The Value of Assurance and Expanded Disclosure of Blockchain on Investor Confidence in ESG Reports

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ABSTRACT

The emergence of blockchain technology to enhance data reliability raises the question of how this might impact the perceived value of independent assurance. In this study, we use an ESG disclosure setting, where both management disclosure and independent assurance are predominantly voluntary, to study how investors perceive the value of assurance in blockchain-based reporting systems. Drawing on dual processing theory, we predict and find that the effect of assurance on investor confidence is greater for traditional reporting systems compared to blockchain-based systems. We also predict and find that assurance has a diminished impact on investor confidence when capability description of the reporting system is provided compared to when they are not provided, consistent with a "substitution effect" between external assurance and more advanced reporting systems. Further, we find that investors' perceived system credibility explains why assurance matters less in blockchain-based reporting systems. Additional evidence on investors' perceived greenwashing corroborates our main findings, indicating that assurance has a greater effect on reducing greenwashing concerns in traditional reporting systems compared to blockchain systems. Overall, our findings show differences in how investors process information across reporting systems. We discuss the implications of our findings for regulators, firm managers considering the use of blockchain technology along the supply chain, and assurance practitioners. If blockchain technology improves data reliability and reporting integrity, it does provide an opportunity for assurance providers to add more value to the information reported beyond the traditional compliance focus.

Keywords: Reporting Systems, Blockchain Technology, ESG Assurance, Investor Confidence

I. INTRODUCTION

An increasing number of firms disclose the adoption of blockchain technology in their annual reports (Huang, Wang, and Yen 2024). Although blockchain applies to a wide range of industries and settings including financial statement audits (Cao, Cong, and Yang 2024; Deloitte 2020), it also has the potential to enhance tracking and reporting environmental, social and governance (ESG) metrics along the supply chain (Jenkins, Negangard, and Sheldon 2024; COSO 2023). The emergence of blockchain technology in recent years to improve data and reporting integrity raises the question of how the use of blockchain-based reporting systems might impact the perceived value of independent assurance.[1] This potential was recognized in recent COSO reports, which highlight the technology's benefits for improving the integrity of both financial and ESG reporting (COSO 2020, 2023). Specifically, with blockchain emerging, there have been calls for assurance engagements to do more and have a broader focus in the future, from compliance focus to systems assurance (Elliott and Duan 2022).

In this study, we use an ESG disclosure setting where both management disclosure and external assurance are predominantly voluntary to examine investor confidence judgments in two distinct reporting systems. Specifically, we study how external assurance affects investor confidence in traditional versus blockchain-based reporting systems. As theory and prior research suggest assurance enhances ESG reporting quality and investor confidence in traditional reporting settings (Ballou, Chen, Grenier, and Heitger 2018; Cohen and Simnett 2015), we also consider whether the effect of assurance varies in settings where capability description of the reporting system is more versus less salient.

Understanding the effect of blockchain systems on investors' confidence judgments in reported information is important to inform ongoing considerations of the technology by

[1] Blockchain offers an alternative to traditional record-keeping systems and is defined as a structured, sequential database of information secured through cryptographic proofs (Yermack 2017, p. 7). Some of the characteristics of blockchain-based reporting systems include immutability, transparency, and decentralized verification, which collectively enhance the reliability of recorded information and reduce the risk of data manipulation.

companies, audit firms and regulatory authorities. Recent archival studies find that capital-markets positively react to firms' blockchain disclosures (Cheng, De Franco, Jiang, and Lin 2019; Wenyi, Jun, and Mengjie 2024; Klöckner, Schmidt, and Wagner 2022; Autore, Clarke, and Jiang 2021). Recent evidence also indicates that the adoption of blockchain technology is associated with increased financial reporting quality and increased transparency (Liao, Lin, and Sun 2025; Chen, Cheng, and Luo 2024), with the technology also having the potential to enhance the verification and reporting integrity of ESG disclosures (Jenkins et al. 2024; COSO 2023). These findings align with blockchain's inherent features of immutability, transparency, and distributed ledgers, which share certain characteristics with traditional assurance.

However, the technology is relatively new to investors (Austin and Williams 2021), and firms are cautioned to weigh the costs versus benefits of adopting blockchain-based reporting systems (Huang et al. 2024). Further, recent studies highlight important limitations of blockchain technology around the reliability of blockchain data and processing capabilities of the technology (Matringe and Power 2023; Pflueger, Kornberger, and Mouritsen 2022; Jenkins et al. 2024). Specifically, transactions in blockchain may still involve unauthorized or fraudulent activities, and can be incorrectly classified in reporting systems (Fortin, Pimentel, and Boulianne 2024; CPA-Canada and AICPA 2017). Despite the espoused benefits and concerns of blockchain, little is known about how investors assess the reliability of information generated through blockchain-based reporting systems, especially for largely unregulated and unaudited disclosure issues such as ESG topics.

To the extent blockchain-based reporting systems can enhance verification efficiency of transactions (Cao et al. 2024; Liu, Wu, and Xu 2019; Jenkins et al. 2024), the adoption of blockchain technology should increase investors' confidence in reported information.[2]

[2] We note that the literature on "familiarity bias" suggests that people including investors are reluctant to rely on information from unfamiliar reporting systems such as blockchain-based reporting systems. This literature suggests that investors will exhibit "familiarity bias" and assess the reliability of reported information higher when

However, our survey of various reports by regulators, investor advisory bodies, and accounting firms suggests that blockchain technology, despite its inherent features, requires careful scrutiny and does *not* automatically provide sufficient assurance without proper controls assessment. Specifically, regulatory authorities and other stakeholders such as accounting firms raise concerns over key aspects of blockchain technology potentially affecting users' perceptions of company disclosures. For example, the US Securities and Exchange Commission (SEC) has issued an alert warning investors that 'proof of reserves,' a verification method commonly used by cryptocurrency exchanges operating on blockchain networks, "is not as rigorous, or as comprehensive, as a financial statement audit and may not provide any level of assurance" (SEC 2023). Similarly, the Public Company Accounting Oversight Board (PCAOB) issued guidance advising auditors to evaluate blockchain-related risks by understanding controls over both on-chain information used as audit evidence and off-chain transactions not protected by blockchain's inherent security features (PCAOB 2020, 2023).

