. Empirical evidence supports this concern. A 2024 study found that corporate greenwashing can affect investors' decisions, with greenwashing producing short-term positive market responses but reducing investors' willingness to invest over the longer term (T. Li et al., 2024). Experimental evidence also indicates that retail investors can respond differently to greenwashed and genuinely sustainable investment products, suggesting that perceptions of greenwashing may influence how investors evaluate sustainable investment opportunities (Kleffel & Muck, 2023).

The problem is particularly relevant for retail investors, who often face greater information constraints than institutional investors. Retail investors may rely on corporate websites,

financial media, investment platforms, social media, ESG ratings, and other simplified sources when evaluating investment opportunities. Research on individual investors has noted that ESG information integration remains an emerging area of study, with earlier research concentrating more heavily on institutional investors (Park & Oh, 2022). More recent evidence confirms that ESG beliefs and motivations among retail investors are highly heterogeneous. Using a large panel of retail investors, Giglio et al. (2025) found substantial differences in investors' motivations for ESG investing and reported that many investors did not perceive a clear reason to invest in ESG assets. This heterogeneity suggests that the same ESG information may not produce the same investment response across individuals.

At the same time, sustainability awareness may play an important role in determining how retail investors respond to ESG information. Awareness can make investors more attentive to environmental and social issues and may increase their willingness to consider sustainability when allocating financial resources. However, awareness should not automatically be interpreted as trust. A sustainability-aware investor may be more interested in ESG investment but may also be more critical of unsupported or exaggerated sustainability claims. This creates an important theoretical tension. Greater awareness may increase the relevance of ESG information for investment decisions, while simultaneously increasing investors' sensitivity to potential greenwashing. Recent research on sustainable finance provides evidence that attention to sustainability-related information is associated with investment intentions, whereas greenwashing perceptions are negatively associated with the likelihood of investing in sustainable financial products (Strauß et al., 2023). This suggests that awareness and skepticism may operate together rather than as opposing forces.

This tension is particularly important in the Indonesian financial market. Indonesia has progressively strengthened its sustainable finance ecosystem through regulatory initiatives, including the Sustainable Finance Roadmap and the Indonesia Taxonomy for Sustainable Finance. The Financial Services Authority (OJK) has explicitly identified public awareness as one of the components of the sustainable finance ecosystem and has emphasized the development of sustainable financial products, market infrastructure, ESG implementation, and public awareness (Otoritas Jasa Keuangan (OJK), 2024). The Indonesia Taxonomy for Sustainable Finance has also been developed as a reference for sustainable activities and indicators, with the stated objective of supporting sustainable financing and capital allocation (Otoritas Jasa Keuangan (OJK), 2025). These developments indicate that the supply of sustainability-related information and investment products is becoming more structured. However, stronger disclosure and regulatory frameworks do not necessarily guarantee that retail investors will trust or use ESG information in their investment decisions.

The emerging Indonesian context therefore presents an important empirical issue. The development of sustainable finance requires not only firms to disclose ESG information but also investors to interpret and evaluate that information. If retail investors perceive ESG information as credible, it may strengthen their willingness to allocate funds toward ESG-oriented investments. Conversely, if investors perceive sustainability claims as exaggerated, selective, or potentially misleading, greenwashing perceptions may weaken the relationship between ESG information and investment allocation. A recent Indonesian study focusing specifically on retail investors also reported varying levels of ESG understanding and concerns about greenwashing, with perceived credibility of corporate sustainability claims emerging as an important issue (Nanlohi et al., 2025). However, the existing Indonesian evidence remains

limited, particularly regarding how ESG information credibility, sustainability awareness, and greenwashing perception jointly shape retail investors' allocation intentions.

Table 1. Empirical Phenomena Supporting the Research Problem

Evidence/Finding	Key figure or finding	Relevance to the present study
Investors' concern about sustainability reporting	94% of surveyed investors believed corporate sustainability reporting contained unsupported claims	Shows a credibility problem in ESG information and the potential for investor skepticism. (PwC Indonesia, 2024)
Investor demand for assurance	85% reported that reasonable assurance would increase confidence in sustainability reporting	Indicates that credibility and verification matter for investment-related use of ESG information. (PwC Indonesia, 2024)
Retail investors and ESG allocation	Retail investors allocated significantly more to stocks when ESG information was provided in an experimental setting	Demonstrates that ESG information can influence portfolio allocation. (Nanlohi et al., 2025)
Retail investor response to sustainability profiles	Retail investors showed a sustainability premium, but willingness to pay declined by about 10–14% after information about assessment limitations was disclosed	Shows that the effect of ESG information depends on perceived credibility. (Breuer & Lehnhoff, 2026)
Greenwashing and investor behavior	Greenwashing can reduce investors' willingness to invest over the longer term	Demonstrates the behavioral consequences of perceived misleading sustainability claims. (T. Li et al., 2024)
Greenwashing and sustainable investment intention	Greenwashing perceptions are negatively associated with the likelihood of investing in sustainable finance products	Supports the relevance of greenwashing perception as a behavioral mechanism. (Strauß et al., 2023)
ESG beliefs among retail investors	48% of surveyed retail investors reported no reason to invest in ESG, while motivations varied considerably among those who did	Highlights substantial heterogeneity in retail investors' ESG preferences. (Giglio et al., 2025)
Indonesian sustainable finance policy	OJK identifies awareness, sustainable products, market infrastructure, and ESG implementation as components of the sustainable finance ecosystem	Establishes the Indonesian institutional context and policy relevance. (Otoritas Jasa Keuangan (OJK), 2024)

The literature therefore reveals an important gap. First, prior studies have established that ESG information can affect individual investors' investment behavior, but relatively less attention has been given to information credibility as a central explanatory factor. Second, studies on greenwashing have largely examined its consequences for corporate reputation, market outcomes, or investor responses after greenwashing is identified, while fewer studies explain how retail investors' perceptions of greenwashing interact with their sustainability awareness when evaluating ESG information. Third, the literature often examines sustainability awareness, trust, greenwashing, or ESG investment intention separately. This creates a fragmented understanding of the psychological process through which retail investors move from receiving ESG information to forming an intention to allocate capital to ESG-oriented

investments. A recent systematic review of ESG investment among retail investors similarly identifies the need for further research on how retail investors engage with ESG information in investment decision-making (J. Li et al., 2025).

The present study addresses this gap by examining the relationship between ESG information credibility and retail investors' ESG allocation intention, while considering the roles of sustainability awareness and greenwashing perception. The underlying argument is that ESG information does not operate in a purely informational vacuum. Investors first assess whether the information is credible and relevant, while their sustainability awareness determines how seriously they consider sustainability-related attributes. At the same time, perceived greenwashing may undermine the positive investment response by raising doubts about the authenticity of ESG claims. This perspective moves beyond the simple assumption that more ESG information automatically leads to stronger sustainable investment intentions. Instead, it recognizes that the behavioral value of ESG information depends on how investors interpret its credibility and whether they perceive a meaningful risk of greenwashing.

The urgency of this study lies in the growing need to ensure that the expansion of sustainable finance is accompanied by credible ESG information and informed retail investment decisions. Regulators and financial institutions can increase the volume of ESG disclosures and sustainable investment products, but these efforts may have limited behavioral effects if retail investors do not trust the information or perceive sustainability claims as potentially misleading. This issue is especially relevant in Indonesia, where sustainable finance regulation and infrastructure continue to develop, including the Indonesia Taxonomy for Sustainable Finance and initiatives aimed at increasing public awareness (Otoritas Jasa Keuangan (OJK), 2024). Understanding how credibility, sustainability awareness, and greenwashing perception shape investors' allocation intentions can therefore contribute to both theory and practice. Theoretically, the study connects information credibility with investor sustainability awareness and skepticism toward greenwashing. Practically, the findings may help regulators, listed companies, asset managers, and financial platforms design ESG communication that is more transparent, verifiable, and meaningful to retail investors.

Against this background, the present study seeks to address an important question concerning how retail investors evaluate ESG information when making sustainable investment choices. Specifically, the study examines whether the credibility of ESG information can encourage retail investors to allocate funds toward ESG-oriented investments and whether this effect is shaped by investors' level of sustainability awareness and their perceptions of greenwashing. The study also considers whether greater sustainability awareness makes investors more attentive to potential greenwashing and, consequently, changes their willingness to allocate funds to ESG investments. By examining these relationships simultaneously, the study aims to provide a more nuanced explanation of how retail investors move from receiving and evaluating ESG information to forming an intention to allocate investment funds.

Accordingly, this study addresses three broader research questions. First, to what extent does the perceived credibility of ESG information influence retail investors' ESG allocation intention? Second, how do sustainability awareness and greenwashing perception shape this investment intention and relate to the credibility of ESG information? Third, do sustainability awareness and greenwashing perception provide indirect pathways through which ESG information credibility influences retail investors' ESG allocation intention? Addressing these questions is expected to clarify whether credible ESG information is sufficient to encourage sustainable investment allocation or whether investors' sustainability awareness and concerns

about greenwashing play a critical role in translating ESG information into investment intentions.

2. Literature Review & Hypothesis Development

2.1 Theoretical Foundation: Signaling Theory

Signaling Theory provides the primary theoretical foundation for explaining how retail investors interpret ESG-related information under conditions of information asymmetry. The theory explains how signals can convey information about otherwise difficult-to-observe characteristics when one party possesses more information than another (Connelly et al., 2011). In financial markets, firms generally possess more detailed information about their strategies, operations, risks, and sustainability practices than external investors. ESG disclosures, sustainability reports, ESG ratings, and related information can therefore function as signals regarding a firm's sustainability characteristics and longer-term quality.

However, the signaling process does not end with the provision of information. A signal must first be interpreted by its recipient. Investors assess whether the information is sufficiently accurate, reliable, transparent, consistent, and supported by evidence before incorporating it into their judgments. Accordingly, the theoretical value of an ESG signal depends not only on whether information is disclosed but also on how investors evaluate its perceived quality and interpret the uncertainty surrounding the underlying sustainability characteristics.

This distinction is particularly important in sustainable finance because retail investors generally cannot directly verify the environmental and social performance communicated by firms. The same ESG information environment may therefore generate both confidence and scrutiny. When information is perceived as credible, investors may regard the signal as more useful for evaluating ESG characteristics and may experience greater confidence in considering ESG-oriented investment opportunities. At the same time, investors who actively evaluate ESG information may scrutinize whether particular sustainability claims are adequately supported, selectively disclosed, exaggerated, or otherwise potentially misleading. Thus, credibility of ESG information and concern about greenwashing should not necessarily be conceptualized as mutually exclusive perceptions.

In this study, four conceptual components are distinguished within the signaling process. First, the signal refers to ESG-related information encountered by retail investors when evaluating companies and investment opportunities. Second, ESG Information Credibility represents the investor's perceived quality of that information, particularly its accuracy, reliability, transparency, and trustworthiness. Third, Sustainability Awareness and Greenwashing Perception represent investor-level interpretations and evaluations of the sustainability information environment. Sustainability Awareness captures the extent to which investors recognize the relevance of sustainability considerations, whereas Greenwashing Perception captures concerns that ESG-related claims may be exaggerated, selective, vague, or misleading. Fourth, ESG Investment Allocation Intention represents the behavioral intention that may follow from investors' interpretation and evaluation of ESG information.

On this basis, the present study distinguishes between relationships that follow directly from the conventional signaling logic and relationships that extend that logic to investor scrutiny. The positive relationship between ESG Information Credibility and ESG Investment Allocation Intention is a direct signaling prediction because credible information should

reduce uncertainty and increase the usefulness of ESG information for investment evaluation. The positive relationship between ESG Information Credibility and Sustainability Awareness similarly reflects the information function of a credible signal. In contrast, the proposed relationship between Sustainability Awareness and Greenwashing Perception extends the signaling perspective by recognizing that investors may not respond to ESG signals passively; greater awareness may increase attention to the quality and authenticity of sustainability claims. The hypothesized negative relationships between ESG Information Credibility and Greenwashing Perception and between Greenwashing Perception and ESG Investment Allocation Intention represent the conventional deterrence logic of signaling: credible information should reduce concerns about misleading claims, while perceived misleading signals should weaken their informational value for investment decisions.

Importantly, these theoretical predictions do not require credibility and scrutiny to be perfect opposites. An investor may regard ESG information as generally credible and useful while simultaneously recognizing that individual sustainability claims may be incomplete, selective, or potentially misleading. The empirical relationships between these perceptions are therefore open to examination rather than predetermined by the theory. This distinction is particularly relevant to the present study because the survey captures investors' perceptions of ESG-related information encountered across their broader investment information environment rather than responses to a single focal disclosure.

Accordingly, Signaling Theory is used in this study as an a priori framework for deriving the directional hypotheses, while the possibility that credibility and critical scrutiny may coexist is treated as a theoretically informed proposition requiring empirical examination. An important qualification, however, concerns the referent of the evaluations captured by the survey. Respondents assessed ESG-related information encountered across their broader investment information environments rather than evaluating a common focal disclosure, company, or investment product. Consequently, their assessments of ESG Information Credibility and Greenwashing Perception may refer to different information sources or firms. The relationship between these constructs therefore represents an association between generalized, investment-contextualized perceptions of ESG information and potential greenwashing, rather than evidence that greater credibility assigned to a particular ESG disclosure generates greater scrutiny of that same disclosure. The unexpected positive association between ESG Information Credibility and Greenwashing Perception must be interpreted within this referent limitation. A design using a standardized ESG disclosure or experimental vignette would be required to establish whether credibility judgments and greenwashing perceptions concern the same informational signal.

2.2. ESG Information Credibility

ESG Information Credibility refers to the extent to which retail investors perceive ESG-related information as trustworthy, accurate, transparent, consistent, and sufficiently supported by evidence. The construct focuses on the **perceived credibility of the information received by investors**, rather than the objectively verified quality of a firm's ESG performance.

This distinction is important because investors often depend on corporate sustainability reports, ESG ratings, financial platforms, media reports, and other information intermediaries. Differences in reporting standards, measurement methods, ESG ratings, and levels of assurance may affect how investors judge the reliability of sustainability information. Recent research specifically identifies credibility and transparency as important dimensions of retail

investors' engagement with ESG investment and calls for further research on how investors respond to disclosures, ratings, sustainability reports, and assurance (J. Li et al., 2025).

Credibility is therefore expected to determine whether ESG information functions as an effective signal. When investors perceive information as credible, they can rely more confidently on the information when forming judgments about sustainability. Conversely, information perceived as vague, inconsistent, exaggerated, or poorly supported may create uncertainty and reduce its usefulness in investment decision-making.

In this study, ESG Information Credibility is operationally defined as retail investors' perceived reliability, accuracy, transparency, consistency, and trustworthiness of ESG information used to evaluate investment opportunities.

Conceptually, ESG Information Credibility should be distinguished from an investor's suspicion that sustainability claims may be misleading. Credibility concerns the perceived quality of the information as an informational signal, including its accuracy, reliability, transparency, and usefulness for forming an investment judgment. It therefore addresses whether the information is sufficiently trustworthy to be used in evaluating an investment opportunity. This judgment does not require the investor to conclude that all ESG claims made by companies are free from exaggeration or selective disclosure. An investor may regard the ESG information environment as sufficiently credible for investment evaluation while still recognizing that some sustainability claims may be misleading. Thus, credibility represents an evaluation of the informational quality and usability of the signal, rather than a determination that the underlying sustainability claims are necessarily genuine.

2.3. Sustainability Awareness

Sustainability Awareness refers to the extent to which retail investors recognize the relevance and importance of environmental, social, and governance considerations in economic and investment decisions. The concept is broader than technical ESG knowledge. It reflects an investor's awareness that investment choices can have consequences beyond financial returns and that sustainability characteristics can be relevant when evaluating investment opportunities.

Recent literature on retail ESG investment places awareness and information searching at the activation stage of ESG engagement. The systematic review by J. Li et al. (2025) identifies awareness as one of the key factors that initiate retail investors' engagement with ESG information, while credibility and transparency become important when investors form attitudes toward ESG investment.

Recent experimental evidence also provides direct support for the behavioral importance of ESG awareness. An experimental study published in 2026 found that increasing ESG awareness increased the probability that individuals would choose sustainable investment options, although the effect remained sensitive to financial returns (Shahen et al., 2026). This finding suggests that awareness is not merely an attitudinal construct; it can influence how individuals evaluate investment alternatives.

For the present study, sustainability awareness is defined as the extent to which retail investors recognize, understand, and consider sustainability issues as relevant to their investment evaluation and allocation decisions.

This definition is deliberately focused on investment-related awareness. It avoids treating sustainability awareness as a general environmental attitude that may exist independently of investment behavior.

2.4. Greenwashing Perception

Greenwashing Perception refers to the extent to which retail investors perceive that sustainability or ESG claims may exaggerate, selectively present, or misrepresent a firm's actual sustainability performance. The construct captures the investor's perception, rather than an objective legal or technical determination that greenwashing has occurred. Greenwashing Perception therefore differs from ESG Information Credibility in both its evaluative target and its psychological content. Whereas credibility concerns whether information is perceived as sufficiently reliable and trustworthy for investment evaluation, greenwashing perception concerns whether the communicated sustainability claims may depart from, exaggerate, or selectively represent the underlying sustainability reality. The two evaluations can coexist because investors may consider ESG information generally useful and sufficiently credible while remaining alert to the possibility that particular companies or claims may contain selective, exaggerated, or misleading elements. In this sense, Greenwashing Perception captures skepticism about the correspondence between sustainability claims and underlying practices, whereas ESG Information Credibility captures confidence in the informational quality of the available signal.

This distinction is particularly important for retail investors. Investors usually have limited access to internal corporate information and cannot independently verify every ESG claim. As a result, their judgment about greenwashing is influenced by the consistency, transparency, completeness, and credibility of available information.

The CFA Institute's investor-focused analysis of ESG fund disclosures illustrates this problem. Its examination of funds marketed to retail investors identified inconsistent disclosures, omissions, unsupported sustainability claims, and excessive emphasis on selected sustainability characteristics as potential sources of greenwashing perceptions. It also noted that retail investors often lack access to the internal records and third-party research necessary to verify such claims independently (Gehric & Moreno, 2023).

Recent empirical evidence further confirms that greenwashing perception matters for individual investment behavior. Gacem et al. (2025), using data from 2,215 French investors, found that higher perceived greenwashing significantly reduced the likelihood of green investment. A one-point increase in greenwashing perception was associated with a 1.68 percentage-point reduction in investment likelihood.

In this study, Greenwashing Perception is defined as the extent to which retail investors perceive ESG claims as potentially exaggerated, misleading, selective, or inconsistent with a firm's actual sustainability practices.

2.5. ESG Investment Allocation Intention

ESG Investment Allocation Intention refers to the extent to which retail investors intend or are willing to allocate financial resources toward investment opportunities that incorporate ESG considerations. The construct captures the investor's behavioral intention rather than actual portfolio behavior.

The distinction is necessary because intention and actual allocation may differ. Investors may express an intention to invest sustainably but face constraints related to financial returns, product availability, transaction costs, liquidity, or investment knowledge. Nevertheless, intention remains an important behavioral outcome because it represents the investor's willingness to translate an evaluation of ESG characteristics into a potential allocation decision.

Recent experimental evidence provides strong support for the relevance of ESG information to actual portfolio choices. Janz et al. (2025) found that retail investors allocated approximately

11 percentage points more to stocks when ESG information was provided than when it was not. More recent research similarly identifies portfolio adjustment as an important action stage in retail investors' ESG engagement (J. Li et al., 2025).

In this study, ESG Investment Allocation Intention is defined as the retail investor's willingness and intention to allocate or increase financial resources toward ESG-oriented investment opportunities.