To develop our predictions, we draw upon the dual processing theory in psychology which suggests that individuals process information through two distinct cognitive systems: System 1 (heuristic processing) and System 2 (systematic processing) (Chaiken 1980; Chaiken and Maheswaran 1994). System 1 represents simple heuristics and effortless information processing where individuals rely on easily accessible cues and mental shortcuts to make judgments (Chaiken 1980; Chaiken and Maheswaran 1994; Birnbaum and Stegner 1979). In contrast, System 2 represents a more deliberate, analytical, and effortful information processing where people carefully evaluate information and engage in deeper cognitive elaboration (Chaiken 1980; Kahneman 2003; Chaiken and Maheswaran 1994). In our setting, we posit that the technological context of the reporting system will trigger different processing routes. With

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the information is generated from more familiar, traditional reporting systems compared to blockchain systems (Austin and Williams 2021; Cao, Han, Hirshleifer, and Zhang 2011).

traditional reporting systems, investors are likely to use simple heuristics (System 1) by relying on familiar and easily accessible cues like external assurance to form their confidence judgments. However, blockchain technology is likely to evoke systematic processing (System 2) whereby investors expend more cognitive effort to understand and evaluate it and the associated disclosure (more effortful). This is because blockchain represents a relatively novel and complex technology that most investors have limited familiarity with (Austin and Williams 2021), requiring more cognitive effort to understand and evaluate it. Therefore, investors are likely to engage in more effortful processing when evaluating information from blockchain-based systems. Thus, we predict that assurance will have a greater positive effect on investors' confidence in traditional reporting systems compared to blockchain reporting systems.

We further draw on the dual information processing theory and contend that contextual factors like capability descriptions of the reporting system provide investors more information about a reporting system and can serve to promote investors to go beyond System 1 processing and engage more effortful (System 2) information processing (Griffith, Kadous, and Young 2021). Therefore, we predict the positive effect of external assurance on investor confidence will be stronger when a capability description of the reporting is not provided compared to when it is provided, as assurance compensates for the lack of detailed information about the capabilities of reporting systems.[3] As capability descriptions highlight the unique credibility enhancing features of blockchain reporting systems, we further explore whether capability descriptions will have a greater effect on investor confidence in the reported information for blockchain compared to traditional reporting systems.

To test our predictions, we conduct a $2 \times 2 \times 2$ between-subjects experiment with nonprofessional investors. We manipulate *reporting system* (blockchain versus traditional),

[3] The configural information processing theory also suggests that people process multiple pieces of information in a configural manner, where the presence of one reliable mechanism (e.g., advanced reporting systems) can substitute for another (e.g., assurance) (Kelly and Tan 2017).

capability description of the reporting system (provided versus not provided) and *external assurance* (present versus absent). The participants (hereafter investors) consider a company's approach to tracking and reporting operational and supply chain greenhouse gas (GHG) emissions, and the relevant reporting system. We focus on a GHG emissions disclosure topic because companies are increasingly making significant carbon infrastructure adjustments as part of their "net zero" emissions pledges and in response to changing regulatory landscape relating to GHG emissions disclosure regulations around the world. Further, GHG emissions reporting has become mainstream among global companies, and a substantial number of companies obtain independent assurance over their carbon disclosures (KPMG 2022). However, questions remain over the reliability and credibility of this type of disclosures, consistent with "greenwashing" concerns.[4]

Consistent with our predictions, we find that external assurance has a stronger positive effect on investor confidence in traditional reporting systems compared to blockchain systems. We also find that providing capability description of the reporting system increases investor confidence, and this effect is greater when assurance is absent versus present, consistent with a "substitution effect" between external assurance and more advanced reporting systems. Overall, the results support our theoretical predictions about how traditional versus blockchain systems trigger different information processing routes (System 1 versus System 2).

We next examine the possible mechanism through which different reporting systems (blockchain versus traditional) and assurance jointly influence investor confidence, and our mediation analysis indicates that perceived system credibility explains our results. Our theory suggests that investors adopt simple heuristics (System 1) when processing information from

[4] Given the expansion of GHG emissions reporting and concerns over greenwashing, there have been proposals for alternative reporting systems to address its complexity, particularly because emissions reporting often involve transactions along the supply chain. For example, emissions reporting requires tracking Scope 1 emissions across multiple suppliers and operational sites, making blockchain-based reporting systems a potential solution for enhancing traceability and transparency of direct and indirect GHG emissions (Jenkins et al. 2024).

traditional reporting systems but engage in more effortful cognitive processing (System 2) when evaluating information from blockchain reporting systems. Specifically, investors rely heavily on familiar cues like external assurance to form confidence judgments in traditional systems. In contrast, blockchain reporting systems trigger more systematic (effortful) evaluation of the underlying technological capabilities rather than primarily relying on assurance. This differential information processing explains why assurance matters less in blockchain-based reporting systems compared to traditional systems.

We contribute to the existing literature in several ways. First, we contribute to the burgeoning literature on blockchain technology that has thus far remained largely "normative" as most studies look at the future applications rather than the implications of blockchain technology (Garanina, Ranta, and Dumay 2022, p. 1512). We use an experiment with investors and provide what we believe is the first direct evidence on the effect of blockchain technology on investor confidence in management disclosures. In doing so, our study adds to recent literature that provides evidence of positive capital-market reaction to blockchain announcements (Cheng et al. 2019; Wenyi et al. 2024; Klöckner et al. 2022; Cahill, Baur, Liu, and Yang 2020; Autore et al. 2021), and research showing intended and unintended effects of blockchain technology for financial and nonfinancial reporting quality (Autore, Chen, Clarke, and Lin 2024; Liao et al. 2025; Jenkins et al. 2024; Huang et al. 2024). Importantly, we provide evidence for perceived system credibility as the process and thus offer evidence on a different channel that is difficult to observe in an archival work.

Second, we contribute to the ESG assurance literature that has to date examined the value of ESG assurance in traditional reporting systems and in settings where information about the underlying reporting systems is not salient (Simnett, Vanstraelen, and Chua 2009; De Meyst, Cardinaels, and Van den Abbeele 2023; Coram, Monroe, and Woodliff 2009). Our study shows that ESG assurance matters more in traditional reporting systems and where the capability of reporting systems is not disclosed. More broadly, we extend the assurance and audit literature by providing initial evidence on the effects of assurance services when blockchain technology is adopted.

Third, we contribute to the dual processing theory in psychology as our results indicate that this theory extends to ethically and emotionally charged disclosure settings. This is nontrivial because prior research suggests that when faced with such ethically charged information like ESG disclosures, investors typically default to simple heuristics (Elliott, Jackson, Peecher, and White 2014; Guiral, Moon, Tan, and Yu 2020; Garavaglia, Van Landuyt, White, and Irwin 2023). That is, ESG disclosures are often "imagery-provoking and value-laden in nature" (Elliott et al. 2014, p. 276), which can trigger affective responses that promote reliance on heuristic processing rather than systematic analytical evaluation. Our results suggest that the use of advanced reporting systems (e.g., blockchain-based systems) trigger more systematic information processing, even though the imagery-provoking nature of ESG information might naturally push investors toward simpler heuristic processing.

Finally, our study has policy and practical implications. For regulators, our findings inform ongoing regulatory considerations about ESG reporting and assurance requirements, which naturally require alternative reporting systems. We provide initial evidence on the perceived value of blockchain-based reporting systems and show that the value of mandating ESG assurance may vary across traditional versus blockchain systems. Our results also inform firm managers considering blockchain adoption for ESG reporting by providing insights into how the perceived value of ESG assurance may vary between blockchain and traditional reporting systems. For assurance providers, our findings suggest they may need to recalibrate their value proposition in blockchain settings, as investors engage in more systematic processing of the underlying technological capabilities rather than relying primarily on external assurance as a credibility signal. These insights are particularly timely given the increasing focus on ESG disclosures and the ongoing consideration of alternative ESG reporting systems.

II. BACKGROUND AND THEORY

Assurance and Blockchain

Assurance on ESG is an unregulated market where the choice to obtain assurance is voluntary. Therefore, there is an opportunity to assess the value of assurance as it is possible to compare between the choice to not obtain assurance and the choice to obtain it, which is different to the financial statement audit. Prior literature documents that ESG assurance does have value in improving the credibility and reliability of information (Coram et al. 2009; Pflugrath, Roebuck, and Simnett 2011; Simnett et al. 2009). The theoretical reasons for this expectation are based on agency theory (Jensen and Meckling 1979). In accounting, this relates to the uncertainty that causes information asymmetry between the investors and those managing the firm (Walker 2013). Han, Shiwakoti, Jarvis, Mordi, and Botchie (2023) suggest that blockchain by enabling shared, verified and agreed-upon data can reduce information asymmetry and agency problems. In the context of voluntary ESG reporting, applications of blockchain reporting systems are likely to affect users' perceptions of the importance of ESG assurance and confidence towards this type of reporting. We draw on dual processing theories to analyse how nonprofessional investors process ESG assurance information under different types of ESG reporting systems (i.e., traditional *versus* blockchain).

Dual information processing theories propose that individuals engage in cognitive information processes in two distinct modes to form their thinking and reasoning, simple heuristic processing (peripheral route or System 1 processing) (Chaiken 1980; Chaiken and Maheswaran 1994; Kahneman and Frederick 2002) and systematic processing (central route or System 2 processing) (Chaiken 1980; Kahneman 2003; Birnbaum and Stegner 1979). In heuristic processing, individuals use effortless intuitions and information cues that are easily accessible to make judgments efficiently. Dual information processing theories typically assume that heuristic processing is the default mode of individuals' cognitive processes. It relies on retrievable information cues, past experience and existing associations (Sloman 1996; Smith and DeCoster 2000; Kahneman and Klein 2009; Asay, Elliott, and Rennekamp 2017; Hamilton and Winchel 2019). On the other hand, systematic processing is a deliberate process, where individuals exert considerable cognitive effort and exhibit higher order reasoning to comprehend and analyse information in performing tasks and making judgments of the information (Chaiken 1980; Evans and Stanovich 2013).

Prior research demonstrates that contextual factors can trigger individuals' cognitive processes to engage in more effortful System 2 processing. A number of accounting research studies have drawn on dual processing theories to illustrate that contextual factors motivate systematic processing to improve judgment quality and performance (Brazel, Agoglia, and Hatfield 2004; Farrell, Goh, and White 2014; Griffith 2018; Griffith, Kadous, and Young 2016; Perols 2024). For example, Griffith et al. (2021) show that priming auditors with an accuracy goal can evoke System 2 processes for those auditors who are prone to heuristic System 1 processes and improve audit performance in auditing estimates.[5] In addition, Perols (2024) demonstrates that a contextual variable, a cybersecurity incident, prompts nonprofessional investors to engage in systematic processing by paying attention to information about cybersecurity assurance details, whereby increases their willingness to invest in the more comprehensive cybersecurity assurance services conditions.

In an ESG reporting setting, different technological contexts of ESG reporting systems may promote individual information processing of ESG reporting in different ways. In the

[5] This is because an accuracy goal can affect how individuals recognise the needs to frame a situation or problem, the aspect of viewing the problem, and the strategies to adopt to solve the problem (Weber and Johnson 2009). Using an accuracy goal enables auditors to recognise the need to engage in System 2 processing to consider the problem more broadly with all relevant information and more appropriate strategies.

traditional reporting system, investors are likely to engage in the default mode of information processing (System 1), using simple heuristic cues and easily accessible information (i.e., assurance) when evaluating the reliability of ESG information, resulting in assurance function on the ESG report having a more prominent positive effect towards investors' evaluation of ESG disclosures. In contrast, in the blockchain reporting system, the more complex technological context of the reporting system has the potential to evoke investors to engage in more systematic and effortful information processing.[6]

When System 2 processing is activated, individuals tend to weight relevant information cues more heavily (Griffith et al. 2021). Information cues, including common attributes of blockchain technology, such as the trust and reliability features are expected to be incorporated into evaluation of the ESG reporting process and quality. As a result, the importance of the assurance function may diminish as individuals systematically evaluate other relevant information cues on ESG reports when forming their judgments. Therefore, investors are likely to engage in more effortful cognitive processing when evaluating blockchain-based disclosures, and we thus expect that assurance may have a greater impact on investors' confidence perceptions in a traditional reporting system than in a blockchain reporting system. We posit the following:

H1: Assurance will have a greater positive effect on investors' confidence perceptions in a traditional reporting system compared to a blockchain reporting system.

Capability Disclosure and Assurance

Another way to reduce the information asymmetry and agency problems is to provide more information from management about the systems that are in place. Specifically, as another credibility enhancing mechanism, increased management disclosure has been shown to reduce

[6] That is, blockchain represents a relatively novel and complex technology that most investors have limited familiarity with (Austin and Williams 2021), requiring more cognitive effort to understand and evaluate it. Unlike traditional reporting systems that investors can assess using established mental models, blockchain's technical characteristics also demand more deliberate analysis to comprehend their implications for information credibility.

information asymmetry and uncertainty, as well as increase shareholder value (Botosan and Plumlee 2002; Bushee and Leuz 2005; Pflugrath et al. 2011), which is also an attribute of auditing (Walker 2013). Additionally, with increasing demands of transparency in ESG reporting, management also have the incentive to disclose efforts they put in to address this need (Fernandez-Feijoo, Romero, and Ruiz 2014; Kaspersen and Johansen 2016). For example, management may choose to discuss "system characteristics and capabilities" of reporting systems to improve reliance on the system outputs (Commerford, Dennis, Joe, and Ulla 2022). When both credibility enhancing mechanisms (i.e., assurance information and system capability disclosures) are made available on ESG reporting, we expect to see a substitution effect between enhanced management disclosure including a system capability description and provision of assurance.