2.6. ESG Information Credibility and ESG Investment Allocation Intention

The relationship between ESG Information Credibility and ESG Investment Allocation Intention represents the most direct application of Signaling Theory in the present study. A signal is useful to an investor when it provides credible information about characteristics that cannot be directly observed. In the ESG context, perceived credibility can increase the informational value of sustainability-related information and reduce uncertainty surrounding the ESG characteristics communicated by firms or investment products (Connelly et al., 2011; Janz et al., 2025; J. Li et al., 2025).

When retail investors perceive ESG information as reliable, transparent, and trustworthy, they may have greater confidence in using that information when evaluating ESG-oriented investment opportunities. Conversely, information perceived as unreliable or poorly supported provides a weaker basis for investment evaluation and may increase uncertainty. Accordingly, the signaling perspective provides a clear a priori basis for expecting credible ESG information to be positively associated with investors' intention to allocate financial resources to ESG-oriented opportunities.

H1: ESG information credibility has a positive effect on retail investors' ESG investment allocation intention.

2.7. ESG Information Credibility and Sustainability Awareness

The relationship between ESG information credibility and sustainability awareness can be explained through the information function of credible signals. Retail investors cannot respond to sustainability information if they do not recognize its relevance. Credible and understandable ESG information can make sustainability considerations more salient by helping investors identify the environmental, social, and governance implications associated with an investment.

This argument is consistent with the recent systematic review by J. Li et al. (2025), which identifies awareness and information searching as important mechanisms through which retail investors become engaged with ESG investment, while credibility and transparency of ESG data shape subsequent investor attitudes. The distinction between these stages is useful for the present study because it suggests that credible information can contribute to the development of investment-related sustainability awareness.

Recent experimental evidence provides additional support. When individuals received information specifically designed to increase their ESG awareness, their probability of selecting sustainable investment alternatives increased (Shahen et al., 2026). Although awareness is not created solely by information credibility, credible information is expected to make sustainability-related information more meaningful and usable, thereby strengthening investors' awareness of sustainability considerations in investment decisions. This relationship represents an information-processing extension of the signaling perspective, whereby a signal that is perceived as credible may increase the extent to which investors recognize and attend to the sustainability information being communicated. Accordingly:

H2: ESG information credibility has a positive effect on retail investors' sustainability awareness.

2.8. Sustainability Awareness and ESG Investment Allocation Intention

Investors who are more aware of sustainability issues are more likely to recognize ESG characteristics as relevant to investment evaluation. Sustainability awareness can therefore increase the likelihood that investors will consider environmental, social, and governance attributes when deciding how to allocate financial resources.

This relationship is supported by recent evidence. The 2026 experimental study on ESG awareness found that increasing awareness increased the probability of choosing sustainable investment alternatives, although financial return considerations continued to matter (Shahen et al., 2026). The finding is important because it indicates that awareness can influence investment decisions without implying that investors ignore conventional financial considerations.

The relationship is also consistent with the retail ESG literature. J. Li et al. (2025) identify awareness and information searching as an activation mechanism in retail investors' ESG engagement and portfolio adjustment as a subsequent behavioral stage. Therefore, investors who recognize the relevance of sustainability are expected to show stronger intentions to allocate funds to ESG-oriented investments.

H3: Sustainability awareness has a positive effect on retail investors' ESG investment allocation intention.

2.9. ESG Information Credibility and Greenwashing Perception

ESG Information Credibility and Greenwashing Perception represent distinct but related forms of investor evaluation within the ESG information environment. ESG Information Credibility concerns the perceived quality of ESG information as a signal, particularly whether the information is accurate, reliable, transparent, and trustworthy. Greenwashing Perception concerns whether sustainability claims may be exaggerated, selectively disclosed, vague, or misleading. The two constructs therefore do not represent opposite ends of a single psychological continuum.

Under the conventional signaling logic, credible information should reduce uncertainty concerning the characteristics communicated by firms and consequently reduce the need for investors to suspect misleading claims (Connelly et al., 2011). When ESG information is transparent, consistent, and supported by evidence, investors should have fewer reasons to question whether sustainability claims accurately represent underlying practices. This reasoning provides the theoretical basis for a negative relationship between ESG Information Credibility and Greenwashing Perception.

At the same time, Signaling Theory does not imply that recipients passively accept signals. Investors must interpret and evaluate signals in an environment in which multiple disclosures, ratings, reports, and external information sources may differ in quality. An investor may therefore regard ESG information as generally credible and useful while still scrutinizing whether particular claims are sufficiently supported. This possibility means that credibility and greenwashing perception can coexist without conceptual contradiction.

The present study therefore treats the relationship between ESG Information Credibility and Greenwashing Perception as an empirical question. The hypothesized negative relationship reflects the conventional signaling prediction that higher perceived signal quality should reduce uncertainty and concerns about misleading claims. The possibility of a positive

association represents an alternative empirical outcome rather than a prediction introduced after observing the data. A further qualification concerns the level at which these two evaluations are made. Because respondents were not asked to assess a single standardized ESG disclosure, the credibility judgment and the greenwashing judgment may concern different companies, reports, or information sources. For example, a respondent may consider ESG information from one source credible while believing that other companies frequently exaggerate their sustainability claims. Such responses can produce a positive association between ESG Information Credibility and Greenwashing Perception without implying that credibility and greenwashing coexist in the evaluation of the same disclosure. Accordingly, the hypothesized relationship is examined as an association between generalized perceptions of ESG information and greenwashing within the respondents' investment information environments. The current design does not permit a disclosure-specific interpretation of this relationship.

H4: ESG Information Credibility has a negative effect on retail investors' Greenwashing Perception.

2.10. Sustainability Awareness and Greenwashing Perception

Sustainability Awareness represents an investor's recognition that environmental, social, and governance considerations are relevant to investment decisions. From a signaling perspective, greater awareness may influence not only whether investors attend to ESG signals but also how critically they interpret them.

Investors who are more attentive to sustainability issues may be more likely to examine the consistency, completeness, and plausibility of sustainability claims. Greater awareness can therefore increase attention to discrepancies between communicated ESG characteristics and available evidence (Gehric & Moreno, 2023; Kathan et al., 2025). In this sense, sustainability awareness represents a theoretically informed extension of the signaling perspective from signal reception to signal scrutiny.

This argument does not imply that greater awareness necessarily produces distrust. Rather, more sustainability-aware investors may pay greater attention to the possibility that ESG claims are selective, exaggerated, vague, or difficult to verify. Greenwashing Perception therefore captures a critical evaluative response to ESG-related information rather than a simple absence of trust.

H5: Sustainability awareness has a positive effect on retail investors' greenwashing perception.

2.11. Greenwashing Perception and ESG Investment Allocation Intention

Greenwashing Perception is expected to weaken investors' willingness to translate ESG information into investment allocation. When investors believe that sustainability claims may be exaggerated, selective, vague, or misleading, the informational value of the signal is reduced and uncertainty concerning the underlying ESG characteristics increases. From a signaling perspective, a signal that is perceived as unreliable should provide a weaker basis for investment evaluation than a signal perceived as credible.

This reasoning is consistent with empirical evidence showing that perceived greenwashing can discourage sustainable investment decisions (Gacem et al., 2025; Joseph & Jose, 2025; Suci et al., 2026). From this perspective, investors who perceive greater risk that ESG claims do not correspond to underlying practices should be less willing to rely on those claims when allocating financial resources to ESG-oriented investments.

The theoretical prediction concerns the expected direction of the relationship, but it does not imply that every investor who recognizes potential greenwashing will necessarily withdraw

from ESG investment opportunities. Investors may continue to consider ESG investments while simultaneously scrutinizing the credibility of particular claims. The present hypothesis therefore tests whether the conventional deterrence prediction is observed in the Indonesian retail-investor context.

H6: Greenwashing perception has a negative effect on retail investors' ESG investment allocation intention.

Although the theoretical argument predicts that perceived greenwashing should discourage ESG investment allocation, the relationship may also depend on investors' prior engagement with ESG-related information and investment opportunities. Investors who are more actively involved in ESG investing may encounter greenwashing discussions more frequently and consequently report stronger perceptions of potential greenwashing while simultaneously maintaining stronger intentions to invest in ESG-oriented products. In this situation, a positive association between Greenwashing Perception and ESG Investment Allocation Intention would not imply that perceived greenwashing encourages investment. Rather, both variables may reflect a broader level of ESG involvement or information engagement.

Other factors may also influence this relationship, including prior ESG investment experience, frequency of ESG-information exposure, sustainable finance literacy, financial literacy, expected financial returns, risk tolerance, environmental values, and general involvement in ESG issues. These factors may shape both investors' sensitivity to greenwashing and their willingness to consider ESG investments. Accordingly, the hypothesized negative relationship is retained as the theoretically expected direction, while the possibility of alternative explanations is recognized when interpreting an empirical relationship in the opposite direction.

2.12. The Mediating Role of Sustainability Awareness

The preceding arguments suggest that ESG Information Credibility may be indirectly associated with ESG Investment Allocation Intention through Sustainability Awareness. Credible ESG information may provide investors with a more reliable basis for recognizing the relevance of sustainability considerations when evaluating investment opportunities. In this sense, Sustainability Awareness represents an investor-level interpretation of ESG information that may connect perceived information quality with subsequent investment intention.

The recent systematic review of retail ESG investment distinguishes awareness and information searching from later investor attitudes and portfolio actions (J. Li et al., 2025). Experimental evidence also indicates that ESG awareness can influence sustainable investment choices (Shahen et al., 2026). These findings provide a basis for examining whether Sustainability Awareness statistically transmits part of the association between ESG Information Credibility and ESG Investment Allocation Intention.

Importantly, the proposed mediation represents a theoretically specified association rather than an empirically established temporal process. Because the present study uses cross-sectional data, a significant indirect effect would indicate that the variables are statistically connected through the specified pathway but would not establish that credibility temporally precedes awareness or that awareness subsequently causes investment intention.

H7a: Sustainability awareness mediates the relationship between ESG information credibility and retail investors' ESG investment allocation intention.

2.13. The Mediating Role of Greenwashing Perception

ESG Information Credibility may also be indirectly associated with ESG Investment Allocation Intention through Greenwashing Perception. From the conventional signaling perspective, credible ESG information should reduce uncertainty concerning the characteristics communicated by firms and therefore reduce concerns that sustainability claims may be exaggerated or misleading. Lower Greenwashing Perception should, in turn, provide a more favorable informational basis for considering ESG-oriented investments.

Investor-focused research indicates that inconsistent or unsupported ESG disclosures can contribute to greenwashing perceptions (Gehric & Moreno, 2023), while recent evidence suggests that perceived greenwashing can discourage sustainable investment decisions (Gacem et al., 2025). Accordingly, the hypothesized mediation follows the conventional signaling logic in which higher perceived signal quality reduces concerns about misleading claims and consequently supports investment allocation intention.

However, the statistical significance of an indirect effect should be distinguished from confirmation of the theoretical mechanism. A significant indirect effect would demonstrate that ESG Information Credibility and ESG Investment Allocation Intention are statistically associated through Greenwashing Perception, but the theoretical interpretation also depends on whether the component relationships are consistent with their hypothesized directions.

H7b: Greenwashing perception mediates the relationship between ESG information credibility and retail investors' ESG investment allocation intention.

2.14. The Proposed Serial Relationship of Sustainability Awareness and Greenwashing Perception

The proposed model further examines whether Sustainability Awareness and Greenwashing Perception are sequentially associated with the relationship between ESG Information Credibility and ESG Investment Allocation Intention. The theoretical logic proposes that credible ESG information may increase investors' recognition of the relevance of sustainability issues. Greater Sustainability Awareness may then increase attention to the credibility and authenticity of ESG claims, which may be reflected in Greenwashing Perception. Greenwashing Perception is subsequently expected to influence investors' intention to allocate funds to ESG-oriented investments.

The proposed sequence integrates the information function of ESG credibility with the investor's subsequent interpretation and evaluation of sustainability claims. In particular, Sustainability Awareness is positioned as a cognitive condition that may increase attention to ESG information, whereas Greenwashing Perception represents a more specific evaluative response concerning the possibility that sustainability claims are misleading.

Importantly, the proposed sequence is a theoretically specified structural ordering rather than an empirically established temporal process. Because the present study uses cross-sectional survey data, the analysis cannot determine whether ESG Information Credibility precedes Sustainability Awareness, whether Sustainability Awareness precedes Greenwashing Perception, or whether these perceptions develop simultaneously. Consequently, a statistically significant serial indirect effect should be interpreted as evidence of a statistical association through the specified pathway rather than as definitive evidence of the complete psychological sequence.

The hypothesized direction of the final stage is also theoretically important. The signaling framework predicts that stronger Greenwashing Perception should weaken ESG Investment Allocation Intention because perceived misleading claims reduce the informational value of

ESG signals. If the empirical relationship between Greenwashing Perception and ESG Investment Allocation Intention differs from this hypothesized direction, a significant serial indirect effect would demonstrate a statistically significant indirect association but would not confirm the complete theoretical mechanism originally proposed.

Accordingly, the study examines the following serial indirect relationship:

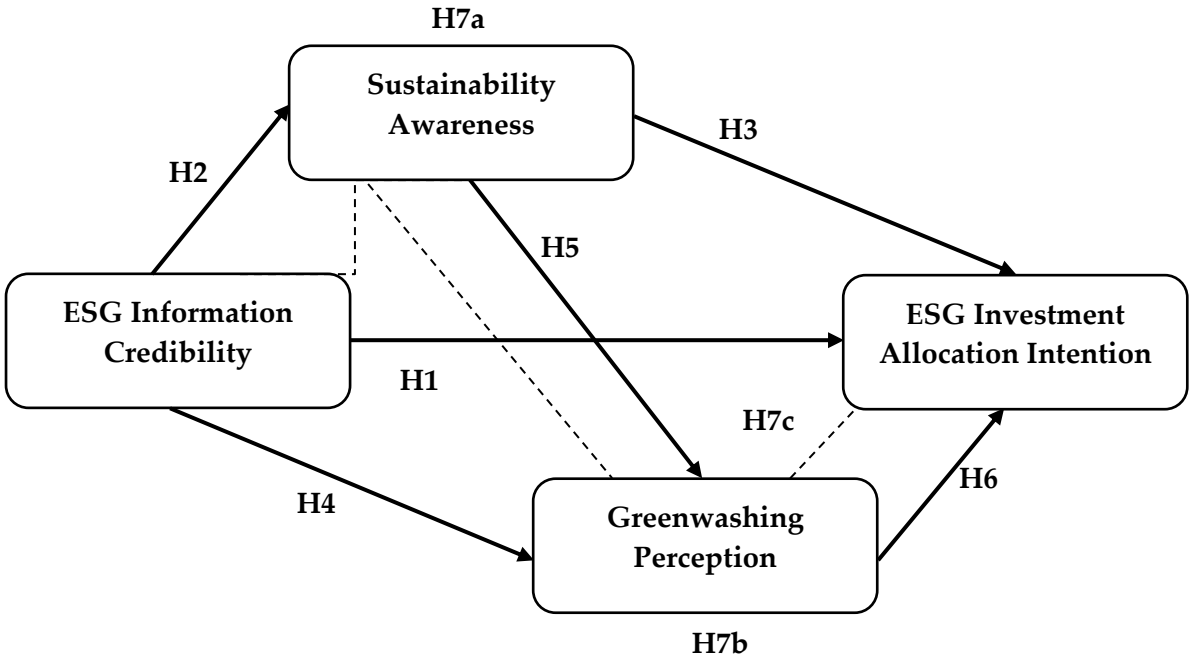
H7c: Sustainability Awareness and Greenwashing Perception sequentially mediate the relationship between ESG Information Credibility and retail investors' ESG Investment Allocation Intention.

2.15. Conceptual Framework

Based on the theoretical arguments and empirical evidence discussed above, the proposed research model consists of one exogenous construct, two mediating constructs, and one endogenous construct.

The model proposes that ESG Information Credibility directly increases ESG Investment Allocation Intention and indirectly influences it through Sustainability Awareness and Greenwashing Perception. Sustainability Awareness is expected to increase both allocation intention and the perception that ESG claims may be subject to greenwashing. The hypothesized negative direction represents the conventional signaling prediction and is evaluated empirically in the structural model. The complete structural logic can therefore be expressed as:

Figure 1. Conceptual Framework



2.16. Theoretical Contribution of the Proposed Model

The proposed framework contributes to the ESG investment literature in three ways. First, it distinguishes ESG information credibility from ESG information availability. This distinction is important because retail investors may receive substantial amounts of ESG information without necessarily considering it reliable. Second, the framework connects sustainability awareness with greenwashing perception, suggesting that greater sustainability awareness may make investors more critical rather than simply more supportive of ESG investment.

Third, the model proposes a set of theoretically specified direct, indirect, and serial relationships among ESG Information Credibility, Sustainability Awareness, Greenwashing Perception, and ESG Investment Allocation Intention. The serial ordering represents the proposed theoretical structure to be empirically examined rather than an established temporal behavioral process.

This approach is consistent with the recent systematic review of retail ESG investment, which identifies awareness, credibility and transparency, behavioral responses, and portfolio adjustment as distinct but interconnected stages of retail investors' ESG engagement (J. Li et al., 2025). The present study extends this literature by empirically connecting these stages within one model and focusing specifically on the tension between sustainability engagement and greenwashing skepticism.

The central theoretical proposition is therefore not simply that credible ESG information encourages sustainable investment. Rather, the study proposes that credible ESG information can activate sustainability awareness, while sustainability-aware investors may scrutinize ESG claims more carefully and form perceptions of greenwashing that ultimately shape their willingness to allocate investment funds.

3. Methodology

3.1. Research Design

This study employs a quantitative, explanatory, and cross-sectional research design to examine how retail investors evaluate ESG-related information and how these evaluations relate to their intention to allocate financial resources to ESG-oriented investments. A quantitative explanatory design is appropriate because the study seeks to empirically examine theoretically derived relationships among ESG Information Credibility, Sustainability Awareness, Greenwashing Perception, and ESG Investment Allocation Intention using structured data collected from individual retail investors. The explanatory orientation is particularly relevant because the study does not merely describe investors' ESG-related perceptions, but seeks to explain the relationships among the constructs and the mechanisms through which ESG information credibility may be associated with investment allocation intention.

The explanatory design also allows the study to examine both direct and indirect relationships among the constructs. In particular, the study investigates whether Sustainability Awareness and Greenwashing Perception provide indirect pathways through which ESG Information Credibility is associated with ESG Investment Allocation Intention. The study further examines a sequential mechanism in which ESG Information Credibility is associated with Sustainability Awareness, which is subsequently related to Greenwashing Perception and, in turn, to ESG Investment Allocation Intention. This type of model is consistent with the use of PLS-SEM for examining complex models involving multiple latent constructs and indirect relationships, particularly when the research objective includes explanation and prediction (J. Hair & Alamer, 2022).

A cross-sectional design is employed because the required data are collected from respondents at a single period of observation through a structured online questionnaire. This design is appropriate for capturing retail investors' perceptions of ESG information, their awareness of sustainability issues, their perceptions of potential greenwashing, and their investment allocation intentions at the time of the survey. However, because all constructs are measured at the same point in time, the empirical findings are interpreted as statistical associations that

are consistent with the proposed theoretical relationships rather than definitive evidence of causal relationships. This limitation is particularly important when interpreting the indirect and serial mediation findings because statistical mediation in cross-sectional data does not by itself establish temporal causality. The study used a perception-based, cross-sectional measurement design. Respondents evaluated ESG-related information in the context of their own investment experience and exposure to ESG information rather than evaluating a standardized disclosure from a single focal company. Accordingly, the constructs capture investors' generalized but investment-contextualized perceptions of ESG information and related corporate sustainability claims.

The study focuses on individual retail investors in Indonesia because their investment decisions are directly relevant to the development of sustainable finance and ESG-oriented investment products. Unlike institutional investors, retail investors generally make investment decisions based on information available through public disclosures, financial platforms, media, investment communities, and other information sources. Their assessment of ESG information credibility and potential greenwashing may therefore influence whether sustainability-related information is translated into an intention to allocate investment funds. Recent research on retail ESG investment also highlights the importance of information credibility, sustainability awareness, and subsequent investment responses in understanding individual investors' engagement with ESG investment (J. Li et al., 2025).

The empirical model examines six direct relationships involving ESG Information Credibility, Sustainability Awareness, Greenwashing Perception, and ESG Investment Allocation Intention. In addition, three indirect pathways are examined, namely the indirect relationship through Sustainability Awareness, the indirect relationship through Greenwashing Perception, and the serial mediation pathway from ESG Information Credibility through Sustainability Awareness and Greenwashing Perception to ESG Investment Allocation Intention. This design allows the study to examine not only whether credible ESG information is associated with retail investors' allocation intention, but also how investors' awareness of sustainability and their perceptions of greenwashing may shape this relationship.

3.2. Research Setting and Study Period

The study was conducted in Indonesia, an emerging market in which sustainable finance and ESG-related investment have become increasingly relevant to financial market participants. Indonesia provides an appropriate setting for examining retail investors' responses to ESG information because the country's sustainable finance framework has continued to develop through regulatory initiatives and the expansion of sustainable financial instruments. In particular, the Financial Services Authority (Otoritas Jasa Keuangan, OJK) has developed the Indonesia Taxonomy for Sustainable Finance (TKBI) as a framework for identifying sustainable economic activities and supporting sustainable capital allocation. The third version of the TKBI was issued in February 2026 and expanded the classification and technical screening criteria across additional sectors, marking an important development in Indonesia's sustainable finance framework (Otoritas Jasa Keuangan (OJK), 2026b).

The Indonesian setting is also relevant because retail investors increasingly participate in investment markets and may encounter ESG-related information through corporate disclosures, investment platforms, financial media, securities companies, investment communities, and other digital sources. Recent research involving Indonesian retail investors demonstrates that sustainability-related considerations can influence individual investors' investment judgments and intentions, while also highlighting the continuing tension between

ethical considerations and conventional financial factors such as returns, risk, and investment convenience (Aulia et al., 2025). The setting therefore provides a relevant context for examining whether the credibility of ESG information is sufficient to encourage investment allocation or whether sustainability awareness and perceptions of greenwashing also shape investors' responses.

Data were collected from individual retail investors residing in Indonesia from January to April 2026 using a structured online questionnaire. The four-month data collection period was selected to provide sufficient time to reach retail investors from different geographic areas, investment backgrounds, and levels of exposure to ESG-related information. The online approach was also appropriate because the target population is geographically dispersed and commonly accesses investment information through digital channels.

The survey targeted individual investors who had previous experience with financial investments and had encountered information related to ESG, sustainability, green investment, responsible investment, or related concepts. Respondents were not required to have previously purchased an ESG-labelled investment product because the study examines intention to allocate funds to ESG-oriented investments, including among investors who may currently hold conventional investments. This approach allows the study to capture variation in investors' perceptions of ESG information, sustainability awareness, greenwashing concerns, and willingness to consider ESG-oriented investment opportunities.

The data collection period also coincided with an important stage in the development of Indonesia's sustainable finance framework. During the study period, OJK released the third version of the Indonesia Sustainable Finance Taxonomy, reinforcing the national emphasis on credible sustainability classification and sustainable capital allocation (Otoritas Jasa Keuangan (OJK), 2026b). This institutional context strengthens the relevance of examining how individual investors perceive the credibility of ESG information at a time when sustainable finance standards and information frameworks were becoming more developed.

3.3. Population and Unit of Analysis

The population of this study comprises individual retail investors residing in Indonesia who have experience in making financial investments. Retail investors are considered an appropriate population for this study because the research focuses on individual-level perceptions and decision-making processes concerning ESG information. In contrast to institutional investors, individual investors may have different levels of financial knowledge, sustainability awareness, access to information, and ability to independently evaluate corporate ESG claims. These differences make retail investors an important group for examining how the credibility of ESG information and perceptions of greenwashing are translated into investment intentions.

The selection of retail investors is also consistent with the growing research interest in understanding individual investors' engagement with sustainable finance. A recent systematic review identified retail investors as an increasingly important but still insufficiently studied group in ESG investment research. The review indicates that retail investors' engagement with ESG investment involves several interconnected stages, including awareness and information searching, evaluation of ESG information credibility and transparency, and subsequent investment actions (J. Li et al., 2025). Recent empirical research in Indonesia further demonstrates the relevance of this population. Aulia et al. (2025), for example, examined 511 Indonesian individual capital-market investors and found that ethical considerations

significantly influenced their judgments and intentions regarding sustainable government bonds.

The unit of analysis is the individual retail investor. This level of analysis corresponds directly to the theoretical framework of the study, which seeks to explain how individual investors perceive ESG information, recognize sustainability considerations, evaluate potential greenwashing, and form intentions to allocate financial resources to ESG-oriented investments. Accordingly, each completed questionnaire represents one observation in the empirical analysis.

The population is not restricted to investors who have previously purchased ESG-labelled financial products. Both investors with previous ESG investment experience and those who have invested in conventional financial products are eligible to participate, provided that they have sufficient investment experience and have encountered ESG- or sustainability-related information. This broader definition is important because the dependent construct concerns ESG Investment Allocation Intention, rather than actual ownership of ESG investment products. Restricting the population only to existing ESG investors could produce a selection effect and limit the ability of the study to explain why some retail investors are willing to consider ESG investments while others remain reluctant.

To ensure that respondents have sufficient experience to evaluate investment-related ESG information, eligibility is based on several criteria. Respondents must be 18 years of age or older, reside in Indonesia, have personally made at least one investment in a financial product, and have encountered ESG, sustainability, green investment, responsible investment, or related information. Eligible financial products may include stocks, mutual funds, bonds, exchange-traded funds, or other investment products available to individual investors. Respondents who do not meet these conditions are excluded from the final dataset.

This population definition is also consistent with recent empirical work involving Indonesian retail investors, where respondents were selected based on being at least 18 years old and having previous investment experience in the Indonesian capital market (Aulia et al., 2025). The criterion is particularly relevant to the present study because respondents need to understand investment allocation sufficiently to evaluate whether they would be willing to direct part of their financial resources toward ESG-oriented investment opportunities.

3.4. Sampling and Generalizability

Because a complete sampling frame containing all individual retail investors in Indonesia is not publicly available, this study employed a non-probability purposive sampling technique. Purposive sampling was considered appropriate because participation required specific characteristics that were directly related to the research objectives (Memon et al., 2025). In particular, respondents needed to have actual investment experience and sufficient exposure to ESG- or sustainability-related information to provide meaningful evaluations of ESG information credibility and greenwashing. The use of purposive sampling is also consistent with recent empirical research on sustainable investment among Indonesian retail investors, which selected respondents based on age and prior investment experience in the Indonesian capital market (Aulia et al., 2025).

The sampling process was designed to ensure that respondents were capable of evaluating the investment-related issues examined in the study. Rather than recruiting members of the general adult population, the study specifically targeted individuals who had personal experience in making financial investments. This criterion was considered important because respondents without investment experience may have difficulty evaluating their willingness

to allocate financial resources to ESG-oriented investments. Moreover, previous research shows substantial heterogeneity among retail investors in their perceptions, motivations, and preferences concerning ESG investment, further supporting the need to target respondents with actual investment experience (Giglio et al., 2025).

Respondents were recruited through online distribution channels during the data collection period from January to April 2026. The questionnaire was disseminated through relevant investment communities, investor networks, social media groups, digital investment forums, and other online channels accessible to Indonesian retail investors. The online recruitment approach enabled the study to reach investors from different geographical areas and investment backgrounds while maintaining the eligibility requirements established for the study.

To ensure consistency between the target population and the research objectives, respondents were required to meet five eligibility criteria. First, they had to be at least 18 years old. Second, they had to reside in Indonesia. Third, they had to have personally made at least one investment in a financial product. Fourth, they had to have encountered information related to ESG, sustainability, green investment, responsible investment, or a closely related concept. Fifth, they had to voluntarily agree to participate in the study and complete the questionnaire.

The investment-experience criterion was intentionally defined broadly. Respondents were eligible if they had experience investing in stocks, mutual funds, bonds, exchange-traded funds, or other financial investment products available to individual investors. They were not required to have previously invested in an ESG-labelled product. This distinction is important because the study examines ESG Investment Allocation Intention rather than existing ESG investment ownership. Including both conventional and ESG-oriented investors enables the study to capture differences in how investors evaluate ESG information and whether they are willing to consider allocating funds to ESG-oriented investment opportunities.

The requirement for prior exposure to ESG or sustainability-related information was also included as an important screening condition. Since the study examines ESG Information Credibility and Greenwashing Perception, respondents need to have at least some familiarity with ESG-related information before they can meaningfully evaluate its credibility or the possibility that sustainability claims may be misleading. This criterion also helps reduce measurement noise that could arise if respondents were unfamiliar with the subject matter being assessed.

Eligibility was assessed through screening questions presented at the beginning of the online questionnaire. Respondents who did not satisfy one or more of the eligibility criteria were excluded from the subsequent sections of the survey. In addition, responses were screened for completeness and response quality before inclusion in the final dataset. Incomplete responses, duplicate submissions, responses that failed the eligibility screening, and responses showing clear evidence of careless or patterned answering were excluded from the final analysis.

The use of purposive sampling means that the resulting sample should not be interpreted as statistically representative of all Indonesian retail investors. Rather, the sample is intended to provide theoretically relevant observations from individuals who meet the characteristics necessary to address the research questions. This limitation is acknowledged when interpreting the generalizability of the findings. Nevertheless, purposive sampling is appropriate for the present study because the research requires respondents with specific investment experience and exposure to ESG-related information, rather than a general population sample.

The sampling strategy also establishes an important boundary condition for the interpretation of the findings. Because respondents were purposively selected based on investment experience and prior exposure to ESG- or sustainability-related information, the resulting sample should not be treated as statistically representative of the broader Indonesian retail-investor population. The eligibility criteria were intentionally designed to obtain respondents capable of evaluating ESG information credibility and greenwashing-related perceptions. Consequently, the findings are most appropriately generalized to retail investors with at least some investment experience and familiarity with ESG-related information, rather than to investors who have never encountered ESG or sustainability information.

The composition of the final sample further reinforces this boundary condition. Although respondents varied in investment experience and prior ESG investment experience, a relatively large proportion reported higher educational attainment and frequent exposure to ESG-related information. These characteristics may be associated with greater familiarity with ESG concepts and therefore may influence the observed relationships among ESG Information Credibility, Greenwashing Perception, and ESG Investment Allocation Intention.

3.5. Sample Size Determination

The required sample size was determined before the main data analysis to ensure that the study had sufficient statistical power to detect meaningful relationships among the research constructs. Rather than relying solely on the traditional 10-times rule, which has been criticized for producing imprecise estimates of the minimum sample size in PLS-SEM, the study considered statistical power and the complexity of the structural model when determining the required number of observations (Kock & Hadaya, 2018).

The most complex endogenous construct in the proposed model is ESG Investment Allocation Intention, which is simultaneously predicted by ESG Information Credibility, Sustainability Awareness, and Greenwashing Perception. In addition, the study examines indirect effects through Sustainability Awareness and Greenwashing Perception, including a serial mediation pathway. Because indirect effects generally require greater statistical sensitivity than individual direct effects, the sample size was set above the minimum required for estimating the direct structural relationships.

An a priori power analysis was therefore used as the primary basis for determining the minimum sample requirement, with a significance level of 5% and statistical power of 80%. The analysis considered the maximum number of predictors directed toward a single endogenous construct in the structural model, which is three. The resulting minimum sample requirement was treated as a statistical threshold rather than as the target number of observations. A larger sample was sought to provide greater stability for the estimation of indirect and serial mediation effects and to reduce the potential influence of unusable or low-quality responses.

Accordingly, the study targeted at least 300 valid responses from eligible Indonesian retail investors. This target was deliberately set above the minimum statistical requirement because the research model includes multiple mediation pathways and because online survey research may involve the exclusion of incomplete, duplicate, inattentive, or otherwise invalid responses. The final sample size used in the PLS-SEM analysis is therefore based on the number of observations that remained after the eligibility and data-quality screening procedures described in Section 3.4.

The adequacy of the final sample was subsequently assessed in relation to the estimated structural model and its statistical power. This approach is consistent with recommendations

that PLS-SEM sample-size decisions should be based on the anticipated magnitude of the smallest relevant structural relationship rather than solely on a simple rule based on the number of indicators or structural paths (Kock & Hadaya, 2018).

3.6. Questionnaire Development and Measurement Procedure

The questionnaire was developed through a systematic process to ensure that the measurement items were conceptually consistent with the research framework and appropriate for the context of retail investors in Indonesia. Rather than developing the measures entirely from scratch, the study adapted measurement items from previously published research addressing ESG information, sustainability awareness, greenwashing perceptions, and sustainable investment intentions. Adaptation was necessary because several existing measures were developed in different research contexts and therefore required contextual adjustment to reflect the experiences and perceptions of individual retail investors. The questionnaire development process involved construct specification, identification and adaptation of measurement items, expert review, and translation and back-translation. First, the conceptual meaning of each construct was established based on the theoretical framework and relevant empirical literature. The four constructs examined in the study were ESG Information Credibility, Sustainability Awareness, Greenwashing Perception, and ESG Investment Allocation Intention. Measurement items were then selected according to their conceptual relevance and adapted to the context of retail investment while maintaining the substantive meaning of the original measures.

Particular attention was given to maintaining a clear conceptual boundary between ESG Information Credibility and Greenwashing Perception during questionnaire development. ESG Information Credibility was specified as an evaluation of the quality, reliability, transparency, and usefulness of ESG information for investment judgment. Greenwashing Perception was specified as an evaluation of whether sustainability claims may exaggerate, selectively disclose, obscure, or misrepresent underlying sustainability performance. The distinction was subsequently reflected in the wording of the measurement items. EIC items were framed around the perceived accuracy, reliability, transparency, and informational integrity of ESG information, whereas GWP items were framed around suspected corporate practices involving concealment, misleading claims, vagueness, exaggeration, and selective presentation. The two constructs were therefore treated as related evaluations within the same ESG information environment, but not as opposite indicators of a single underlying dimension.

The operationalization of Sustainability Awareness was also specifically oriented toward investment decision-making. The construct was defined in terms of investors' recognition that environmental, social, and governance considerations are relevant when evaluating and comparing investment opportunities. Thus, the measurement does not simply capture general environmental concern or awareness, but focuses on the extent to which sustainability considerations are recognized as relevant to investment decisions. This approach is consistent with recent research identifying awareness as an important component of retail investors' engagement with ESG investment (J. Li et al., 2025).

Before the main survey, the questionnaire was reviewed by two academic experts with relevant expertise in sustainable finance, investment behavior, and quantitative research. The review focused on the conceptual relevance, clarity, wording, and contextual appropriateness of the measurement items. The experts also assessed whether individual statements were potentially ambiguous, redundant, double-barreled, or difficult for retail investors to

understand. Minor wording adjustments were subsequently made where necessary while preserving the intended meaning of the original measurement items.

The questionnaire was prepared in Bahasa Indonesia for data collection. The original English items were translated into Bahasa Indonesia and subsequently back-translated into English to assess semantic and conceptual equivalence between the two versions. Any differences identified during the comparison were reviewed and resolved before the questionnaire was distributed. This procedure was particularly important for constructs such as information credibility and greenwashing perception, where differences in wording could substantially affect respondents' interpretation.

The final questionnaire consisted of three main sections. The first section contained screening questions designed to establish respondent eligibility according to the sampling criteria described in Section 3.4. The second section contained the measurement items for ESG Information Credibility, Sustainability Awareness, Greenwashing Perception, and ESG Investment Allocation Intention. The final section collected demographic and investment-related characteristics to describe the respondent profile and provide relevant contextual information about their investment experience.

All substantive measurement items were measured using a five-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree. The same response scale was applied consistently across the four constructs to facilitate interpretation and reduce unnecessary variation in the response format.

To reduce potential response bias, the questionnaire did not disclose the specific hypotheses or the expected direction of relationships among the constructs. Respondents were instructed to answer based on their own investment experience and perceptions. The questionnaire also used relatively straightforward wording and avoided unnecessary technical terminology so that respondents with different levels of financial and ESG knowledge could understand the statements consistently.

The empirical quality of the adapted measurement instruments was subsequently assessed using the PLS-SEM measurement model procedures described in Section 3.10. Indicator reliability, internal consistency reliability, convergent validity, and discriminant validity were evaluated before the structural relationships were interpreted. This approach allows the adapted measures to be empirically assessed within the specific context of Indonesian retail investors rather than assuming that their validity automatically transfers from previous research settings.

The final measurement items and their respective sources are presented in **Table 2**.

3.7. Measurement Scale

The study employed multi-item reflective measures to operationalize ESG Information Credibility, Sustainability Awareness, Greenwashing Perception, and ESG Investment Allocation Intention. The use of multiple indicators allows each construct to be represented by several observable statements and reduces the risk that the empirical assessment of a latent construct depends on a single question. All measurement items were adapted from relevant previous studies and modified where necessary to reflect the context of Indonesian retail investors.

All substantive measurement items were measured using a five-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree. The five-point scale was applied consistently across all constructs to facilitate respondents' evaluation of the statements and maintain a uniform response format throughout the questionnaire. The use of a five-point Likert scale is

also appropriate for survey-based research involving individual respondents because it provides sufficient variation for capturing differences in perceptions and behavioral intentions while keeping the response process relatively straightforward.

3.8. ESG Information Credibility

ESG Information Credibility was operationalized as the extent to which retail investors perceive ESG-related information as accurate, reliable, trustworthy, transparent, and not deliberately misleading. The construct focuses on the perceived credibility of ESG-related information encountered by investors when evaluating companies and investment opportunities, rather than on the objectively verified ESG performance of any particular company.

The measurement items were adapted from recent research on perceived ESG-report credibility and related credibility literature. Recent work on ESG assurance credibility operationalizes perceived credibility around whether ESG reporting faithfully reflects sustainability performance, provides reliable information, is free from manipulation, and is sufficiently transparent to support informed judgment (Hoai, 2026). These dimensions are also consistent with established credibility research, which distinguishes accuracy, truthfulness, evidence, trustworthiness, and understandability as important components of perceived credibility (Lock & Seele, 2017).

For the present study, the wording was adapted so that respondents evaluate ESG information from the perspective of an individual investor rather than an auditor or professional assurance user.

3.9. Sustainability Awareness

Sustainability Awareness was operationalized as the extent to which retail investors recognize the relevance of environmental, social, and governance considerations when evaluating investment opportunities and making investment decisions. The construct was deliberately framed around investment rather than general environmental consciousness.

The measurement was informed by previous research on sustainability awareness and ESG-related preferences. Khalil and Khalil (2022), for example, measured environmental and social sustainability awareness using multiple items addressing respondents' recognition of environmental and social issues and their relevance to individual choices. More recent research also treats ESG awareness as a meaningful factor in sustainable investment decisions, providing further support for examining awareness in an investment context (Shahen et al., 2026).

The items in the present study were therefore adapted to capture whether investors recognize sustainability issues as relevant when assessing and comparing investment opportunities.