This expectation is also consistent with dual processing theories. As a contextual factor, a capability description from management provides investors more information about a reporting system and can serve to promote investors to go beyond System 1 processing and engage more effortful System 2 processing, thinking extendedly about the reporting system, process and quality of information produced (Griffith et al. 2021). That is, as capability description provides more information about system features, investors have sufficient information to engage in systematic evaluation of the reporting system itself, reducing their need to rely on external assurance as a credibility signal. As a result, engaging in System 2 processing, investors may place less reliance on heuristic information cues, such as assurance. Therefore, we propose our expectation as follows, with a directional and null hypothesis:

H2a: When there is no assurance, a capability description will increase investors' confidence in the reported information compared to when no such description is provided.

H2b: When there is assurance, a capability description will make no difference to investors' confidence in the reported information compared to when no such description is provided.

Capability Disclosure and Blockchain

As discussed above, capability disclosures and blockchain reporting systems both have the potential to promote System 2 processing for investors when evaluating information. This raises the question of how these two System 2 triggers might interact when both are present. Intuitively, as a contextual variable, a capability disclosure can evoke investors' System 2 processing in a traditional reporting system and increase credibility perceptions of management disclosures, resulting in increased investor confidence. However, in a blockchain reporting system, investors may already be engaged in System 2 processing as they factor in the complex attributes of blockchain technology when evaluating the system and information. Under these conditions, a capability disclosure may have little or no additional impact on promoting further systematic processing or improving investor confidence.

On the other hand, capability disclosures might serve as a cognitive scaffold that helps investors more effectively process information from blockchain-based reporting systems. For example, capability descriptions could provide a structured framework that enables investors to better understand and evaluate blockchain's credibility-enhancing features. This latter perspective suggests that capability disclosures might lead investors to put more reliance on information from blockchain reporting systems. These competing perspectives reflect broader theoretical questions about how multiple System 2 triggers interact: That is, whether multiple factors that promote systematic processing work together synergistically or create cognitive overload that diminishes their individual effects.

Given these competing theoretical perspectives and the lack of prior empirical evidence on how capability disclosures might interact with advanced reporting systems, we pose this issue as a research question as follows:

RQ: How does capability disclosure affect investors' confidence in a traditional reporting system compared to a blockchain reporting system?

III. RESEARCH METHOD

Experimental Design and Participants

To test our predictions, we conduct a $2 \times 2 \times 2$ between-subjects experiment where the participants assume the role of prospective investors considering an investment in Zoya Stores, a hypothetical firm in the retail industry. We manipulate *reporting system* (traditional versus blockchain-based reporting system), *capability description* of the reporting system (provided versus not provided) and *disclosure assurance* (present versus absent). In manipulating our first independent variable, participants learn that the firm has introduced a new supply chain management system that utilizes either enterprise resource planning (ERP) or blockchain technology as part of managing and reporting greenhouse gas (GHG) emissions. We also manipulate *capability description* of the reporting system. In the capability description provided conditions, the case materials highlight attributes of the new system such as increased accuracy and transparency of GHG emissions reporting. These attributes were not included in the capability description not provided conditions. Finally, participants learned that the firm obtained or did not obtain external assurance over the GHG emissions disclosures.

We recruited 359 participants via Prolific, a web-based crowdsourcing platform.[7] Recruiting reasonably informed investor participants via web-based crowdsourcing platforms (e.g., Prolific) has become more common among behavioural accounting studies (Buchheit, Doxey, Pollard, and Stinson 2017). Prior studies find online workers have similar characteristics and exert a comparable effort to that of participants in traditional labour markets (Farrell, Grenier, and Leiby 2017). A unique feature of Prolific is that potential participants can be filtered using their pre-registered profiles. Using these pre-screening filters, we restrict our participant pool to those whose country of residence is the United States, who have completed a Bachelor's degree, who have made investment in the past (either personal or through their

[7] Prior to data collection, we received ethics approval from the institutional review board.

employment) in the common stock or shares of a company, those whose first language is English, and with an approval rating of 95% or above.

With these filters, we invited eligible subjects to participate in our study in exchange for a £2.00 (approximately $US2.50) fixed payment. A total of 402 participants clicked on our link via Prolific. We excluded 43 participants that did not complete the experiment, giving us 359 useable responses. We also exclude 70 participants that failed our manipulation check questions. Thus, we use the remaining 289 participants in our analyses.

On average, participants are 40.4 years old, and 55.4% are male. Participants' average working experience is 17.55 years, and 81% (64%) have evaluated a company's financial (nonfinancial) performance reports at least once in the past. The participants also report a moderate level of familiarity with financial statements, with an average rating of 5.96 on an 11-point scale anchored from 0 = "very low" to 10 = "very high." On average, participants took 12.6 minutes to complete the task.

Case and Procedures

We administered the experiment via Qualtrics software, which randomly allocated the participants to one of the eight experimental conditions. All participants assumed the role of a prospective investor and began the experiment by reading through Zoya Stores' background and financial information. We held the firm's financial performance constant across all experimental conditions, with participants learning that the firm's most recent financial performance was favorable. Similarly, both operational (i.e., Scope 1 and 2) and supply chain (Scope 3) GHG emissions performance improved relative to the previous financial year. As in current reporting practice, the case materials indicated that the total operational GHG emissions (Scope 1 and 2) accounted for a smaller portion of the firm's overall GHG emissions relative to supply chain emissions, but declined by a greater percentage (i.e., 10.39%). In contrast, total GHG emissions in the supply chain (Scope 3) represented the largest portion of the firm's overall emissions but decreased by a smaller percentage (3.75%). These varying degrees and percentage decreases reflect current GHG emissions reporting, and the different challenges associated with reducing emissions in each category.[8] Importantly, we made the design choice of favourable ESG performance reporting because prior literature shows that the value of trust-building mechanisms (e.g., external assurance) is more concentrated for positive ESG disclosures (Coram et al. 2009).

All participants then learned that Zoya introduced a new supply chain management system to trace and report operational and supply chain GHG emissions. Subsequently, the participants read through the specific manipulations as described below in the next section.

After reading the case materials, all participants completed post-experimental questions related to our dependent and process measures. Finally, they answered questions regarding their ESG views and demographic profiles.

Independent Variables

We manipulate three independent variables in a between-subjects experiment. We first manipulate reporting system at two levels (traditional versus blockchain reporting system). In the traditional conditions, participants learned that the company introduced a new supply chain management system that utilizes Enterprise Resource Planning (ERP) technology to track operational and supply chain GHG emissions. In the blockchain conditions, participants learned that the company introduced a new supply chain management system that utilizes blockchain technology.[9] To strengthen the salience of the reporting system manipulation, we

[8] For example, direct operational changes might be more straightforward to implement compared to the broader supply chain adjustments required for Scope 3 emission reductions.