3.10. Greenwashing Perception

Greenwashing Perception was operationalized as the extent to which retail investors perceive that ESG-related claims encountered in the investment information environment may involve exaggeration, selective disclosure, ambiguity, or misrepresentation of environmental, social, or broader sustainability performance. The construct therefore captures investors' critical perceptions of potential greenwashing associated with corporate ESG claims encountered during investment evaluation.

The measurement items were adapted primarily from Sun and Shi (2022), who developed a five-item measure of greenwashing perception covering hidden or omitted information, misleading environmental claims, visually or graphically misleading presentations, vague or unprovable claims, and exaggerated environmental features.

For this study, the original consumer-oriented wording was adapted to an investment-information context. Thus, the items refer to ESG claims and corporate sustainability information encountered by investors rather than to green product claims encountered by consumers.

3.11. ESG Investment Allocation Intention

ESG Investment Allocation Intention was operationalized as the extent to which retail investors intend, are willing, or are likely to allocate financial resources toward companies or investment products that demonstrate credible ESG characteristics.

The measurement was adapted primarily from Zhang et al. (2024), who examined ESG investment intentions among retail investors and measured intention using four indicators concerning the likelihood of investing in companies with ESG performance considerations, future investment, intention to invest in companies that pay greater attention to ESG performance, and intention to increase investment frequency.

The items were modified to emphasize allocation intention rather than simply general attitudes toward ESG. This distinction is important because the dependent construct in the present study concerns the investor's intended allocation of financial resources, not merely whether the investor considers ESG important.

Although EIAI1 refers to "credible ESG characteristics," the item was retained as part of the behavioral-intention construct rather than as a measure of ESG Information Credibility. ESG Information Credibility concerns investors' perceptions of the quality, reliability, transparency, and trustworthiness of ESG-related information used in investment evaluation, whereas ESG Investment Allocation Intention concerns the investor's prospective willingness, intention, or likelihood to allocate financial resources toward ESG-oriented investments. ESG Information Credibility concerns the perceived quality of ESG information used in investment evaluation, whereas ESG Investment Allocation Intention concerns the respondent's prospective behavioral tendency to allocate financial resources toward ESG-oriented investments. The former is informational and perceptual, whereas the latter is behavioral and intention-based.Thus, the reference to credible ESG characteristics in EIAI1 represents a criterion that may inform the investor's intended investment choice rather than the perceived credibility of ESG information itself.

Table 2. Measurement Items

Construct	Code	Measurement Item	Source
ESG Information Credibility	EIC1	I believe that ESG information accurately reflects a company's sustainability performance.	Adapted from (Hoai, 2026; Lock & Seele, 2017)
	EIC2	I consider ESG information reliable when evaluating a company's environmental and social performance.	
	EIC3	I believe that ESG information is transparent enough to support my investment judgment.	
	EIC4	I believe that ESG information is presented without deliberately misleading investors.	
Sustainability Awareness	SA1	I am aware that sustainability issues are relevant to investment decisions.	

Construct	Code	Measurement Item	Source
	SA2	I recognize that investment decisions can have environmental and social consequences.	Adapted from (Khalil & Khalil, 2022; Shahen et al., 2026)
	SA3	I pay attention to sustainability issues when evaluating investment opportunities.	
	SA4	I consider sustainability issues when comparing alternative investment opportunities.	
Greenwashing Perception	GWP1	Some companies hide important information to make their ESG claims appear better than they actually are.	Adapted from (Sun & Shi, 2022)
	GWP2	Some companies make ESG claims that can be misleading to investors.	
	GWP3	Some companies use ESG claims that are vague or difficult to verify.	
	GWP4	Some companies exaggerate their environmental or social achievements.	
	GWP5	Some companies selectively present ESG information to create a more favorable image.	
ESG Investment Allocation Intention	EIAI1	I intend to invest in companies or investment products with credible ESG characteristics.	Adapted from (Zhang et al., 2024)
	EIAI2	I am willing to allocate part of my investment portfolio to ESG-oriented investments.	
	EIAI3	I intend to increase my allocation to ESG-oriented investments when suitable opportunities are available.	
	EIAI4	I am likely to choose an ESG-oriented investment over a comparable conventional investment.	

Note: All items were measured using a five-point Likert scale, where 1 = strongly disagree and 5 = strongly agree. Items were translated into Bahasa Indonesia for data collection and adapted to the Indonesian retail-investor context.

3.12. Data Collection Procedure

Data were collected through a structured online questionnaire administered to individual retail investors residing in Indonesia between January and April 2026. An online survey was selected because the target respondents were geographically dispersed across Indonesia and commonly accessed investment-related information through digital platforms and online investor communities. The approach also enabled the researchers to reach respondents with different investment backgrounds without limiting participation to investors located in a particular city or region.

The questionnaire was distributed through several online channels relevant to the target population, including investment communities, investor networks, social media groups, digital investment forums, and other online communities in which individual investors

participate. The distribution process was conducted purposively to reach respondents who met the eligibility criteria established in the sampling procedure. Respondents were encouraged to participate voluntarily and were not required to disclose personally identifiable financial information or specific details about their investment accounts.

Before accessing the substantive measurement questions, potential respondents were presented with a brief explanation of the research purpose and the conditions for participation. They were informed that participation was voluntary, that their responses would be treated confidentially, and that the information collected would be used solely for academic research purposes. Respondents were also required to provide their consent before proceeding to the questionnaire.

The first part of the questionnaire contained screening questions designed to confirm respondent eligibility. The screening assessed whether respondents were at least 18 years old, resided in Indonesia, had previous experience making financial investments, and had encountered ESG, sustainability, green investment, responsible investment, or related information. Respondents who did not satisfy the required criteria were not included in the subsequent analysis.

Eligible respondents were then directed to the main questionnaire containing the measurement items for ESG Information Credibility, Sustainability Awareness, Greenwashing Perception, and ESG Investment Allocation Intention. All substantive items were measured using a five-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree. Respondents were instructed to answer each statement based on their own perceptions and investment experience rather than on what they considered to be socially desirable or theoretically correct answers.

The final section of the questionnaire collected respondents' demographic and investment-related characteristics. These variables were used to describe the composition of the sample and provide contextual information about the respondents' investment experience. The demographic information was not used to identify individual respondents.

After the data collection period ended in April 2026, all submitted responses were screened before statistical analysis. Responses that did not satisfy the eligibility requirements, contained substantial missing information, represented duplicate submissions, or demonstrated clear evidence of careless responding were excluded from the final dataset. The remaining valid responses constituted the final sample for the PLS-SEM analysis.

The data collection and screening process was conducted consistently across the four-month period to ensure that all respondents were exposed to the same questionnaire and response scale. The final dataset was subsequently coded and prepared for analysis using Smart-PLS 4, with the analytical procedures described in the following sections.

3.13. Ethical Considerations

This study was conducted in accordance with the basic ethical principles applicable to research involving human participants. Before completing the questionnaire, all potential respondents were provided with information about the purpose of the study, the voluntary nature of participation, the general use of the collected data, and the confidentiality of their responses. Respondents were required to provide informed consent before proceeding to the substantive questions.

Participation was entirely voluntary, and respondents were not offered incentives that could create undue pressure to participate. They were informed that they could discontinue their participation at any point before submitting the questionnaire without providing a reason.

Only respondents who agreed to participate and met the eligibility criteria were included in the research dataset.

The study did not request personally identifiable information such as national identification numbers, bank or brokerage account details, account passwords, or specific transaction records. The questionnaire focused on respondents' perceptions of ESG information, sustainability awareness, greenwashing perception, and investment allocation intention. Demographic and investment-related information was collected only for research and descriptive purposes.

All responses were treated confidentially and analyzed in aggregate form. Individual responses were not reported or disclosed in a manner that could identify particular participants. The collected data were used exclusively for academic research and were not shared for commercial purposes.

Because the study involved perceptions and intentions rather than sensitive financial transactions or access to respondents' investment accounts, the questionnaire was designed to minimize potential risks to participants. The wording of the questions was kept neutral and did not require respondents to disclose the amount, value, or performance of their personal investments.

The researchers also sought to maintain transparency throughout the data collection process. Respondents were informed that there were no right or wrong answers and were encouraged to provide responses based on their own experiences and perceptions. This approach was intended to reduce social desirability pressure and support more accurate measurement of the constructs examined in the study.

3.14. Data Analysis Technique

The collected data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with Smart-PLS 4. PLS-SEM was selected because the proposed research model involves multiple latent constructs and examines both direct and indirect relationships, including a sequential mediation mechanism. The method is appropriate for assessing theoretically derived structural relationships while simultaneously evaluating the reliability and validity of the measurement instruments (J. Hair & Alamer, 2022). The analysis was conducted by first assessing the measurement model and subsequently evaluating the structural model and the proposed hypotheses.

Before estimating the PLS-SEM model, the dataset was screened to ensure that only eligible and sufficiently complete responses were retained. The screening process considered respondent eligibility, incomplete responses, duplicate submissions, and indications of careless or patterned answering. Descriptive statistics were subsequently used to summarize the demographic and investment-related characteristics of the respondents. These procedures were undertaken to ensure that the final dataset represented respondents who met the predefined sampling criteria and were capable of providing meaningful responses to the research questions.

The measurement model was evaluated before interpreting the structural relationships. All four constructs were specified as reflective constructs. The assessment therefore considered indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. Indicator reliability was assessed through the outer loadings of the measurement items. Internal consistency reliability was evaluated using Cronbach's alpha, composite reliability, and rho_A. Values of approximately 0.70 or higher were considered indicative of acceptable internal consistency. Convergent validity was assessed using the Average Variance

Extracted (AVE), with a value of at least 0.50 indicating that the construct explained an adequate proportion of the variance in its indicators. These procedures follow established recommendations for assessing reflective measurement models using PLS-SEM (J. Hair & Alamer, 2022).

Discriminant validity was assessed primarily using the Heterotrait-Monotrait ratio (HTMT). This assessment is particularly relevant because ESG Information Credibility, Sustainability Awareness, and Greenwashing Perception are conceptually related and may therefore exhibit empirical overlap. The HTMT values were examined to determine whether the constructs were sufficiently distinct from one another (J. F. Hair et al., 2019; Henseler et al., 2015).

After establishing the adequacy of the measurement model, the structural model was assessed. Collinearity among the predictor constructs was examined using the variance inflation factor (VIF) to ensure that excessive collinearity did not distort the estimated path coefficients. The explanatory power of the model was then assessed using the coefficient of determination (R^2) for Sustainability Awareness, Greenwashing Perception, and ESG Investment Allocation Intention. The effect size (f^2) was also examined to determine the contribution of individual predictor constructs to the explained variance of the endogenous constructs. These assessments were used to evaluate the explanatory performance of the proposed structural model in addition to the statistical significance of the hypothesized relationships (J. F. Hair et al., 2019).

Because all study constructs were measured using a self-administered questionnaire from a single respondent at one point in time, the potential for common method bias (CMB) was considered. To reduce the likelihood of method-related bias, several procedural remedies were implemented during questionnaire administration. Participation was anonymous and voluntary, item wording was kept neutral and non-evaluative, the measurement sections were presented separately, and respondents were not informed of the hypothesized direction of relationships among the constructs. These procedures were intended to reduce evaluation apprehension, consistency motives, and respondents' tendency to align their answers with the expected research relationships.

A separate statistical CMB test was not conducted because the available Smart-PLS analysis did not provide the required full-collinearity diagnostic within the analysis workflow used in this study. Accordingly, the structural-model VIF values reported in Table 8 are treated as diagnostics of predictor collinearity rather than as evidence that CMB is absent. The study therefore does not claim that common method bias has been statistically eliminated. Instead, the findings should be interpreted with this methodological consideration in mind, particularly because all variables were obtained from the same questionnaire and respondent source. Future research could strengthen robustness by incorporating procedural and statistical approaches specifically designed to assess common method bias, as well as multi-source, time-lagged, or experimental research designs. Accordingly, common method effects remain a methodological consideration when interpreting the unexpected positive relationship between Greenwashing Perception and ESG Investment Allocation Intention.

The hypothesized direct relationships were tested using bootstrapping with 5,000 resamples in Smart-PLS 4. The procedure generated standardized path coefficients, standard errors, *t*-statistics, *p*-values, and bootstrapped confidence intervals. The direct effects examined the proposed relationships among ESG Information Credibility, Sustainability Awareness, Greenwashing Perception, and ESG Investment Allocation Intention. A hypothesized

relationship was considered supported when the estimated coefficient was consistent with the proposed direction and its bootstrapped confidence interval did not include zero.

The mediation hypotheses were evaluated through specific indirect effects using the same bootstrapping procedure. The first indirect pathway examined whether ESG Information Credibility was associated with ESG Investment Allocation Intention through Sustainability Awareness. The second examined whether ESG Information Credibility was associated with ESG Investment Allocation Intention through Greenwashing Perception. The significance of each indirect effect was determined from its bootstrapped confidence interval. An indirect effect was considered statistically significant when its bootstrapped confidence interval did not include zero. However, statistical significance was distinguished from theoretical support. The interpretation of each mediation hypothesis also considered whether the signs of the component path coefficients were consistent with the hypothesized mechanism. Accordingly, a statistically significant indirect effect was not automatically interpreted as confirmation of the corresponding theoretical mediation hypothesis when one or more component relationships operated in the opposite direction to that predicted.

The study also tested the proposed serial mediation effect, in which ESG Information Credibility is associated with Sustainability Awareness, which is subsequently related to Greenwashing Perception and then to ESG Investment Allocation Intention. This pathway represents the most specific indirect mechanism proposed in the research framework. The serial indirect effect was evaluated as a combined indirect relationship rather than as a collection of separate direct effects. Specifically, the analysis assessed whether the pathway ESG Information Credibility → Sustainability Awareness → Greenwashing Perception → ESG Investment Allocation Intention produced a statistically significant indirect effect. The serial indirect effect was considered statistically significant when its bootstrapped confidence interval did not include zero. Confirmation of the proposed theoretical mechanism, however, additionally required consideration of whether the component path directions were consistent with the hypothesized sequence.

The direct relationship between ESG Information Credibility and ESG Investment Allocation Intention was retained while testing the indirect effects. This approach allows the study to determine whether Sustainability Awareness and Greenwashing Perception explain part of the relationship between ESG Information Credibility and ESG Investment Allocation Intention while also allowing a direct relationship to remain in the model. The interpretation of mediation therefore considers both the specific indirect effects and the corresponding direct effect rather than relying solely on whether the direct relationship becomes statistically insignificant.

In addition to the direct and specific indirect effects, the analysis examined the total effect of ESG Information Credibility on ESG Investment Allocation Intention. The total effect was interpreted together with the direct effect and all specific indirect effects to determine the overall pattern of association between the constructs. Particular attention was given to the signs of the component paths because statistical significance of a serial indirect effect does not, by itself, establish that the full theoretical mechanism operates in the hypothesized direction.

Given the cross-sectional nature of the data, the proposed serial mediation was interpreted as a statistically estimated indirect association consistent with the specified structural model rather than as evidence of temporal or causal ordering. Where theoretically plausible, alternative structural specifications were considered as rival explanations for the observed associations.

3.15. Sensitivity Analysis

To assess the robustness of the structural findings to potential item-content overlap, two supplementary sensitivity analyses were conducted using Smart-PLS 4. In Model A, indicator EIC4 was excluded from the ESG Information Credibility construct because its reference to information being presented without deliberately misleading investors may be conceptually close to Greenwashing Perception. In Model B, indicator EIAI1 was excluded from the ESG Investment Allocation Intention construct because its reference to "credible ESG characteristics" may introduce semantic proximity to ESG Information Credibility. The two indicators were excluded separately, while the remaining measurement indicators and structural relationships were retained. The path coefficients and specific indirect effects obtained from the two alternative specifications were compared with those of the baseline model to examine whether the principal structural findings were sensitive to the inclusion of these indicators. The sensitivity analyses were interpreted as assessments of the stability of the estimated relationships rather than as definitive evidence that the constructs were entirely free from conceptual overlap.

4. Result and Discussion

4.1. Data Collection and Screening

Data were collected through a structured online questionnaire during the data-collection period from January to April 2026. A total of 365 questionnaire responses were received during the data-collection period. The responses were subsequently subjected to a systematic screening procedure to ensure that only eligible and sufficiently reliable observations were included in the empirical analysis.

First, 12 responses were excluded because the respondents did not satisfy the predetermined eligibility criteria, including the minimum age requirement, residence in Indonesia, previous financial investment experience, and prior exposure to ESG-related or sustainability-related information. Second, 9 responses were excluded because they contained substantial missing information in the substantive measurement items. Third, 8 duplicate submissions were identified and removed. Finally, 16 responses were excluded because they showed evidence of careless or patterned responding that could compromise response quality.

Following the screening procedure, 320 valid responses were retained for the empirical analysis, representing 87.7% of the total responses received. The final dataset was subsequently analyzed using SmartPLS 4. All descriptive statistics, measurement-model estimates, structural-model estimates, hypothesis-testing results, mediation analyses, and PLSpredict results reported in this study were generated from the final dataset comprising 320 valid responses.

Table 3. Questionnaire Screening and Final Sample Selection

Screening Stage	Number of Responses	Percentage
Questionnaires received	365	100.0%
Excluded for failing eligibility criteria	12	3.3%
Excluded for substantial missing responses	9	2.5%
Excluded for duplicate submissions	8	2.2%
Excluded for careless or patterned responding	16	4.4%
Final valid responses	**320**	**87.7%**

Source: Primary data processed (2026)

4.2. Respondent Characteristics

The characteristics of the respondents were examined to provide an overview of the composition of the sample and the investment background of the participants. Because the research investigates perceptions of ESG information and investment allocation intention, demographic characteristics were considered alongside several investment-related characteristics. **Table 4** presents the demographic and investment profiles of the respondents.

Table 4. Characteristics of Respondents (N=320)

Characteristic	Category	Frequency	Percentage (%)
Gender	Male	177	55.3
	Female	143	44.7
Age	18–25 years	61	19.1
	26–35 years	104	32.5
	36–45 years	83	25.9
	46–55 years	49	15.3
	>55 years	23	7.2
Education	High school/equivalent	27	8.4
	Diploma	24	7.5
	Bachelor's degree	174	54.4
	Master's degree	78	24.4
	Doctoral degree	17	5.3
Monthly Income	< IDR 5 million	42	13.1
	IDR 5–10 million	82	25.6
	IDR 10–20 million	104	32.5
	IDR 20–30 million	53	16.6
	> IDR 30 million	39	12.2
Investment Experience	<2 years	54	16.9
	2–5 years	108	33.8
	6–10 years	91	28.4
	>10 years	67	20.9
Investment Type	Stocks	213	66.6
	Mutual funds	161	50.3
	Bonds	96	30.0
	ETFs	58	18.1
	Other investment products	47	14.7
ESG Information Exposure	Rarely	39	12.2
	Occasionally	107	33.4
	Frequently	126	39.4
	Very frequently	48	15.0
Previous ESG Investment Experience	Yes	119	37.2
	No	201	62.8

Note: *N = 320. Investment type permits multiple responses; therefore, percentages for this characteristic do not sum to 100%.*

Table 4 results indicate that the sample contains a relatively balanced representation of male and female retail investors, although male respondents constitute a slightly larger proportion of the sample (55.3%). The largest age group is respondents aged 26–35 years, accounting for 32.5% of the sample, followed by those aged 36–45 years (25.9%). This age composition provides contextual information about the demographic structure of the sample and indicates that the respondents are concentrated in economically active age groups.

Educational attainment is relatively high, with 84.1% of respondents holding at least a bachelor's degree. This characteristic is potentially relevant to the study because evaluating ESG information credibility and identifying possible greenwashing may require investors to process relatively complex information concerning corporate sustainability practices. However, the relatively high educational attainment of the sample may also limit the transferability of the findings to retail investors with lower educational attainment. Education should therefore not be interpreted as automatically implying greater ESG knowledge or investment sophistication.