[9] Our choice of language in the reporting system manipulation and the use of the term "new" reporting system is consistent with prior work (Austin and Williams 2021). To rule out participants guessing the type of blockchain, we made it explicit to participants in the blockchain conditions that the reporting system utilizes *private* blockchain. Private blockchains offer a number of advantages such as security, privacy and lower costs (Yermack 2017). Further, private blockchains are more common and are associated with increased reporting quality and transparency (Chen et al. 2024; Liao et al. 2025).

asked the participants to provide a written response explaining why the company adopted the relevant technology for its GHG emissions reporting.

The second manipulated variable is capability description of the reporting system (capability description provided or not provided). In the capability description provided conditions, we included additional language that highlights attributes of the system such as the reporting system facilitating increased **accuracy and transparency** in the supply chain. In the capability description not provided conditions, these attributes were not emphasized.

Finally, we manipulate independent ESG assurance at two levels (present versus absent). In the assurance present condition, participants learned that the company obtained a limited assurance over Scope 1, 2 and 3 emissions from a third-party sustainability assurance provider. We focused on a limited ESG assurance because in practice, firms are more likely to obtain this level of assurance for Scope 3 emissions given challenges associated with verifying Scope 3 emissions along the supply chain. This choice also reflects broader practice patterns, where limited assurance is the predominant form of assurance among companies obtaining external ESG assurance (KPMG 2024).[10] In the absent assurance conditions, we informed participants that the company did not obtain independent assurance over the reported GHG emissions figures, consistent with prior research (Hoang and Trotman 2021).

Dependent and Process Variables

After reading through the case materials containing the three manipulations, participants responded to questions asking our dependent and process measures. Our main dependent variable is investor confidence in the reported information. Consistent with prior studies (Bhaskar, Hales, Lambert, and Sinha 2024; Vera-Muñoz, Gaynor, and Kinney Jr 2020), our *investor confidence* measure averages participants' responses to four separate questions

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[10] Importantly, our dual processing theory predicts similar effects regardless of whether limited or reasonable assurance is provided, as both serve as external credibility signals that trigger heuristic processing.

that ask their feelings of confidence, reliability, credibility and trust in the GHG emissions information. In relation to the investors' perceived confidence in the reported information, we asked "given the GHG report you just read, how **assured (or confident)** do you feel that the GHG emissions information in Zoya Stores' report is fairly stated in all material respects"? The participants responded on an 11-point scale anchored from 0 = "not at all assured" to 10 "very assured". For the perceived reliability, credibility and trustworthiness of the information, we asked "how reliable/ credible/ trustworthy do you perceive the GHG emissions information in Zoya Stores' report to be?". Again, the participants responded to separate questions on an 11-point scale anchored from 0 = "not at all reliable/ credible/ trustworthy" to 10 "very reliable/ credible/ trustworthy." The four questions have a high internal consistency rating and measure the same underlying construct with a Cronbach's alpha of 0.976.

Next, we asked participants to respond to our process variable, which is perceived system credibility. We measured participants' perceived system credibility by asking them to indicate their level of agreement or disagreement with two statements. The first statement asked participants to indicate their familiarity with ERP/ blockchain-based reporting systems depending on their assigned experimental condition, while the second statement assessed how 'comfortable' they feel to rely on information from ERP/ blockchain systems. Participants responded on an 11-point scale ranging from 0 = "very unfamiliar/ uncomfortable" to 10 = "very familiar/ comfortable." We use this two-item perceived system credibility measure as our mediator variable to test whether system credibility explains our results.[11]

[11] In our mediation analysis, we use a composite measure of the two system credibility measures for the purposes of brevity and parsimony as both measures yield consistent results.

IV. RESULTS

Manipulation Checks

Participants responded to two questions to ensure that our manipulations were successful. For the reporting system manipulation, we asked participants to recall whether Zoya Stores utilized ERP or blockchain reporting system for its GHG emissions reporting. About 99.4% (97.3%) correctly recalled that they were assigned to ERP (blockchain) technology conditions. This indicates our reporting system manipulation was successful. Second, to check the success of our external assurance manipulation, we asked participants whether Zoya Stores obtained external assurance or no assurance over the reported GHG emission figures. For the assurance manipulation, 91.5% (73.1%) correctly recalled that they were assigned to assurance (no assurance) conditions. In total, 70 participants (19.5%) failed the two manipulation checks.[12] We excluded participants who failed our manipulation checks to ensure our analyses include only those who correctly processed the experimental manipulations. This leaves us with 289 participants (359 - 70 = 289) who successfully recalled the manipulation checks and were used in our data analysis.

Test of Hypotheses

To test our predictions, we conducted full-factorial Analysis of Variance (ANOVA) using investor confidence as the dependent variable (hereafter Investor Confidence). The independent variables are reporting system (hereafter Reporting System), capability description of the reporting system (hereafter Capability Description), external assurance (hereafter Assurance) and their interactions. Drawing on dual processing theory, we expect that traditional versus blockchain-based reporting systems to trigger different information

[12] Specifically, 1 participant failed to recall the traditional manipulation, 5 failed the blockchain manipulation, 15 failed the assurance present condition, and 49 failed the assurance absent condition (1 + 5 + 15 + 49 = 70).

processing among investors, where they use simple versus effortful information processing, respectively.

Descriptive statistics for all participants' confidence judgments across our eight experimental conditions are presented in Panel A of Table 1, and Panel B reports the results of three-way ANOVA. The ANOVA results in Panel B of Table 1 show a significant main effect of assurance ($F = 16.728$, $p < 0.001$, two-tailed), where investor confidence is higher when assurance is present than when it is absent (mean 7.55 > 6.68; Panel A of Table 1), and a marginally significant main effect of capability description ($F = 2.821$, $p = 0.094$, two-tailed). As expected, investor confidence is higher when capability description of the reporting system is provided than when it is not provided (7.32 > 6.99). Consistent with our theoretical predictions, we find a significant *Reporting System* × *Assurance* interaction ($F = 3.139$, $p = 0.039$, one-tailed), and a significant *Capability Description* × *Assurance* interaction ($F = 2.895$, $p = 0.045$, one-tailed).