In terms of income, the largest group reports a monthly income of IDR 10–20 million (32.5%), followed by IDR 5–10 million (25.6%). The distribution indicates that the sample includes investors with different financial capacities rather than being concentrated exclusively among high-income individuals.

Investment experience also varies considerably. Approximately 49.3% of respondents have more than five years of investment experience, while 33.8% have invested for two to five years. This variation allows the study to capture perceptions from both relatively experienced investors and more recent market participants. Nevertheless, investment experience may represent an important source of respondent heterogeneity, particularly in relation to how investors process ESG-related information and evaluate investment opportunities. The observed structural relationships should therefore not be assumed to be invariant across different levels of investment experience.

Stocks represent the most common investment product, reported by 66.6% of respondents, followed by mutual funds at 50.3%. The relatively high proportion of stock investors is relevant to the study because publicly listed companies increasingly communicate ESG-related information through corporate disclosures and other investor-facing channels. Because respondents could select more than one investment type, the percentages in this category exceed 100%.

Importantly, 62.8% of respondents had not previously invested in an ESG-oriented investment product, while 37.2% reported previous ESG investment experience. This composition is useful for the present research because the study examines ESG investment allocation intention rather than only the behavior of existing ESG investors. Including respondents without previous ESG investment experience allows the analysis to examine whether ESG information credibility, sustainability awareness, and greenwashing perception are associated with willingness to consider ESG-oriented investments among both existing ESG investors and retail investors who have not previously invested in ESG-oriented products. At the same time, prior ESG investment experience may represent an important source of heterogeneity in investors' ESG engagement. Investors with previous ESG investment experience may differ from non-ESG investors in their familiarity with ESG information, exposure to greenwashing-related discussions, and investment intentions. Therefore, the observed structural relationships should not be assumed to be invariant across these investor groups.

Regarding exposure to ESG information, 54.4% of respondents reported encountering such information frequently or very frequently, while 45.6% reported rare or occasional exposure. This variation indicates that respondents differ in the extent to which they encounter ESG-related information. However, because exposure to ESG or sustainability-related information was also an eligibility criterion for participation, the sample should not be interpreted as representative of retail investors with little or no familiarity with ESG-related information. The relatively high proportion of respondents with frequent or very frequent ESG-information exposure may also indicate greater familiarity with ESG-related information than would be expected in the broader retail-investor population. This characteristic is particularly relevant when interpreting the unexpected positive relationship between Greenwashing Perception and ESG Investment Allocation Intention, because greater exposure to ESG information may coincide with greater awareness of both ESG investment opportunities and potential greenwashing concerns.

This sampling characteristic is relevant when interpreting the unexpected positive relationship between Greenwashing Perception and ESG Investment Allocation Intention because respondents were intentionally selected for prior exposure to ESG-related information and therefore do not represent investors with little or no familiarity with ESG issues.

4.3. Measurement Model Evaluation

The measurement model was assessed to establish the reliability and validity of the constructs before evaluating the structural relationships. The study employed four reflective constructs, namely ESG Information Credibility, ESG Investment Allocation Intention, Greenwashing Perception, and Sustainability Awareness. The assessment considered indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. The results indicate that the measurement model meets the required criteria for subsequent structural model assessment.

As shown in **Table 5**, all measurement indicators demonstrate satisfactory outer loadings. The loadings range from 0.734 to 0.932, with all indicators exceeding the commonly accepted threshold of 0.70. ESG Information Credibility shows loadings between 0.814 and 0.932, while ESG Investment Allocation Intention ranges from 0.820 to 0.897. The indicators for Greenwashing Perception range from 0.734 to 0.882, and those for Sustainability Awareness range from 0.803 to 0.915. These results indicate that each indicator makes an adequate contribution to measuring its respective latent construct.

Table 5. Measurement Model Assessment

Construct	Indicator	Outer Loading
ESG Information Credibility	EIC1	0.929
	EIC2	0.920
	EIC3	0.932
	EIC4	0.814
ESG Investment Allocation Intention	EIAI1	0.841
	EIAI2	0.897
	EIAI3	0.820
	EIAI4	0.855
Greenwashing Perception	GWP1	0.789
	GWP2	0.775

Construct	Indicator	Outer Loading
Sustainability Awareness	GWP3	0.882
	GWP4	0.822
	GWP5	0.734
	SA1	0.900
	SA2	0.915
	SA3	0.867
	SA4	0.803

Source: Smart-PLS output (2026)

The results of internal consistency reliability and convergent validity are also satisfactory. Cronbach's alpha values range from 0.850 to 0.921, while composite reliability values range from 0.900 to 0.944. All values exceed the recommended minimum level of 0.70, indicating adequate internal consistency across the four constructs. The AVE values range from 0.643 to 0.810, which are all above the 0.50 threshold. These findings provide evidence that the indicators adequately represent their corresponding constructs and that convergent validity has been established. (See Table 6)

Table 6. Construct Reliability and Convergent Validity

Construct	Cronbach's Alpha	rho_A	Composite Reliability	AVE
ESG Information Credibility	0.921	0.932	0.944	0.810
ESG Investment Allocation Intention	0.876	0.881	0.915	0.779
Greenwashing Perception	0.850	0.870	0.900	0.643
Sustainability Awareness	0.895	0.910	0.927	0.761

Source: Smart-PLS output (2026)

Discriminant validity was assessed using the Heterotrait-Monotrait ratio (HTMT). The results presented in the Smart-PLS output (See **Table 7**) show that all HTMT values are below 0.85. The highest value is observed between Sustainability Awareness and Greenwashing Perception (0.682), followed by Greenwashing Perception and ESG Investment Allocation Intention (0.716). The remaining HTMT values range from 0.245 to 0.471. The HTMT results provide empirical evidence consistent with the conceptual distinction between the constructs. In particular, the HTMT value between ESG Information Credibility and Greenwashing Perception is 0.355, which is well below the conservative threshold of 0.85. This result indicates that the two constructs do not exhibit problematic empirical overlap in the present sample. However, HTMT alone does not establish conceptual distinctiveness. The interpretation of discriminant validity therefore rests on the combination of the theoretical distinction established during construct development and the empirical evidence obtained from the measurement model. The distinction is substantively reflected in the measurement content. ESG Information Credibility assesses investors' confidence in the accuracy, reliability, transparency, and informational integrity of ESG information, whereas Greenwashing Perception captures suspicion that corporate sustainability claims may involve concealment, misleading communication, ambiguity, exaggeration, or selective disclosure. The relatively low HTMT value between the two constructs is consistent with this conceptual distinction.

Table 7. Discriminant Validity Using HTMT-Ratio

Construct Pair	HTMT
ESG Investment Allocation Intention ↔ ESG Information Credibility	0.413

Construct Pair	HTMT
Greenwashing Perception ↔ ESG Information Credibility	0.355
Greenwashing Perception ↔ ESG Investment Allocation Intention	0.716
Sustainability Awareness ↔ ESG Information Credibility	0.245
Sustainability Awareness ↔ ESG Investment Allocation Intention	0.471
Sustainability Awareness ↔ Greenwashing Perception	0.682

Source: Smart-PLS output (2026)

Overall, the measurement assessment demonstrates that the four constructs have satisfactory indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. Therefore, the measurement model provides an adequate basis for proceeding to the assessment of the structural model and hypothesis testing.

4.4. Structural Model Evaluation

Following the assessment of the measurement model, the structural model was evaluated by examining collinearity, explanatory power, and effect sizes. In PLS-SEM, structural model assessment is necessary to determine whether collinearity among predictor constructs may distort the estimated relationships and to evaluate how effectively the proposed predictors explain variation in the endogenous constructs (J. Hair & Alamer, 2022; J. F. Hair et al., 2019). Collinearity was first examined using the inner variance inflation factor (VIF). As shown in Table 8, the VIF values range from 1.000 to 1.689. These values are well below the threshold of 3 recommended as a conservative criterion for identifying potential collinearity problems in PLS-SEM (Hair et al., 2019; Sarstedt et al., 2022). Accordingly, no problematic collinearity was detected among the predictor constructs, allowing the structural path estimates to be interpreted without substantial concern regarding inflated standard errors caused by predictor overlap. The reported VIF values are taken directly from the Smart-PLS structural-model output.

Table 8. Collinearity Assessment

Predictor	Endogenous Construct	VIF
ESG Information Credibility	ESG Investment Allocation Intention	1.112
ESG Information Credibility	Greenwashing Perception	1.054
ESG Information Credibility	Sustainability Awareness	1.000
Greenwashing Perception	ESG Investment Allocation Intention	1.689
Sustainability Awareness	ESG Investment Allocation Intention	1.605
Sustainability Awareness	Greenwashing Perception	1.054

Source: Smart-PLS output (2026)

The explanatory power of the model was subsequently assessed using the coefficient of determination (R^2). R^2 represents the proportion of variance in an endogenous construct explained collectively by its predictor constructs. However, its interpretation should consider the research context and model complexity rather than rely mechanically on universal cut-off values (J. F. Hair et al., 2019).

As presented in Table 9, ESG Information Credibility explains 5.1% of the variance in Sustainability Awareness (R^2 = 0.051). ESG Information Credibility and Sustainability Awareness jointly explain 40.8% of the variance in Greenwashing Perception (R^2 = 0.408). Finally, ESG Information Credibility, Sustainability Awareness, and Greenwashing Perception

collectively explain 42.5% of the variance in ESG Investment Allocation Intention ($R^2 = 0.425$). The corresponding adjusted R^2 values are 0.048, 0.404, and 0.419, respectively.

Table 9. Explanatory Power of the Structural Model

Endogenous Construct	R^2	Adjusted R^2
Sustainability Awareness	0.051	0.048
Greenwashing Perception	0.408	0.404
ESG Investment Allocation Intention	0.425	0.419

Source: Smart-PLS output (2026)

These results show a clear difference in explanatory power across the endogenous constructs. The model explains only a relatively small proportion of Sustainability Awareness, suggesting that this construct is likely shaped by factors beyond ESG Information Credibility. In contrast, substantially larger proportions of Greenwashing Perception and ESG Investment Allocation Intention are explained by their respective antecedents. In particular, the R^2 of 0.425 indicates that the three predictors collectively account for 42.5% of the observed variance in retail investors' ESG Investment Allocation Intention. Importantly, R^2 reflects in-sample explanatory power rather than out-of-sample predictive performance, which should be evaluated separately through predictive procedures such as PLSpredict (J. F. Hair et al., 2019; Shmueli et al., 2019).

The f^2 effect size was further examined to assess the incremental contribution of each predictor to the R^2 value of its respective endogenous construct. Following commonly applied PLS-SEM guidelines, f^2 values around 0.02, 0.15, and 0.35 may be interpreted as small, medium, and large effects, respectively, although these benchmarks should be treated as general guidelines rather than rigid decision rules (J. F. Hair et al., 2019).

Table 10. Effect Size Assessment

Structural Relationship	f^2	Interpretation
ESG Information Credibility → ESG Investment Allocation Intention	0.059	Small
ESG Information Credibility → Greenwashing Perception	0.055	Small
ESG Information Credibility → Sustainability Awareness	0.054	Small
Greenwashing Perception → ESG Investment Allocation Intention	0.285	Medium
Sustainability Awareness → ESG Investment Allocation Intention	0.004	Negligible
Sustainability Awareness → Greenwashing Perception	0.523	Large

Source: Smart-PLS output (2026)

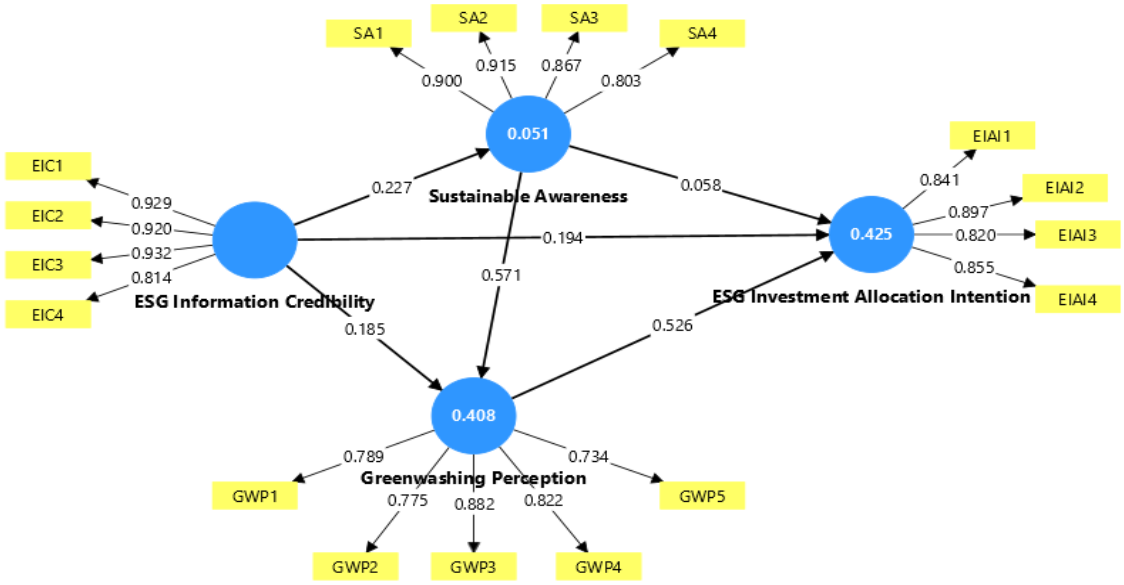
The effect-size results reveal a particularly important pattern. ESG Information Credibility makes small incremental contributions to ESG Investment Allocation Intention ($f^2 = 0.059$), Greenwashing Perception ($f^2 = 0.055$), and Sustainability Awareness ($f^2 = 0.054$). By contrast, Greenwashing Perception produces a medium effect on ESG Investment Allocation Intention ($f^2 = 0.285$). Sustainability Awareness has virtually no incremental explanatory contribution to ESG Investment Allocation Intention ($f^2 = 0.004$), but it has a large effect on Greenwashing Perception ($f^2 = 0.523$). The f^2 values reported here correspond to the SmartPLS results provided in the study output.

Taken together, the structural model demonstrates no problematic collinearity and meaningful explanatory capacity for the two central downstream constructs, Greenwashing Perception and ESG Investment Allocation Intention. More importantly, the effect-size pattern suggests that Sustainability Awareness may operate primarily by shaping investors'

perceptions of greenwashing rather than by directly increasing their ESG allocation intention. Greenwashing Perception, in turn, makes a considerably stronger contribution to explaining allocation intention. This pattern provides an initial indication of the mechanism underlying the proposed model, although the statistical significance and mediation structure must be established through bootstrapping before substantive conclusions are drawn.

Figure 2 presents the estimated PLS-SEM structural model and provides a visual overview of the measurement and structural relationships examined in the study. The figure displays the outer loadings of the reflective indicators, the standardized path coefficients between the constructs, and the R^2 values for Sustainability Awareness, Greenwashing Perception, and ESG Investment Allocation Intention. The results show that the model explains 5.1% of the variance in Sustainability Awareness, 40.8% of the variance in Greenwashing Perception, and 42.5% of the variance in ESG Investment Allocation Intention. The figure also illustrates the relative strength of the structural relationships, with the strongest direct paths observed from Sustainability Awareness to Greenwashing Perception ($\beta = 0.571$) and from Greenwashing Perception to ESG Investment Allocation Intention ($\beta = 0.526$). Detailed significance testing of these relationships is presented in the following section.

Figure 2. Estimated PLS-SEM Structural Model



Source: Smart-PLS output (2026)

4.5. Hypothesis Testing

The hypothesized relationships were examined using the bootstrapping results obtained from the PLS-SEM analysis. The assessment considered the standardized path coefficients (β), *t*-statistics, *p*-values, and 95% bootstrap confidence intervals. This approach provides information not only about the statistical significance of each relationship but also about its direction and magnitude. Following established PLS-SEM reporting recommendations, a structural relationship was considered statistically supported when its *p*-value was below 0.05 and the corresponding confidence interval did not include zero (J. F. Hair et al., 2019). The results of the direct-effect analysis are presented in Table 11.

Table 11. Direct Effects and Hypothesis Testing

Hypothesis	Structural Relationship	β	t-value	p-value	95% CI	Decision
H1	ESG Information Credibility → ESG Investment Allocation Intention	0.194	3.879	<0.001	[0.095, 0.295]	**Supported**
H2	ESG Information Credibility → Sustainability Awareness	0.227	4.138	<0.001	[0.121, 0.334]	**Supported**
H3	Sustainability Awareness → ESG Investment Allocation Intention	0.058	0.951	0.340	[-0.066, 0.174]	**Not Supported**
H4	ESG Information Credibility → Greenwashing Perception	0.185	3.699	<0.001	[0.089, 0.282]	**Not Supported, Opposite Direction**
H5	Sustainability Awareness → Greenwashing Perception	0.571	12.185	<0.001	[0.476, 0.663]	**Supported**
H6	Greenwashing Perception → ESG Investment Allocation Intention	0.526	8.824	<0.001	[0.409, 0.644]	**Not Supported, Opposite Direction**

Note: *β = standardized path coefficient; CI = bootstrap confidence interval. A hypothesis is classified as supported only when the estimated relationship is statistically significant and its direction is consistent with the proposed hypothesis.*

Source: Smart-PLS output (2026)

The results indicate that H1 is supported. ESG Information Credibility has a positive and statistically significant effect on ESG Investment Allocation Intention (β = 0.194, t = 3.879, p < .001; 95% CI [0.095, 0.295]). The confidence interval is entirely above zero, indicating that higher perceived credibility of ESG information is associated with stronger intentions among retail investors to allocate financial resources to ESG-oriented investments.

H2 is also supported. ESG Information Credibility has a positive and significant effect on Sustainability Awareness (β = 0.227, t = 4.138, p < .001; 95% CI [0.121, 0.334]). This finding suggests that investors who perceive ESG information as credible tend to demonstrate greater awareness of sustainability considerations in the investment context.

In contrast, H3 is not supported. Although the coefficient for Sustainability Awareness → ESG Investment Allocation Intention is positive (β = 0.058), the relationship is statistically insignificant (t = 0.951, p = 0.340), and the 95% confidence interval crosses zero ([-0.066, 0.174]). Therefore, the evidence does not support a direct positive relationship between sustainability awareness and ESG investment allocation intention.

H4 was not supported. ESG Information Credibility had a positive and statistically significant relationship with Greenwashing Perception (β = 0.185, t = 3.699, p < .001; 95% CI [0.089, 0.282]). Although the hypothesized relationship was negative, the observed coefficient indicates that respondents who reported higher perceived credibility of ESG information also tended to report greater awareness of potential greenwashing within the ESG information environment. This finding should not be interpreted as evidence that credible ESG information causes investors to perceive greenwashing in the same disclosure. Rather, given the non-specific focal referent of the cross-sectional measurement, the result is more appropriately interpreted as a positive association between two related investor perceptions. One possible explanation is that investors who engage more actively with ESG information may simultaneously recognize its informational value and become more attentive to the possibility of selective, exaggerated, or

misleading sustainability claims. This interpretation is consistent with the distinction between information credibility and critical scrutiny of ESG claims.

H5 is supported. Sustainability Awareness has a strong positive effect on Greenwashing Perception (β = 0.571, *t* = 12.185, *p* < .001; 95% CI [0.476, 0.663]). The confidence interval is clearly above zero, and the coefficient represents the strongest direct relationship among the six hypothesized paths. This indicates that investors with greater sustainability awareness tend to report stronger perceptions of potential greenwashing in ESG-related information.