[Insert Table 1 about here]

Consistent with dual processing theory, Hypothesis 1 (H1) predicts that investors will engage in heuristic, simple information processing (System 1) with traditional reporting systems, leading to a stronger effect of external assurance compared to blockchain systems, which trigger systematic, effortful processing (System 2). To test H1, we separately analyse investor confidence in the traditional and blockchain conditions; and the results are presented in Table 2 and 3, respectively. Descriptive statistics of investor confidence are shown in Panel A of Table 1, and the two-way ANOVA results based on the traditional reporting condition are presented in Panel A of Table 2. As predicted, we find a significant main effect of assurance in the traditional reporting condition ($F = 20.262$, $p < 0.001$, two-tailed) and a marginally significant main effect of capability description ($F = 3.074$, $p = 0.082$, two-tailed). Follow-up tests in Panel B of Table 2 and depicted in Panel B of Figure 1 show significant simple effects of assurance whether capability description is provided (mean 7.77 > 6.79, $t = 2.471$, $p = 0.008$, one-tailed) or not provided (mean 7.54 > 6.07, $t = 3.776$, $p < 0.001$).

[Insert Table 2 about here]
[Insert Figure 1 about here]

In contrast, for blockchain, the main effect of assurance is not significant ($F = 2.339$, $p = 0.128$, two-tailed) as shown in Panel A of Table 3. Follow-up tests in Panel B of Table 3 and depicted in Panel B of Figure 2 show that the effect of assurance is significant when capability description of blockchain reporting system is not provided (mean 7.56 > 6.61, $t = 2.151$, $p = 0.017$, one-tailed). However, in contrast to the traditional reporting condition, when capability description is provided, the effect of assurance is not significant in the blockchain condition (mean 7.32 > 7.30, $t = 0.041$, $p = 0.967$). This pattern suggests that capability descriptions prompt investors to engage in more systematic processing of blockchain's technological features, reducing their reliance on external assurance as a trust signal. These results support Hypothesis 1, and suggest that investors rely more heavily on external assurance when processing information from traditional reporting systems compared to blockchain systems.

[Insert Figure 2 about here]

Hypotheses 2a and 2b (H2a and H2b) predict that the presence of capability descriptions will trigger more systematic processing, reducing reliance on external assurance as a heuristic cue. That is, without assurance (H2a), capability descriptions should increase investor confidence. However, with assurance (H2b), capability descriptions should not affect investor confidence. Consistent with this prediction, we find a significant interaction effect between *Capability Description* × *Assurance* ($F = 2.895$, $p = 0.045$; one-tailed see Panel B of Table 1). Follow-up tests in Panel B of Tables 2 and 3 show that when assurance is absent, Capability Description significantly increases investor confidence in the traditional condition ($t = 1.745$,

$p = 0.042$, one-tailed) and marginally increases confidence in the blockchain condition ($t = 1.479$, $p = 0.071$, one-tailed), providing support for H2a. When assurance is present, Capability Description has no effect in either the traditional ($t = 0.625$, $p = 0.533$) or blockchain conditions ($t = -0.557$, $p = 0.579$). Thus, the results do not reject the null prediction in H2b.

[Insert Table 3 about here]

Our research questions explores whether Capability Descriptions will have a greater effect on investors' confidence in blockchain compared to traditional systems. However, the three-way ANOVA results in Panel A of Table 1 show no significant Reporting System × Capability Description interaction ($F = 0.364$, $p = 0.547$). This suggests that the effect of capability descriptions is similar across both reporting systems, contrary to expectations that blockchain systems might benefit more from detailed capability descriptions.

Taken together, our results suggest that both the reporting system and the presence of a capability description affect the role of external assurance in shaping investor confidence. Consistent with dual processing theory, external assurance serves as a dominant heuristic cue for traditional reporting systems, where investors use simple heuristics (System 1) and rely on the presence versus absence of independent assurance. In contrast, for blockchain systems, investors appear to shift toward systematic (System 2) processing, consistent with investors evaluating the technology's credibility-enhancing features rather than relying primarily on external assurance. This pattern is further supported by our results that when capability descriptions are provided, assurance effects disappear in blockchain systems ($p = 0.967$) but remain strong in traditional systems ($p = 0.008$). Overall, these results highlight how and when different reporting systems trigger investors to engage distinct information processing, leading to varying degrees of reliance on external assurance.

Mediation Analyses

Our theory suggests that investors adopt simple heuristics (System 1) when processing information from traditional reporting systems, such that they rely heavily on familiar cues like external assurance when making confidence judgements. In contrast, investors engage in more effortful cognitive information processing (System 2) when evaluating information and associated disclosure from blockchain reporting systems. Consistent with this conjecture, we anticipate investors' perceived system credibility to mediate their confidence judgements in ways that vary across the different reporting systems (i.e., traditional versus blockchain systems) and assurance conditions. We elicit a measure for investors' perceived system credibility across our experimental manipulations.

Descriptive results in Panel A of Table 4 show that the mean of perceived system credibility is higher for blockchain compared to traditional reporting system (mean 5.32 > 4.96). The ANOVA results in Panel B of Table 4 show a marginal significant main effect of Reporting System (mean 5.32 > 4.96, $F = 2.795$, $p = 0.096$, two-tailed). This marginal effect supports our expectation that blockchain systems would be perceived as more credible than traditional systems. Further analyses (untabulated) show that the effect of reporting system on perceived system credibility is significant in the assurance absent condition ($F = 4.941$, $p = 0.028$, two-tailed). However, the reporting system effect on perceived system credibility in the assurance present condition is not significant ($F = 0.001$, $p = 0.979$, two-tailed). The findings are consistent with our theory that investors rely primarily on assurance in traditional reporting systems, whereas blockchain reporting systems evoke more effortful information processing.

[Insert Table 4 about here]

To understand why the effect of assurance matters less in blockchain-based reporting systems particularly when capability description of blockchain is provided, we conducted separate moderated mediation analyses for assurance present and assurance absent conditions using Hayes PROCESS macro (Model 8). In the mediation analyses, we test whether the *interaction* effect of reporting system and assurance on investor confidence is driven by investors' perceived system credibility when capability description is provided compared to when it is not provided.

Panel A of Figure 3 reports the mediation results of the *assurance present* condition when capability description is provided, and Panel B of Figure 3 presents mediation results of the assurance present condition when capability description is not provided. Results show that the indirect effect of reporting system through perceived system credibility is not significant ($\beta = -0.035$, 95% CI [−0.270, 0.205]) when capability description is provided. Similarly, the indirect effect of reporting system through perceived system credibility is insignificant ($\beta = 0.040$, 95% CI [−0.225, 0.298]) when capability description is not provided. This suggests that that when external assurance is present, perceived system credibility does not mediate the relationship between reporting system and investor confidence regardless of whether capability description is provided or not provided.

[Insert Figure 3 about here]

Panel A of Figure 4 reports the mediation results of the *assurance absent* condition when capability description is provided, and Panel B of Figure 4 presents mediation results of the assurance present condition when capability description is not provided. Consistent with our expectation, the indirect effect of reporting system through perceived system credibility is significant ($\beta = 0.497$, 95% CI [0.051, 1.033]) when capability description is provided, indicating that blockchain systems increase investor confidence through enhanced system credibility perceptions when capability information of the system is provided and external assurance is absent. In contrast, the indirect effect of reporting system through perceived system credibility is not significant ($\beta = 0.253$, 95% CI [−0.196, 0.781]) when capability description is not provided.

[Insert Figure 4 about here]

These results indicate that the relationship between the reporting system (traditional vs. blockchain) and investor confidence is significantly mediated by perceptions of system credibility, but only when assurance is absent and capability description of the reporting system is provided. This pattern supports our theory that when external assurance is absent and investors have sufficient information about system capabilities, blockchain technology enhances investor confidence by increasing perceived system credibility, an effect that does not manifest in traditional reporting systems. The mediation results explain our results that capability descriptions reduce assurance effects in blockchain systems ($p = 0.967$) but not traditional systems ($p = 0.008$). Overall, the mediation results provide support for our theory that traditional versus blockchain-based reporting systems trigger different information processing routes that explain why assurance matters less in blockchain reporting systems.[13]

Additional Analyses

Recent studies show that investors' reactions to ESG-related disclosures is susceptible to their perceived greenwashing (Bhaskar et al. 2024; Fanning, Hatfield, and Sealy 2024). A pertinent question in our setting is whether different reporting systems and assurance separately and/or jointly affect investors' perceived greenwashing, because these variables do signal a firm's commitment, or lack thereof, to ESG issues.

We elicit a measure for investors' perceived greenwashing across our experimental manipulations. Following Fanning et al. (2024), we measure participants' perceived greenwashing by asking them to indicate their level of agreement or disagreement with five

[13] As additional evidence of process, we asked participants to provide a written explanation for why the company adopted the reporting system in their assigned condition, then examined those responses for evidence of information processing. Consistent with our dual processing theory, responses of the participants in the blockchain conditions show more effortful information processing, with participants discussing complex technological features compared to participants in the traditional system conditions who focused on basic operational features of the reporting system.

statements. These statements assessed whether the information in Zoya Stores' GHG emissions report was perceived as *accurate,* whether it was *appropriate* for Zoya to engage in the initiatives stated in the report, and whether the report reflected the *genuine* intentions of Zoya's management team. Additionally, we evaluated whether participants believed that Zoya's management team made a significant *effort* to accomplish the emissions reductions stated in the report and whether the management team was primarily motivated by a desire to have a *positive impact on society*, such as improving the natural environment. Participants responded on an 11-point scale ranging from 0 = "strongly disagree" to 10 = "strongly agree." We find a Cronbach's alpha of 0.890, indicating that the five questions have a high internal consistency rating. We reverse coded the participants' responses to the questions, and average participants' responses to these statements (Fanning et al. 2024).

Descriptive results in Panel A of Table 5 show that the mean perceived greenwashing is higher when assurance is absent compared to when assurance is present (mean 2.76 > 2.41). In traditional reporting systems, perceived greenwashing is higher when assurance is absent versus present (mean 2.77 > 2.34). Similarly, for blockchain systems, perceived greenwashing is higher when assurance is absent compared to when it is present (mean 2.75 > 2.47).

The ANOVA results in Panel B of Table 5 show a significant main effect of Assurance ($F = 3.775$, $p = 0.053$, two-tailed), indicating that participants perceive higher levels of greenwashing in the absence of Assurance. Further analyses (untabulated) show that the effect of assurance on perceived greenwashing is significant in traditional reporting systems ($F = 3.314$, $p = 0.036$, one-tailed). However, the assurance effect on greenwashing in blockchain reporting systems is not significant ($F = 0.958$, $p = 0.329$, two-tailed).

We also find a significant interaction between *Capability Description* × *Assurance* ($F = 4.781$, $p = 0.015$, one-tailed). For both traditional and blockchain reporting systems, the highest perceived greenwashing occurs when assurance is absent and capability description of the reporting system is not provided (means 3.01 and 3.13, respectively). This finding is consistent with the substitution effect between assurance and capability descriptions in mitigating perceived greenwashing particularly in blockchain-based reporting systems, that is, providing a capability description offers a buffer against lack of assurance.

[Insert Table 5 about here]

Overall, the results provide additional evidence that assurance effects on greenwashing follow similar patterns to investor confidence, with assurance having stronger effects on greenwashing in traditional reporting systems compared to blockchain systems. This further supports our inferences that information about reporting systems affects investors' perceived disclosure credibility.

V. CONCLUSION

Prior research has long documented the credibility enhancing effects of external assurance over management disclosures. However, the emergence of blockchain technology, which provides some level of reliability over the data similar to traditional assurance services, raises the question of how much the value of assurance persists in blockchain-based reporting systems. In this study, we provide theory and experimental evidence indicating that assurance matters less for investor confidence in blockchain-based reporting systems compared to traditional reporting systems.

Our results suggest that investors' reliance on assurance varies systematically between traditional and blockchain-based reporting systems. Specifically, investors use simple heuristics (System 1) when evaluating information from traditional reporting systems and rely on external assurance, regardless of whether capability description of the reporting system is provided or not provided. However, when evaluating information from blockchain-based reporting systems, we find a different pattern in investors' information processing that is consistent with more systematic, effortful processing (System 2). That is, when capability description is provided, the effect of assurance is not significant, indicating that investors engage in more effortful, systematic processing to understand and evaluate the technology's inherent capabilities as a trust mechanism. Interestingly, when capability description of the blockchain reporting system is not provided, assurance significantly enhances investor confidence, suggesting that investors may default back to heuristic processing when there is no sufficient information about the capabilities of blockchain-based reporting systems.

Our results contribute to the dual processing theory in psychology as they suggest technological characteristics can override natural tendencies toward heuristic processing, even when considering ethically and emotionally charged ESG topics. These results should also be informative to global regulators as they consider the implications of firms' blockchain-related disclosures to investors' judgments, particularly in ESG-related disclosure settings where both management disclosure and assurance are still evolving. Understanding how blockchain technology influences investor confidence can help regulators develop guidelines that ensure credible blockchain reporting systems. Further, our results inform assurance practitioners as they weigh evidence about the "hype" versus "value" of blockchain-based reporting systems in the eyes of investors. The other aspect of this is that if blockchain allows the auditors to have more confidence in the data (Cao et al. 2024; COSO 2020), it gives them the opportunity to move from a compliance focus to provide more value adding services.