Finally, H6 is not supported in its hypothesized direction. Greenwashing Perception has a positive and statistically significant association with ESG Investment Allocation Intention (β = 0.526, t = 8.824, p < 0.001; 95% CI [0.409, 0.644]), whereas H6 predicted a negative relationship. The finding therefore indicates a statistically significant positive association in the present sample, but the cross-sectional design does not establish that higher perceived greenwashing causes stronger ESG investment allocation intention.

4.6. Mediation and Serial Mediation Analysis

The mediation hypotheses were examined using specific indirect effects obtained through bootstrapping in Smart-PLS 4. The analysis considered the magnitude, statistical significance, confidence intervals, and direction of the indirect relationships. A statistically significant indirect effect indicates that the predictor and outcome are statistically associated through the specified mediator or sequence of mediators. However, statistical significance of an indirect effect does not by itself establish the complete theoretical mechanism, particularly when one or more component relationships differ from their hypothesized directions. Therefore, the interpretation of each mediation hypothesis considers both the significance of the indirect effect and the directional consistency of its component paths.

Table 12. Specific Indirect Effects and Mediation Testing

Hypothesis	Specific Indirect Path	β	t-value	p value	95% CI	Interpretation
H7a	EIC → SA → EIAI	0.013	0.867	.375	[-0.014, 0.045]	Not supported; indirect effect not statistically significant
H7b	EIC → GWP → EIAI	0.097	3.323	.001	[0.035, 0.160]	Statistically significant indirect association; hypothesized mediation mechanism not confirmed because component path directions are inconsistent with theoretical predictions
H7c	EIC → SA → GWP → EIAI	0.068	3.672	<.001	[0.035, 0.108]	Statistically significant serial indirect association; hypothesized deterrence mechanism not confirmed because the final component path operates in the opposite direction

Note: *β = standardized indirect effect; CI = bootstrap confidence interval.*

Source: Smart-PLS output (2026)

Table 13. Total and Total Indirect Effects

Relationship	Effect Type	β	t-value	p-value	95% CI
EIC → EIAI	Direct effect	0.194	3.879	<.001	[0.095, 0.295]
EIC → EIAI	Total indirect effect	0.178	5.209	<.001	[0.116, 0.249]

Relationship	Effect Type	β	t-value	p-value	95% CI
EIC → EIAI	**Total effect**	**0.372**	**7.080**	**<.001**	**[0.267, 0.474]**

H7a is not supported. The indirect relationship between ESG Information Credibility and ESG Investment Allocation Intention through Sustainability Awareness is small and statistically insignificant (β = 0.013, t = 0.867, p = 0.375; 95% CI [-0.014, 0.045]). The confidence interval includes zero, indicating that Sustainability Awareness alone does not provide a statistically significant indirect pathway between ESG Information Credibility and ESG Investment Allocation Intention.

H7b shows a statistically significant indirect association between ESG Information Credibility and ESG Investment Allocation Intention through Greenwashing Perception (β = 0.097, t = 3.323, p = 0.001; 95% CI [0.035, 0.160]). However, the component relationships do not follow the hypothesized theoretical directions. ESG Information Credibility is positively rather than negatively associated with Greenwashing Perception, and Greenwashing Perception is positively rather than negatively associated with ESG Investment Allocation Intention. Therefore, the significant indirect effect should be interpreted as a statistical association through Greenwashing Perception rather than as confirmation of the originally proposed theoretical mediation mechanism.

H7c shows a statistically significant serial indirect association from ESG Information Credibility to ESG Investment Allocation Intention through Sustainability Awareness and Greenwashing Perception (β = 0.068, t = 3.672, p < 0.001; 95% CI [0.035, 0.108]). The confidence interval does not include zero, indicating that the specified serial indirect association is statistically significant.

However, the result does not confirm the complete theoretical mechanism proposed in H7c. The hypothesized sequence assumed that Greenwashing Perception would have a negative relationship with ESG Investment Allocation Intention, consistent with H6. The observed relationship is instead positive and statistically significant (β = 0.526, t = 8.824, p < 0.001). Consequently, the significant serial indirect effect reflects an unexpected positive sign structure rather than confirmation of the theoretically predicted deterrence mechanism.

The finding should therefore be interpreted as evidence that the constructs are statistically connected through the specified serial pathway, while the psychological and temporal sequence implied by the theoretical model remains unconfirmed. Establishing the proposed mechanism would require longitudinal or experimental evidence capable of establishing temporal ordering and testing whether changes in perceived ESG information credibility lead to changes in sustainability awareness, subsequent greenwashing perception, and ultimately investment allocation intention.

The positive serial coefficient reflects the sign structure of the observed component relationships. ESG Information Credibility is positively associated with Sustainability Awareness (β = 0.227), Sustainability Awareness is positively associated with Greenwashing Perception (β = 0.571), and Greenwashing Perception is positively associated with ESG Investment Allocation Intention (β = 0.526). Thus, the estimated serial pathway is positive because all three component relationships are positive. This differs from the original theoretical expectation that Greenwashing Perception would negatively influence ESG Investment Allocation Intention.

Accordingly, H7c is more appropriately described as a statistically significant serial indirect association with an unexpected sign structure, rather than as definitive confirmation of the

hypothesized theoretical mechanism. The finding demonstrates that the proposed statistical pathway is associated with allocation intention in the observed data, but it does not establish that the complete cognitive-evaluative process operates in the theoretically predicted direction.

The total indirect effect of ESG Information Credibility on ESG Investment Allocation Intention is positive and statistically significant ($\beta = 0.178$, $t = 5.209$, $p < 0.001$; 95% CI [0.116, 0.249]). The total effect is also positive and statistically significant ($\beta = 0.372$, $t = 7.080$, $p < 0.001$; 95% CI [0.267, 0.474]). The total effect therefore reflects both the direct association of ESG Information Credibility with allocation intention and its combined indirect associations through the mediating constructs.

Nevertheless, the cross-sectional design prevents the temporal ordering implied by the serial model from being established. All constructs were measured within the same survey period, and the analysis therefore cannot determine whether ESG Information Credibility precedes Sustainability Awareness, whether Sustainability Awareness subsequently produces Greenwashing Perception, or whether investors' existing ESG investment intentions and engagement instead contribute to greater exposure to ESG information and greenwashing-related information.

The serial mediation result should therefore be interpreted as an empirical indirect association within the estimated structural model rather than as evidence of a confirmed temporal or causal sequence.

4.7. Sensitivity Analysis

Table 14. Comparison of Baseline and Sensitivity Models

Structural path/effect	Baseline	Model A: without EIC4	Model B: without EIAI1
EIC → EIAI	0.194***	0.184***	0.201***
EIC → GWP	0.185***	0.192***	0.185***
EIC → SA	0.227***	0.228***	0.227***
GWP → EIAI	0.526***	0.527***	0.523***
SA → EIAI	0.058 (ns)	0.059 (ns)	0.054 (ns)
SA → GWP	0.571***	0.569***	0.571***
EIC → SA → EIAI	0.013 (ns)	0.014 (ns)	0.012 (ns)
EIC → GWP → EIAI	0.097**	0.101**	0.097**
EIC → SA → GWP → EIAI	0.068***	0.068***	0.068***

*Notes: EIC = ESG Information Credibility; SA = Sustainability Awareness; GWP = Greenwashing Perception; EIAI = ESG Investment Allocation Intention. ns = not statistically significant. *** p < .001; ** p ≈ .001 based on the reported bootstrap output. The exact p-values should be retained in the underlying analysis table.*

The sensitivity analyses indicate that the principal structural findings remain stable across the baseline and the two alternative model specifications (Table 14). The direct effect of ESG Information Credibility on ESG Investment Allocation Intention remained positive and statistically significant, with coefficients of 0.194 in the baseline model, 0.184 after excluding EIC4, and 0.201 after excluding EIAI1. Similarly, the effect of ESG Information Credibility on Greenwashing Perception remained positive and significant across all three models, with coefficients ranging from 0.185 to 0.192. The relationships involving Sustainability Awareness and Greenwashing Perception also retained their original directions and significance patterns.

The indirect-effect estimates exhibited a comparable pattern. The indirect effect of ESG Information Credibility on ESG Investment Allocation Intention through Sustainability Awareness alone remained statistically nonsignificant across all three models. In contrast, the

indirect effect through Greenwashing Perception remained positive and significant, as did the serial indirect effect through Sustainability Awareness and Greenwashing Perception. These results suggest that the principal structural findings are not materially dependent on the inclusion of EIC4 or EIAI1. Nevertheless, the stability of the estimates should not be interpreted as definitive evidence that the original indicators are free from conceptual overlap.

4.8. Predictive Assessment Using PLSpredict

In addition to assessing the explanatory power of the structural model, this study evaluated its out-of-sample predictive performance using the PLSpredict procedure available in Smart-PLS 4. Unlike R^2, which reflects the explanatory power of the model within the observed sample, PLSpredict provides an assessment of how well the estimated PLS-SEM model can predict observations that are not used for model estimation. This predictive assessment complements the structural model evaluation and is recommended as part of contemporary PLS-SEM reporting (J. F. Hair et al., 2019; Shmueli et al., 2019).

The PLSpredict results are presented in **Table 15**. The assessment considers Q^2_predict, as well as the prediction errors generated by PLS-SEM and the linear model (LM) benchmark. Positive Q^2_predict values indicate that the model provides predictive information for the corresponding indicators. In addition, lower RMSE values indicate lower prediction error and therefore better predictive performance.

Table 15. PLSpredict Results

Indicator	Q^2_predict	PLS-SEM RMSE	LM RMSE	PLS-SEM MAE	LM MAE
EIAI1	0.073	0.902	0.909	0.735	0.749
EIAI2	0.108	1.055	1.061	0.850	0.859
EIAI3	0.081	0.933	0.940	0.765	0.771
EIAI4	0.123	0.915	0.921	0.756	0.756
GWP1	0.055	0.867	0.876	0.707	0.713
GWP2	0.033	0.984	0.975	0.812	0.808
GWP3	0.047	1.045	1.048	0.874	0.879
GWP4	0.044	1.020	1.031	0.849	0.860
GWP5	0.120	0.955	0.949	0.807	0.779
SA1	0.036	1.060	1.066	0.898	0.903
SA2	0.051	1.125	1.131	0.983	0.983
SA3	0.027	1.056	1.061	0.891	0.897
SA4	0.022	0.957	0.966	0.816	0.826

Note: *EIAI = ESG Investment Allocation Intention; GWP = Greenwashing Perception; SA = Sustainability Awareness. Lower RMSE and MAE values indicate lower prediction error.*

Source: Smart-PLS output (2026)

The results show that all Q^2_predict values are positive, ranging from 0.022 to 0.123. This indicates that the model provides predictive information for all evaluated indicators. For ESG Investment Allocation Intention, the Q^2_predict values range from 0.073 to 0.123. The corresponding values for Greenwashing Perception range from 0.033 to 0.120, while Sustainability Awareness ranges from 0.022 to 0.051. These results indicate that the model retains predictive relevance across the three endogenous constructs included in the analysis.

The comparison between PLS-SEM and the LM benchmark provides additional evidence regarding predictive performance. For ESG Investment Allocation Intention, the PLS-SEM

model produces lower RMSE values than the LM benchmark for all four indicators. For example, the RMSE for EIAI1 is 0.902 for PLS-SEM compared with 0.909 for LM, while EIAI2 shows values of 1.055 and 1.061, respectively. Similar patterns are observed for EIAI3 and EIAI4. The PLS-SEM model therefore demonstrates lower prediction error than the linear benchmark across all indicators of the study's main outcome construct.

A similar pattern is observed for most indicators of Sustainability Awareness. PLS-SEM produces lower RMSE values than the LM benchmark for SA1, SA2, SA3, and SA4. For Greenwashing Perception, however, the results are more mixed. PLS-SEM produces lower RMSE than LM for GWP1, GWP3, and GWP4, whereas LM performs slightly better for GWP2 and GWP5. Thus, the predictive performance is not uniformly superior across every indicator, but the model demonstrates competitive predictive performance for most indicators.

Overall, the PLSpredict assessment provides supportive evidence of the model's out-of-sample predictive capability, particularly for the main dependent construct, ESG Investment Allocation Intention. The positive Q^2_predict values across all indicators and the consistently lower PLS-SEM RMSE values for EIAI indicators suggest that the proposed model is not limited to explaining relationships within the estimation sample. It also demonstrates a measurable capacity to generate predictions for observations outside the estimation process. This finding complements the R^2 results reported earlier and strengthens the empirical assessment of the proposed ESG investment model (Shmueli et al., 2019).

5. Discussion

The findings provide several insights into how retail investors process ESG-related information when forming their intention to allocate resources to ESG-oriented investments. The results generally support the importance of ESG Information Credibility, but they also reveal that the relationship between information, sustainability awareness, greenwashing perception, and investment intention is not a simple linear process. In particular, Sustainability Awareness does not directly translate into ESG Investment Allocation Intention, while Greenwashing Perception shows a positive rather than negative relationship with investment allocation intention. The significant serial mediation further indicates that Sustainability Awareness becomes more consequential when it is followed by Greenwashing Perception. These findings provide a basis for reconsidering how retail investors process ESG information within the signaling process.

5.1. ESG Information Credibility and ESG Investment Allocation Intention

The findings support H1, showing that ESG Information Credibility has a positive and significant relationship with retail investors' ESG Investment Allocation Intention. This result indicates that investors who perceive ESG information as credible tend to report stronger intentions to allocate financial resources to ESG-oriented investments. The finding is consistent with the basic argument of Signaling Theory, which suggests that information can reduce uncertainty when the recipient perceives the signal as sufficiently credible and informative (Connelly et al., 2011).

In the ESG investment context, credibility is particularly important because retail investors often make decisions based on publicly available information rather than privileged or highly specialized information. ESG reports, sustainability disclosures, investment profiles, and other ESG-related communication can therefore serve as signals about the sustainability characteristics of an investment opportunity. When investors perceive these signals as credible, they may be more willing to incorporate them into their investment evaluation.

This finding is consistent with recent studies showing that ESG information can influence individual investors' investment decisions. Park and Oh (2022) demonstrated that ESG information can be integrated into individual investors' corporate investment decisions, while Zhang et al. (2024) found that perceptions of ESG performance are associated with investment intentions in the Chinese stock market. More recent evidence from Janz et al. (2025) further demonstrates that ESG information can affect individual investors' portfolio choices. Similarly, Hu et al. (2026) show that ESG reports can function as signals that shape investment decisions. The present study extends these findings by focusing specifically on perceived credibility of ESG information rather than ESG information exposure alone. This distinction is important because the availability of ESG information does not necessarily mean that investors will regard it as trustworthy. The finding therefore reinforces the argument developed in the literature review that the effectiveness of ESG information depends partly on how investors evaluate the quality and credibility of the signal.

At the same time, the relatively modest effect size observed in the present study suggests that information credibility is not the only consideration underlying ESG investment intention. Retail investors may simultaneously consider financial returns, risk, investment knowledge, product characteristics, and other factors. Giglio et al. (2025), for example, demonstrate that investors' ESG beliefs are reflected in their portfolio choices, but those choices are embedded within broader investment considerations. Thus, ESG Information Credibility appears to be an important signal, but not a sufficient explanation of retail investors' allocation intentions.

5.2. ESG Information Credibility and Sustainability Awareness

The findings support H2, indicating that ESG Information Credibility is positively associated with Sustainability Awareness. This result suggests that credible ESG information can encourage investors to pay greater attention to sustainability considerations in their investment decisions.

The finding can be explained through Signaling Theory. Information that is perceived as credible is more likely to receive attention and be incorporated into the recipient's interpretation of an investment opportunity (Connelly et al., 2011). When investors perceive ESG information as reliable, sustainability-related issues may become more salient in their evaluation process. Credibility therefore does not only influence the final investment intention; it may also shape the cognitive stage through which investors recognize the relevance of sustainability.

This interpretation is supported by Khalil and Khalil (2022), who demonstrate the importance of sustainability awareness in shaping interest in ESG investments. Similarly, Park and Oh (2022) show that ESG information can be incorporated into individual investors' decision-making processes. More recent evidence from Shahen et al. (2026) further indicates that ESG awareness can influence sustainable investment decisions, although the translation of awareness into actual decision-making may depend on other considerations.

The present study adds to this literature by placing ESG Information Credibility before Sustainability Awareness. Rather than assuming that awareness exists independently of information quality, the findings suggest that the way investors perceive ESG information may contribute to the development of sustainability awareness. However, the relatively low R^2 for Sustainability Awareness indicates that ESG Information Credibility explains only a small proportion of its variance. Therefore, awareness should not be understood as being determined primarily by ESG information credibility. Other factors, such as sustainability

literacy, personal values, financial education, media exposure, and investment experience, may also contribute to investors' sustainability awareness.

5.3. Sustainability Awareness and ESG Investment Allocation Intention

The findings do not support H3. Sustainability Awareness has a positive but statistically insignificant relationship with ESG Investment Allocation Intention. This result is important because it challenges the assumption that greater awareness of sustainability issues automatically produces stronger intentions to invest in ESG-oriented products.

The result differs from studies suggesting that ESG or sustainability awareness can encourage sustainable investment behavior. Khalil and Khalil (2022) identify sustainability awareness as an important factor in generating interest in ESG investments, while Shahen et al. (2026) report that ESG awareness can influence sustainable investment decisions. Zhang et al. (2024) also demonstrate the relevance of investors' perceptions of ESG performance to investment intentions.

However, the present finding suggests that awareness may be necessary but not sufficient for investment allocation. Investors may understand the importance of sustainability while remaining uncertain about whether a particular ESG investment genuinely reflects sustainable performance. They may also consider expected returns, financial risk, credibility of ESG claims, and the possibility of greenwashing before deciding whether to allocate capital.

This interpretation is particularly relevant to the present model because Sustainability Awareness has a strong relationship with Greenwashing Perception. Thus, awareness may make investors more attentive and critical rather than simply more willing to invest. This possibility is consistent with Kleffel and Muck (2023), who demonstrate that investors can experience confusion or internal conflict when responding to greenwashing. Similarly, Gehric and Moreno (2023) highlight the risks of greenwashing in investment fund disclosures from an investor perspective.

Therefore, the insignificant H3 result should not be interpreted as evidence that Sustainability Awareness is unimportant. Rather, it suggests that its role may operate through a more specific evaluative mechanism, which becomes evident in the mediation analysis.

5.4. Interpreting the Positive Association Between ESG Information Credibility and Greenwashing Perception

The relationship between ESG Information Credibility and Greenwashing Perception differs from the hypothesized signaling prediction. ESG Information Credibility has a positive and statistically significant association with Greenwashing Perception ($\beta = 0.185$, $t = 3.699$, $p < .001$; 95% CI [0.089, 0.282]), whereas H4 predicted a negative relationship. H4 is therefore not supported.

The finding should first be interpreted as an empirical association rather than as evidence that credible ESG information causes investors to perceive greater greenwashing. The theoretical prediction underlying H4 was derived from the conventional signaling logic that higher signal quality should reduce uncertainty and concerns about misleading claims. The observed positive coefficient therefore represents a departure from that a priori prediction.

One possible interpretation is that credibility and critical scrutiny can coexist within a broader ESG information environment. Investors may regard ESG information as sufficiently credible and useful for investment evaluation while simultaneously recognizing that particular sustainability claims may be selective, exaggerated, vague, or potentially misleading. Importantly, this interpretation does not imply that credibility itself produces greenwashing

perception. It describes a possible investor-level configuration in which confidence in the usefulness of ESG information and awareness of potential limitations of sustainability claims coexist.

This interpretation is consistent with the conceptual distinction between the perceived quality of an ESG signal and the investor's evaluation of whether particular claims are authentic. However, the present study does not directly measure investor engagement, information-search behavior, or scrutiny intensity and therefore cannot establish that these processes explain the positive coefficient. Alternative explanations, including omitted investor characteristics, respondent selection, reverse directionality, and common method effects, should therefore also be considered.

Furthermore, the survey did not anchor respondents' evaluations to a single focal company, ESG report, investment product, or specific disclosure. The positive coefficient consequently represents an association between two perceptions concerning ESG-related information encountered more broadly rather than a causal relationship between credibility and greenwashing perception concerning the same signal.

Future research should test this relationship using a common focal disclosure or company and, where possible, experimental designs that manipulate signal quality, third-party assurance, or discrepancies between ESG claims and underlying performance.

The positive association between ESG Information Credibility and Greenwashing Perception should be interpreted in light of the study's generalized measurement referent. Because respondents evaluated ESG-related information encountered across their broader investment environments rather than a common focal disclosure, their credibility and greenwashing judgments may concern different companies or information sources. The positive coefficient therefore indicates that respondents reporting higher perceived credibility of ESG information also tend to report stronger perceptions of potential greenwashing in the broader ESG information environment. It does not establish that perceiving a particular ESG disclosure as credible increases the perception that the same disclosure is misleading. This distinction limits the disclosure-specific interpretation of the result and should be considered when evaluating its implications for Signaling Theory.

5.5. Sustainability Awareness and Greenwashing Perception

The findings strongly support H5. Sustainability Awareness has a positive and substantial relationship with Greenwashing Perception. This relationship represents the strongest direct path among the six hypothesized relationships and has the largest effect size in explaining Greenwashing Perception.

The finding suggests that sustainability awareness may operate as more than general knowledge or concern about environmental and social issues. Investors with greater sustainability awareness may possess a stronger basis for critically evaluating ESG claims. They may be more likely to compare corporate sustainability statements with the underlying information available to them and therefore become more sensitive to possible inconsistencies or exaggerated claims.

This interpretation is consistent with Kleffel and Muck (2023), who show that investors' responses to greenwashing can involve confusion and internal conflict. It also aligns with Gehric and Moreno (2023), who emphasize greenwashing risks in investment disclosures from the investor perspective. More recent evidence from Kathan et al. (2025) reinforces the difficulty investors face when ESG scores or other sustainability indicators do not necessarily provide a complete representation of actual sustainability performance.

The result also provides an important explanation for the insignificant relationship between Sustainability Awareness and ESG Investment Allocation Intention. Awareness may not directly encourage investors to allocate more capital. Instead, it may make investors more evaluative of ESG claims, with Greenwashing Perception serving as the next stage in the decision process.

This interpretation represents an important contribution of the present study. Previous research has often examined sustainability awareness or sustainable finance literacy as a potential driver of sustainable investment. The present findings suggest a more nuanced mechanism: awareness can make investors more critical before it makes them more decisive.

5.6. Greenwashing Perception and ESG Investment Allocation Intention

H6 is not supported because Greenwashing Perception has a positive and statistically significant relationship with ESG Investment Allocation Intention, whereas the hypothesis predicted a negative relationship ($\beta = 0.526$, $t = 8.824$, $p < 0.001$; 95% CI [0.409, 0.644]). The path coefficient is relatively strong within the estimated structural model, and the corresponding effect size is also substantial. However, this positive coefficient should not be interpreted as evidence that perceived greenwashing encourages investors to allocate more funds to ESG-oriented investments. Rather, the findings demonstrate a positive association between the two constructs without establishing the causal process underlying that association.

An important consideration in interpreting this unexpected result is the potential heterogeneity of investors within the sample. Investors may differ in prior ESG investment experience, exposure to ESG-related information, general investment experience, financial capacity, and familiarity with sustainability issues. These characteristics may shape how investors interpret perceived greenwashing and translate such perceptions into investment intentions. For example, investors who are already familiar with ESG products may respond to perceived greenwashing differently from those who have never invested in ESG-related instruments, while investors with greater exposure to ESG information may possess different levels of awareness and evaluative capacity. Nevertheless, these possibilities remain plausible interpretations rather than empirically established mechanisms in the present study. Although aggregate respondent characteristics indicate variation in investment experience and ESG-information exposure, respondent-level demographic and investment-characteristic data were not available for additional control-variable or subgroup analyses. Consequently, the present findings cannot establish whether the positive GWP–EIAI association is consistent across investor groups or concentrated in particular segments. The relationship should therefore be interpreted as an aggregate association within the sampled population rather than evidence of a uniform behavioral response among all retail investors.

Several alternative explanations may help contextualize this finding. First, omitted investor characteristics may be associated with both Greenwashing Perception and ESG Investment Allocation Intention. Prior ESG investment experience, ESG-information exposure, sustainable finance literacy, financial literacy, expected returns, risk tolerance, environmental values, and broader ESG involvement are potentially relevant factors. For example, investors who are more involved in ESG-related investing may have stronger intentions to consider ESG-oriented products while also being more familiar with controversies involving misleading sustainability claims. However, these characteristics were not included as controls in the present model. Their potential explanatory roles therefore remain untested.

Second, the characteristics of the sample are relevant to the interpretation and generalizability of the findings. The sample was purposively drawn from retail investors with previous

investment experience who had encountered ESG-, sustainability-, or related investment information. Furthermore, 54.4% of respondents reported frequent or very frequent exposure to ESG information. This profile suggests that a substantial proportion of the sample had relatively frequent contact with ESG-related information. Such exposure may be relevant to how respondents recognize and evaluate potential greenwashing. However, the available evidence does not establish that ESG-information exposure or sample selection explains the positive GWP–EIAI coefficient. Determining whether this relationship varies with information exposure requires respondent-level analysis.

Third, reverse directionality cannot be excluded. Investors who already have stronger intentions to consider ESG-oriented investments may actively seek ESG-related information and consequently encounter more discussions concerning greenwashing. Under this interpretation, investment interest may precede greater awareness of potentially misleading sustainability claims, rather than greenwashing perception necessarily preceding investment intention. Because all constructs were measured at a single point in time, the cross-sectional design cannot establish temporal ordering or distinguish the proposed direction from this alternative explanation.

Fourth, the substantive meaning of the Greenwashing Perception measure warrants consideration. The GWP indicators capture perceptions that companies may conceal information, make misleading claims, use vague or difficult-to-verify claims, exaggerate sustainability achievements, or selectively present ESG information. These items assess perceived misleading sustainability communication rather than directly measuring distrust of ESG investments, rejection of ESG products, or willingness to avoid such investments. A higher GWP score therefore does not necessarily imply that an investor rejects ESG-oriented investment opportunities. Investors may recognize the possibility of misleading claims while continuing to express an intention to consider ESG investments. Although this interpretation is conceptually plausible, the present data do not establish whether respondents primarily understood greenwashing perception as skepticism, awareness, vigilance, or a combination of these responses.

Fifth, common method effects cannot be completely excluded. All constructs were measured using a self-administered questionnaire completed by the same respondents at a single point in time. Procedural measures were implemented to reduce potential method-related bias, including anonymous participation, neutral wording, separation of measurement sections, and withholding information about the expected direction of the hypotheses. However, a separate statistical assessment of common method bias was not conducted using a dedicated diagnostic procedure. Accordingly, the procedural measures should not be interpreted as demonstrating that common method bias has been eliminated. The positive GWP–EIAI association should therefore be interpreted with this methodological limitation in mind.

Taken together, these alternative explanations indicate that the positive GWP–EIAI relationship should be treated as a context-dependent empirical association rather than evidence of an established positive behavioral mechanism. This distinction is important because previous investor research has generally reported that greenwashing perceptions can discourage sustainable investment decisions (Gacem et al., 2025; Joseph & Jose, 2025; Suci et al., 2026). The divergence between those findings and the present result may reflect differences in investor characteristics, ESG-information exposure, measurement interpretation, institutional context, or other unobserved conditions. However, the present study cannot determine which explanation accounts for the observed relationship. Future research should

therefore collect respondent-level investor characteristics, incorporate theoretically justified control variables, compare investors with and without prior ESG investment experience, and examine heterogeneity across levels of ESG-information exposure. Where multi-group analysis is used, measurement invariance should be established before structural relationships are compared across groups. Longitudinal and experimental designs could further help establish temporal ordering and evaluate competing explanations for the relationship between greenwashing perception and ESG investment allocation intention.

5.7. The Mediating and Sequential Roles of Sustainability Awareness and Greenwashing Perception

The mediation results indicate that the specified indirect pathways differ in both statistical significance and consistency with the hypothesized theoretical mechanisms. H7a is not supported because the indirect association through Sustainability Awareness is statistically insignificant. H7b yields a statistically significant indirect association through Greenwashing Perception, but the component path directions contradict the original theoretical predictions. Similarly, H7c yields a statistically significant serial indirect association through Sustainability Awareness and Greenwashing Perception, but the result does not confirm the proposed deterrence mechanism because the final path from Greenwashing Perception to ESG Investment Allocation Intention is positive rather than negative. These findings require a clear distinction between statistical evidence of an indirect association and theoretical confirmation of the hypothesized mediation process.

The non-significant H7a indicates that Sustainability Awareness alone does not provide a statistically significant indirect pathway between ESG Information Credibility and ESG Investment Allocation Intention. Although ESG Information Credibility is positively associated with Sustainability Awareness, Sustainability Awareness does not have a significant direct association with ESG Investment Allocation Intention. Thus, awareness alone does not appear to transmit a statistically significant indirect association between perceived ESG information credibility and allocation intention in the proposed model.

H7b shows a statistically significant indirect association through Greenwashing Perception ($\beta = 0.097$, $t = 3.323$, $p = 0.001$; 95% CI [0.035, 0.160]). However, this indirect association should not be interpreted as confirmation of the hypothesized mediation mechanism because both component relationships involving Greenwashing Perception differ from the original theoretical expectations. ESG Information Credibility is positively rather than negatively associated with Greenwashing Perception, and Greenwashing Perception is positively rather than negatively associated with ESG Investment Allocation Intention. The statistical indirect effect is therefore significant, but its theoretical interpretation is inconsistent with the proposed deterrence mechanism.

The same distinction is important for H7c. The serial indirect association is statistically significant ($\beta = 0.068$, $t = 3.672$, $p < 0.001$; 95% CI [0.035, 0.108]), indicating that the specified sequence of paths forms a statistically significant indirect association in the estimated model. However, the final component relationship, Greenwashing Perception → ESG Investment Allocation Intention, has a positive rather than the hypothesized negative direction. Therefore, the significant serial indirect effect does not confirm the complete theoretical mechanism originally proposed. Instead, it should be interpreted as a statistically significant serial association with an unexpected directional pattern.

The total indirect effect of ESG Information Credibility on ESG Investment Allocation Intention is also statistically significant ($\beta = 0.178$, $t = 5.209$, $p < 0.001$; 95% CI [0.116, 0.249]), while the total effect is positive and statistically significant ($\beta = 0.372$, $t = 7.080$, $p < 0.001$; 95% CI [0.267, 0.474]). These results indicate that ESG Information Credibility is associated with allocation intention through multiple indirect pathways in the proposed model. Nevertheless, the significant total indirect effect should not be interpreted as evidence that all proposed mediating mechanisms operate in the theoretically expected directions.

An additional issue concerns the proposed temporal ordering of ESG Information Credibility and Sustainability Awareness. The primary model specifies ESG Information Credibility as an antecedent of Sustainability Awareness, which subsequently relates to Greenwashing Perception. However, sustainability awareness may also be a relatively pre-existing investor characteristic that shapes how individuals search for, evaluate, and critically interpret ESG-related information. To examine this alternative theoretical ordering, we estimated a rival structural model in which the direction of the relationship between Sustainability Awareness and ESG Information Credibility was reversed, while the remaining structural relationships were retained.

In the alternative model, Sustainability Awareness was positively associated with ESG Information Credibility ($\beta = 0.227$, $t = 4.138$, $p < 0.001$). The model also retained positive and statistically significant relationships between ESG Information Credibility and Greenwashing Perception ($\beta = 0.185$, $t = 3.699$, $p < 0.001$) and between Greenwashing Perception and ESG Investment Allocation Intention ($\beta = 0.526$, $t = 8.834$, $p < 0.001$). These results indicate that the alternative ordering is also compatible with statistically significant structural relationships in the observed data. However, the significance of these paths does not establish that Sustainability Awareness temporally precedes ESG Information Credibility or that the alternative specification provides a superior explanation of the data. In particular, the alternative model yielded an R^2 of 0.051 for ESG Information Credibility, whereas the primary model yielded an R^2 of 0.051 for Sustainability Awareness. Because these values refer to different endogenous constructs, they do not establish the superiority of either ordering.

Taken together, the rival-model analysis reinforces the need to distinguish theoretical specification from temporal and causal inference. The primary serial model represents one theoretically motivated account of the observed structural relationships, but the alternative ordering is also statistically viable. Because all constructs were measured cross-sectionally, the data cannot establish whether credibility evaluations precede changes in sustainability awareness or whether pre-existing awareness shapes subsequent credibility evaluations and greenwashing perceptions. Nor can the estimated indirect effects establish that investors temporally move from credible information to awareness, from awareness to greenwashing perception, and then to investment intention. Longitudinal designs with repeated measurements or time-lagged observations, as well as experiments that manipulate ESG disclosure credibility, would provide stronger evidence regarding temporal ordering and the proposed psychological mechanisms. Future studies should also incorporate relevant investor characteristics, including prior ESG investment experience and ESG-information exposure, to investigate whether these relationships vary across investor segments.

The sensitivity analyses provide additional evidence of the robustness of the principal structural relationships. The positive and significant association between ESG Information Credibility and ESG Investment Allocation Intention persisted when EIC4 or EIAI1 was excluded separately. The indirect association through Greenwashing Perception and the serial

indirect association through Sustainability Awareness and Greenwashing Perception also remained stable. These findings indicate that the principal results are not attributable solely to either of the two potentially overlapping indicators.

Nevertheless, coefficient stability does not eliminate the underlying measurement concern. EIC4 refers explicitly to the absence of deliberately misleading information, which is semantically close to the content of Greenwashing Perception. Likewise, EIAI1 incorporates the notion of "credible ESG characteristics" into an indicator of investment intention. The sensitivity analyses therefore provide evidence of structural robustness rather than definitive proof of complete conceptual separation. Future research should distinguish ESG information credibility through attributes such as accuracy, reliability, and transparency, while measuring investment allocation intention through willingness, planned allocation, and intended investment choices without explicitly embedding credibility judgments in the intention indicators.

5.8. Theoretical Implications

This study contributes to the application of Signaling Theory in the retail ESG investment context in three main ways.

First, the study clarifies that the signaling process should distinguish between the ESG signal itself, the perceived quality of that signal, the investor's interpretation of the information, and the behavioral response to that interpretation. ESG Information Credibility captures the perceived quality of ESG-related information as an informational signal, whereas Sustainability Awareness and Greenwashing Perception capture different forms of investor interpretation and evaluation. ESG Investment Allocation Intention represents the behavioral outcome examined in the model. This conceptual distinction helps avoid treating ESG disclosure as automatically informative simply because information is available.

Second, the findings show that the conventional signaling predictions are not uniformly observed across the investor-evaluation process. The positive association between ESG Information Credibility and ESG Investment Allocation Intention is consistent with the conventional signaling logic, whereas the positive association between ESG Information Credibility and Greenwashing Perception differs from the hypothesized negative relationship. Similarly, the positive association between Greenwashing Perception and ESG Investment Allocation Intention differs from the deterrence prediction derived from signaling logic. These deviations should not be interpreted as evidence that Signaling Theory is invalid. Rather, they indicate that the behavioral consequences of ESG signals may depend on how investors interpret and evaluate information within a broader information environment. This distinction also applies to the mediation findings. Although the indirect association through Greenwashing Perception (H7b) and the serial indirect association through Sustainability Awareness and Greenwashing Perception (H7c) are statistically significant, neither result confirms the complete theoretical mechanism originally proposed. The positive EIC–GWP association differs from the predicted negative relationship in H4, while the positive GWP–EIAI association differs from the predicted deterrence relationship in H6. Consequently, the significant indirect effects should be interpreted as evidence of statistical connectivity among the constructs within the specified model, rather than as validation of the original theoretical mediation mechanisms. The contribution of these findings lies in identifying indirect associations that warrant further investigation, not in claiming that the hypothesized signaling process has been confirmed in its entirety.

Third, the findings suggest that perceived credibility and critical scrutiny should not necessarily be treated as mutually exclusive investor responses. An investor may regard ESG information as sufficiently credible to be useful while simultaneously recognizing the possibility that some sustainability claims are incomplete, selective, exaggerated, or misleading. The present findings are therefore consistent with the possibility of coexistence between informational confidence and critical scrutiny, although the underlying psychological mechanism was not directly tested.

Importantly, the study does not claim that Signaling Theory predicted the positive Greenwashing Perception relationships observed in the data. The negative H4 and H6 hypotheses were specified before the empirical results and represent the conventional signaling predictions. The positive coefficients are therefore treated as empirical departures from those predictions rather than as post-hoc theoretical confirmations. This distinction strengthens the theoretical interpretation by separating theory-derived predictions from exploratory explanations of unexpected findings.

The study consequently positions Signaling Theory as a framework for understanding how ESG information acquires informational value and how investors evaluate its quality, while recognizing that investor responses to ESG signals may involve both confidence and scrutiny. Future research should test these alternative response processes using focal-disclosure experiments, longitudinal designs, or models incorporating investor engagement, information exposure, ESG literacy, and other relevant boundary conditions.

5.9. Practical Implications

The findings have implications for companies, financial institutions, regulators, and retail investors.

For companies, the results suggest that ESG communication should focus not only on increasing the quantity of sustainability information but also on ensuring its credibility, consistency, and verifiability. Investors may scrutinize ESG claims more closely when they become more aware of sustainability issues. Therefore, companies should provide clear evidence supporting their ESG claims and avoid broad statements that cannot be substantiated. This is particularly important given the documented risks associated with ESG scores, investment disclosures, and greenwashing (Gehric & Moreno, 2023; Kathan et al., 2025).

For financial institutions and investment platforms, the findings indicate that investor education should move beyond basic ESG awareness. Educational initiatives should help retail investors understand how to evaluate ESG information, compare sustainability claims, identify potential greenwashing, and assess the credibility of ESG-related investment products. Simply increasing awareness may not be sufficient to change investment intentions, as demonstrated by the insignificant direct relationship between Sustainability Awareness and ESG Investment Allocation Intention.

For regulators, the findings reinforce the importance of improving the transparency, comparability, and credibility of ESG information available to retail investors. The development of Indonesia's sustainable-finance framework and taxonomy provides an institutional foundation for improving the quality and consistency of sustainability-related information (Otoritas Jasa Keuangan (OJK), 2024, 2025, 2026a). Stronger disclosure standards, clearer ESG classifications, and mechanisms for verifying sustainability claims can help investors distinguish substantive ESG practices from potentially misleading communication.

For retail investors, the findings suggest that skepticism should not necessarily result in either unconditional acceptance or complete rejection of ESG investments. Greenwashing concerns can instead be used as a reason to conduct additional due diligence. Investors can examine the consistency of ESG claims, supporting evidence, sustainability performance, and available disclosure before making allocation decisions.

Finally, the positive relationship between Greenwashing Perception and ESG Investment Allocation Intention suggests that investment platforms should not assume that investors who recognize greenwashing will automatically abandon ESG products. Some investors may remain interested in ESG investing while becoming more selective. Providing accessible comparison tools, standardized ESG information, and transparent sustainability profiles may therefore help investors convert skepticism into more informed allocation decisions.

6. Conclusion and Suggestion

6.1. Conclusion

This study examined how retail investors evaluate ESG information and how such evaluations are associated with their intention to allocate financial resources to ESG-oriented investments. The findings show that ESG Information Credibility is positively associated with ESG Investment Allocation Intention and Sustainability Awareness. However, Sustainability Awareness does not have a significant direct association with ESG Investment Allocation Intention.

A particularly important finding is the strong relationship between Sustainability Awareness and Greenwashing Perception. This suggests that sustainability awareness may be associated with greater attention to the possibility that ESG claims are selective, exaggerated, vague, or misleading rather than simply with stronger willingness to invest in ESG products. Greenwashing Perception also shows a strong positive relationship with ESG Investment Allocation Intention, which differs from the negative relationship proposed in the original hypothesis and from several previous studies that have viewed greenwashing perception primarily as a barrier to sustainable investment. This result should not be interpreted as suggesting that greenwashing encourages ESG investment. Instead, it represents an unexpected positive association that may reflect the coexistence of interest in ESG investment opportunities and concerns about potentially misleading sustainability claims. However, investor engagement, information exposure, and other possible explanations for this association were not directly tested in the present study.

The mediation analysis identifies statistically significant indirect associations involving Greenwashing Perception. The indirect association through Greenwashing Perception and the serial indirect association through Sustainability Awareness and Greenwashing Perception are both statistically significant. However, neither result confirms the complete theoretical mediation mechanism originally proposed. The positive relationships between ESG Information Credibility and Greenwashing Perception and between Greenwashing Perception and ESG Investment Allocation Intention differ from the hypothesized directions. Accordingly, H7b and H7c are interpreted as statistically significant indirect associations with unexpected directional structures, rather than as confirmation of the hypothesized mediation and serial deterrence mechanisms. The findings therefore identify empirical pathways that warrant further investigation without establishing the proposed temporal or causal sequence.

From a theoretical perspective, the findings provide a more nuanced application of Signaling Theory to retail ESG investment. The theory provides a basis for distinguishing the ESG signal

itself, the perceived quality of that signal, investors' interpretation and evaluation of the information, and their intended behavioral response. The positive association between ESG Information Credibility and ESG Investment Allocation Intention is consistent with the conventional signaling logic that credible information increases the usefulness of a signal for investment evaluation. However, the positive association between ESG Information Credibility and Greenwashing Perception departs from the hypothesized negative signaling relationship. This finding suggests that perceived credibility and critical scrutiny may coexist within a broader ESG information environment, although the mechanism underlying this coexistence was not directly tested. The findings also highlight distinct roles for Sustainability Awareness and Greenwashing Perception in the estimated model, with Sustainability Awareness being strongly associated with Greenwashing Perception but not directly with ESG Investment Allocation Intention. The statistically significant serial indirect association is consistent with the proposed integrative structure, but it does not establish the temporal or psychological sequence implied by the model.

From a practical and economic perspective, the findings highlight the importance of improving the quality and credibility of ESG information available to retail investors. Companies and financial institutions should provide ESG information that is transparent, verifiable, comparable, and supported by clear evidence. For investors, stronger sustainability awareness should be accompanied by the ability to critically evaluate ESG claims and identify potential greenwashing. For regulators and financial-market institutions, improving ESG disclosure standards, classification systems, and information comparability can reduce information uncertainty and support more informed allocation of capital toward genuinely sustainable activities. In this sense, improving ESG information quality may contribute to more informed investor decision-making and, potentially, to more efficient allocation of financial resources toward sustainable economic activities.

6.2. Limitations and Suggestions for Future Research

Several limitations should be considered when interpreting the findings.

First, the cross-sectional survey design did not anchor respondents' evaluations to a single focal company, ESG report, ESG rating, investment product, or standardized ESG disclosure. Although the measurement context was restricted to ESG information encountered by retail investors in investment evaluation, respondents could have based their credibility and greenwashing judgments on different information sources and companies. This referent mismatch is particularly consequential for interpreting the positive association between ESG Information Credibility and Greenwashing Perception. Respondents may consider ESG information from one source credible while simultaneously believing that other companies exaggerate or selectively present sustainability claims. The observed association therefore cannot establish that credibility and greenwashing perceptions concern the same informational signal, nor that credible information causes greater scrutiny of that disclosure. Instead, it should be interpreted as an association between generalized, investment-contextualized perceptions of ESG information credibility and potential greenwashing. Future studies should expose all respondents to a common focal referent, such as the same ESG report, sustainability disclosure, ESG rating, or investment product, and measure credibility, perceived greenwashing, and allocation intention with respect to that same object. Experimental vignette designs could further manipulate disclosure assurance, information

quality, or discrepancies between ESG claims and underlying performance to establish clearer referential alignment and stronger evidence regarding the proposed signaling mechanism.

Second, the proposed temporal ordering of ESG Information Credibility, Sustainability Awareness, and Greenwashing Perception remains theoretically contestable. The primary model conceptualizes Sustainability Awareness as an outcome of ESG Information Credibility and as an antecedent of Greenwashing Perception. However, sustainability awareness may also represent a relatively pre-existing investor characteristic that shapes how individuals search for, evaluate, and critically interpret ESG-related information. To examine this alternative, we estimated a rival structural model in which Sustainability Awareness preceded ESG Information Credibility while the remaining structural relationships were retained. The alternative model yielded a positive and statistically significant path from Sustainability Awareness to ESG Information Credibility ($\beta = 0.227$, $p < 0.001$). Nevertheless, this result does not establish the temporal or causal priority of sustainability awareness, nor does the significance of the alternative path alone demonstrate that the alternative model provides a superior explanation of the data. The cross-sectional design cannot determine whether credibility evaluations precede changes in sustainability awareness or whether pre-existing awareness shapes subsequent evaluations of ESG information. Future research should use longitudinal designs with repeated measurements or experimental approaches to establish temporal ordering and examine whether credibility evaluations precede changes in sustainability awareness and subsequent greenwashing scrutiny.

Third, the study relied on self-reported questionnaire responses to measure perceptions and investment intention. Although this approach is appropriate for examining investor perceptions and behavioral intentions, reported intention does not necessarily correspond to actual investment allocation. This issue is particularly relevant to the unexpected positive relationship between Greenwashing Perception and ESG Investment Allocation Intention. The finding may reflect greater engagement with ESG investing rather than an actual willingness to invest despite greenwashing concerns. Future research should therefore incorporate behavioral or transaction-based measures, such as actual portfolio allocation, investment choices in experimental settings, or observed trading behavior.

Fourth, the model explains a relatively small proportion of the variance in Sustainability Awareness, indicating that ESG Information Credibility alone provides a limited explanation of this construct. This suggests that important antecedents of sustainability awareness remain outside the current model. Future research could incorporate variables such as sustainable finance literacy, financial knowledge, investment experience, environmental values, trust, ESG information exposure, and perceived financial returns to provide a more comprehensive explanation of how sustainability awareness develops.

Fifth, the findings reveal a potentially important contextual difference from previous research concerning Greenwashing Perception and ESG Investment Allocation Intention. The positive relationship observed in this study contrasts with research reporting that greenwashing perception discourages sustainable investment. This difference should not be treated as definitive evidence of a universal alternative relationship. Instead, it provides a basis for further investigation. Future research could examine whether the positive association is specific to Indonesian retail investors, particular investor segments, or investors with higher levels of ESG engagement. Experimental research could also test whether greenwashing information leads investors to withdraw from ESG products, become more selective, or increase their search for credible ESG opportunities.

Sixth, although the supplementary sensitivity analyses indicate that the principal structural relationships remain stable when EIC4 and EIAI1 are excluded separately, potential item-content overlap remains a measurement limitation. Specifically, EIC4 refers to ESG information being presented without deliberately misleading investors, which may be conceptually close to Greenwashing Perception. Similarly, EIAI1 explicitly refers to "credible ESG characteristics," potentially introducing semantic proximity between ESG Information Credibility and ESG Investment Allocation Intention. The stability of the structural estimates following the exclusion of these indicators provides evidence of robustness but does not establish complete conceptual separation among the constructs. Future research should develop and validate alternative indicators that assess ESG information credibility through attributes such as accuracy, reliability, and transparency, while measuring investment allocation intention through willingness, planned allocation, and intended investment choices without explicitly embedding credibility judgments in the dependent construct.

Seventh, the study could not empirically examine investor heterogeneity through additional control-variable or subgroup analyses. Although aggregate respondent characteristics were reported, respondent-level demographic and investment-characteristic data were not available for further statistical analysis. Consequently, prior ESG investment experience, ESG-information exposure, general investment experience, education, income, and investment type could not be incorporated as individual-level controls or used to assess differences in the structural relationships across investor groups. This limitation is particularly relevant to the unexpected positive association between Greenwashing Perception and ESG Investment Allocation Intention, as the observed relationship may differ across investors with different levels of ESG engagement or information exposure. However, the present study cannot determine whether the relationship is consistent across investor segments or disproportionately reflects the responses of particular groups. Future research should collect and retain respondent-level demographic and investment-characteristic data, incorporate theoretically justified control variables, and formally test heterogeneity between investors with and without prior ESG investment experience and across different levels of ESG-information exposure. Where multi-group analysis is employed, measurement invariance should be established before comparing structural relationships across groups. Such analyses would help determine whether investor characteristics explain, condition, or otherwise qualify the observed relationships.

Overall, these limitations define the boundaries within which the findings should be interpreted rather than invalidate the study's contributions. The cross-sectional, self-reported, and single-country design constrains causal inference and generalizability, while the absence of respondent-level characteristics limits the empirical assessment of investor heterogeneity. Potential item-content overlap also warrants further measurement validation. Future research combining longitudinal or experimental designs, common focal ESG disclosures, cross-country comparisons, actual investment behavior, respondent-level investor characteristics, and refined measurement instruments would provide stronger evidence regarding the mechanisms and boundary conditions identified in this study.

Declaration of AI and AI-Assisted Technologies in the Writing Process

During the preparation of this work, the author(s) used ChatGPT (OpenAI) to assist with language refinement, organization of the manuscript, development of academic arguments, and improvement of the clarity and readability of the text. The tool was not used to generate,

manipulate, or interpret the empirical data or statistical results. After using this tool, the author(s) carefully reviewed, verified, and edited the content as needed and take(s) full responsibility for the content, accuracy, originality, and integrity of the publication.

Reference

Aulia, M., Afiff, A. Z., Hati, S. R. H., & Gayatri, G. (2025). Ethics and sustainable government bonds: The retail investors' perspective. *Sustainable Futures*, *9*(June), 100499. https://doi.org/10.1016/j.sftr.2025.100499

Breuer, W., & Lehnhoff, H. (2026). From confusion to credibility: Evaluating the effectiveness of sustainability profiles in retail investment decisions. *Finance Research Letters*, *106*(September), 110265. https://doi.org/10.1016/j.frl.2026.110265

Connelly, B., Certo, T., Ireland, R., & Reutzel, C. (2011). Signaling Theory: A Review and Assessment. *Journal of Management - J MANAGE*, *37*, 39–67. https://doi.org/10.1177/0149206310388419

Gacem, S., Hervé, F., & Marsat, S. (2025). When green turns red: Is the perception of greenwashing a barrier to individual green investment? *Finance Research Letters*, *82*(September), 107605. https://doi.org/10.1016/j.frl.2025.107605

Gehric, N., & Moreno, A. (2023). An Exploration of Greenwashing Risks in Investment Fund Disclosures: An Investor Perspective. In *CFA Institute: Research and Policy Centre*. https://doi.org/doi.org/10.56227/23.1.19

Giglio, S., Maggiori, M., Stroebel, J., Tan, Z., Utkus, S., & Xu, X. (2025). Four facts about ESG beliefs and investor portfolios. *Journal of Financial Economics*, *164*(February), 103984. https://doi.org/10.1016/j.jfineco.2024.103984

Hair, J., & Alamer, A. (2022). Partial Least Squares Structural Equation Modeling (PLS-SEM) in second language and education research: Guidelines using an applied example. *Research Methods in Applied Linguistics*, *1*(3), 100027. https://doi.org/10.1016/j.rmal.2022.100027

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, *31*(1), 2–24. https://doi.org/10.1108/EBR-11-2018-0203

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*(1), 115–135. https://doi.org/10.1007/s11747-014-0403-8

Hoai, N. T. (2026). The mediating role of trust in bridging the ESG assurance credibility chasm. *Discover Sustainability*, *7*(1), 369. https://doi.org/10.1007/s43621-026-02747-3

Hu, H., Zhang, T., & Dong, H. (2026). The signaling power of ESG reports: How corporate sustainability disclosure shapes investment decisions in China. *International Review of Financial Analysis*, *109*(January), 104691. https://doi.org/10.1016/j.irfa.2025.104691

Janz, C., Rilke, R. M., & Burcin Yurtoglu, B. (2025). Does ESG information impact individual investors' portfolio choices? *Journal of Economic Behavior & Organization*, *234*(June), 107007. https://doi.org/10.1016/j.jebo.2025.107007

Joseph, C. R., & Jose, S. (2025). Determinants of Gen Z ' s Investment Decisions. *International Journal for Multidisciplinary Research (IJFMR)*, *7*(2), 1–19. https://www.ijfmr.com/papers/2025/2/39688.pdf

Kathan, M. C., Utz, S., Dorfleitner, G., Eckberg, J., & Chmel, L. (2025). What you see is not what you get: ESG scores and greenwashing risk. *Finance Research Letters*, *74*, 106710. https://doi.org/10.1016/j.frl.2024.106710

Khalil, M. K., & Khalil, R. (2022). Leveraging Buyers' Interest in ESG Investments through Sustainability Awareness. In *Sustainability* (Vol. 14, Issue 21, p. 14278). https://doi.org/10.3390/su142114278

Kleffel, P., & Muck, M. (2023). Aggregate confusion or inner conflict? An experimental analysis of investors' reaction to greenwashing. *Finance Research Letters*, *53*(May), 103421. https://doi.org/10.1016/j.frl.2022.103421

Kock, N., & Hadaya, P. (2018). Minimum sample size estimation in PLS-SEM: The inverse square root and gamma-exponential methods. *Information Systems Journal*, *28*(1), 227–261. https://doi.org/10.1111/isj.12131

Li, J., He, H., Jones, L., Gepp, A., & Lu, Y. (2025). ESG investment among retail investors: a systematic literature review and future research agenda. *Journal of Accounting Literature*, *7*(10), 1–33. https://doi.org/10.1108/JAL-06-2025-0288

Li, T., Shu, X., & Liao, G. (2024). Does corporate greenwashing affect investors' decisions? *Finance Research Letters*, *67*(September), 105877. https://doi.org/10.1016/j.frl.2024.105877

Lock, I., & Seele, P. (2017). Measuring Credibility Perceptions in CSR Communication: A Scale Development to Test Readers' Perceived Credibility of CSR Reports. *Management Communication Quarterly*, *31*(4), 584–613. https://doi.org/10.1177/0893318917707592

Memon, M. A., Ramayah, T., Ting, H., & Cheah, J. (2025). PURPOSIVE SAMPLING : A REVIEW AND GUIDELINES FOR QUANTITATIVE RESEARCH. *Journal of Applied Structural Equation Modeling*, *9*(1), 1–23. https://doi.org/10.47263/JASEM.9(1)01

Nanlohi, Y. B., Susanto, M. W., Haqq, D. S. A., Nandito, I. A., & Rachmawati, T. (2025). Menelisik "Greenwashing" di balik gembar-gembor ESG: Studi kasus persepsi dan pengalaman investor ritel terhadap implementasi praktik ESG perusahaan di Indonesia pasca regulasi terbaru. *Anggaran: Jurnal Publikasi Ekonomi Dan Akuntansi*, *3*(2), 53–61. https://doi.org/10.61132/anggaran.v3i2.1344

Otoritas Jasa Keuangan (OJK). (2024). *Roadmap Keuangan Berkelanjutan Tahap II*. Webpage. https://keuanganberkelanjutan.ojk.go.id/keuanganberkelanjutan/ArticleList/View/259/

Otoritas Jasa Keuangan (OJK). (2025). *Indonesia Taxonomy for Sustainable Finance (TKBI) 2025 Version 2*. Webpage. https://ojk.go.id/en/Publikasi/Roadmap-dan-Pedoman/Sektor-Jasa-Keuangan/Keuangan-Berkelanjutan/Pages/Taxonomy-for-Indonesian-Sustainable-Finance-2nd-Edition.aspx

Otoritas Jasa Keuangan (OJK). (2026a). *Indonesia Sustainable Finance Taxonomy (TKBI): A National Framework for Sustainable Finance – Version 3*. Publication. https://iru.ojk.go.id/iru/WebSite/ArticleList/View/937

Otoritas Jasa Keuangan (OJK). (2026b). *Indonesia Taxonomy for Sustainable Finance TKBI Version 3*. Roadmap and Guidelines. https://ojk.go.id/en/Publikasi/Roadmap-dan-Pedoman/Sektor-Jasa-Keuangan/Keuangan-Berkelanjutan/Pages/Indonesia-Taxonomy-for-Sustainable-Finance-TKBI-Version-3.aspx

Park, S. R., & Oh, K. S. (2022). Integration of ESG Information Into Individual Investors' Corporate Investment Decisions: Utilizing the UTAUT Framework. *Frontiers in Psychology*, *13*, 899480. https://doi.org/10.3389/fpsyg.2022.899480

PwC Indonesia. (2024). *94% investor meyakini pelaporan perusahaan tentang kinerja keberlanjutan mengandung klaim tanpa bukti: Survei Investor Global PwC 2023*. Press Release.

https://www.pwc.com/id/en/media-centre/press-release/2024/indonesian/survei-investor--global-pwc-2023.html

Shahen, M. E., Otaify, M., Mohamed, H. A., & Rady, A. (2026). Effect of ESG Awareness on Sustainable Investment Decisions: An Experimental Study. In *Journal of Risk and Financial Management* (Vol. 19, Issue 6, p. 427). https://doi.org/10.3390/jrfm19060427

Shmueli, G., Sarstedt, M., Hair, J. F., Cheah, J.-H., Ting, H., Vaithilingam, S., & Ringle, C. M. (2019). Predictive model assessment in PLS-SEM: guidelines for using PLSpredict. *European Journal of Marketing*, *53*(11), 2322–2347. https://doi.org/10.1108/EJM-02-2019-0189

Strauß, N., Krakow, J., & Chesney, M. (2023). It's the news, stupid! The relationship between news attention, literacy, trust, greenwashing perceptions, and sustainable finance investment in Switzerland. *Journal of Sustainable Finance & Investment*, *13*(4), 1480–1505. https://doi.org/10.1080/20430795.2023.2226792

Suci, Y. R., Roswiyanti, R., Widiawati, A., Handayani, L., & Halik, J. B. (2026). Why Financial Behavior Differs : The Roles of Fintech Literacy , Social Comparison , and Anxiety. *Journal of Economics, Entrepreneurship, Management Business and Accounting*, *4*(4), 1206–1240. https://doi.org/10.61255/jeemba.v4i4.1401

Sun, Y., & Shi, B. (2022). Impact of Greenwashing Perception on Consumers' Green Purchasing Intentions: A Moderated Mediation Model. In *Sustainability* (Vol. 14, Issue 19, p. 12119). https://doi.org/10.3390/su141912119

Zhang, X., Ma, L., & Zhang, M. (2024). Investor Perception of ESG Performance: Examining Investment Intentions in the Chinese Stock Market with Social Self-Efficacy Moderation. In *Journal of Risk and Financial Management* (Vol. 17, Issue 4, p. 166). https://doi.org/10.3390/jrfm17040166