We highlight several limitations that offer opportunities for future research. First, our study focused on an ESG disclosure setting where blockchain's supply chain tracking capabilities may be particularly relevant (Jenkins et al. 2024; COSO 2023). Future research may want to examine whether the substitution effects we observe in this study extend to other disclosure topics such as financial reporting or governance disclosure settings. Second, we focused on limited rather reasonable assurance level, which reflects common practice in ESG reporting (KPMG 2024). Importantly, our theory suggests that investors' reduced reliance on external assurance in blockchain-based reporting systems should operate similarly regardless of assurance level, as both limited and reasonable assurance serve as external credibility signals and should exhibit similar differential effects across traditional and blockchain reporting systems. Nonetheless, future research could examine whether the reduced reliance on assurance in blockchain settings extends to reasonable level of assurance. Finally, our results are based on at a time when blockchain technology is relatively unfamiliar to most investors (Austin and Williams 2021), which may drive the systematic information processing we observe. Future research may want to examine whether the different information processing patterns persist as blockchain becomes more widespread and familiar, or whether increased familiarity reduces blockchain's ability to trigger effortful cognitive processing.

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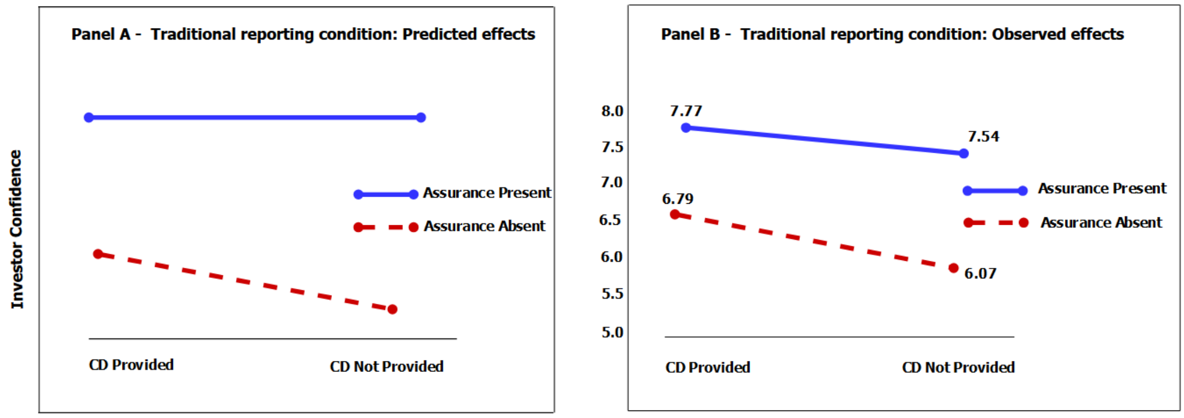
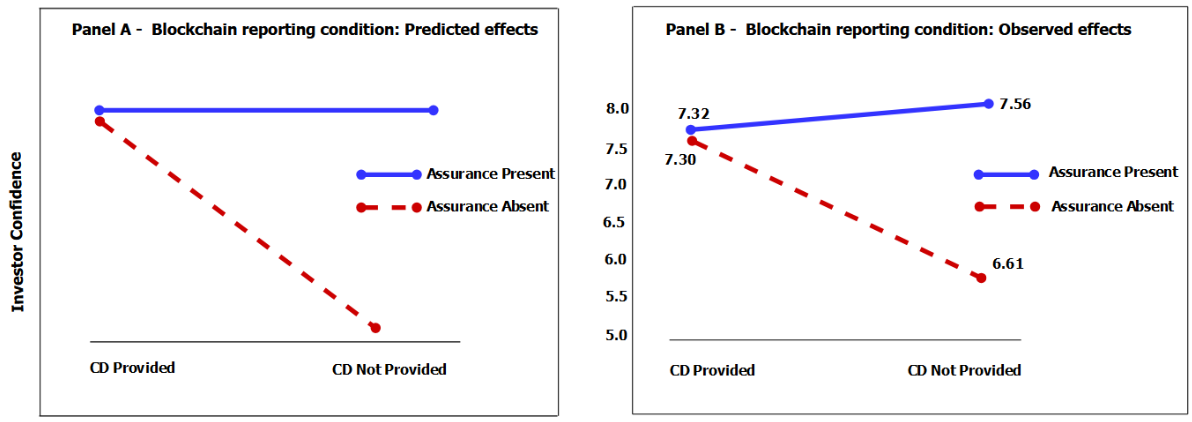
Tables and Figures

Figure 1: Predicted and observed results of assurance in the *traditional* reporting condition



Note: Panel A of Figure 1 summarizes predicted effects of assurance and capability description on investor confidence in the traditional reporting condition. Panel B of Figure 1 plots observed means for investor confidence judgements. The dependent variable, *Investor Confidence*, is the average of participants' responses to four questions commonly used in prior studies that capture investors' confidence, reliability, credibility and trustworthiness in reported information, measured on an 11-point scale anchored from 0 = "not at all assured/ reliable/ credible/ trustworthy" to 10 = "very assured/ reliable/ credible/ trustworthy."

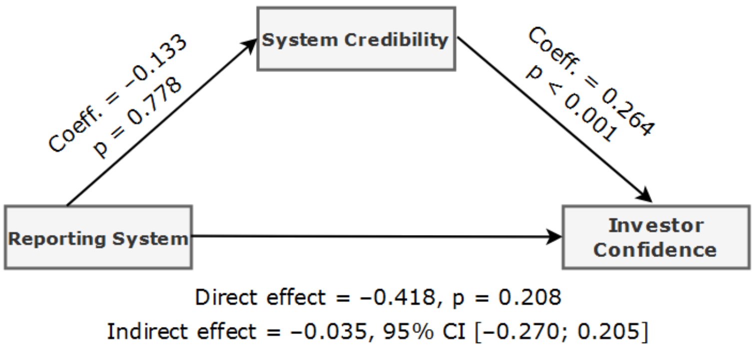
Figure 2: Predicted and observed results of assurance in the *blockchain* reporting condition



Note: Panel A of Figure 2 summarizes predicted effects of assurance and capability description on investor confidence in the blockchain reporting condition. Panel B of Figure 2 plots observed means for investor confidence judgements. The dependent variable, *Investor Confidence*, is the average of participants' responses to four questions commonly used in prior studies that capture investors' confidence, reliability, credibility and trustworthiness in reported information, measured on an 11-point scale anchored from 0 = "not at all assured/ reliable/ credible/ trustworthy" to 10 = "very assured/ reliable/ credible/ trustworthy."

Figure 3: Mediation moderation analysis in the assurance *present* condition – Conditional indirect effect of reporting system

Panel A – Assurance Present: Conditional Indirect Effect of Source When CD is Provided



Panel B – Assurance Present: Conditional Indirect Effect of Source When CD is Not Provided

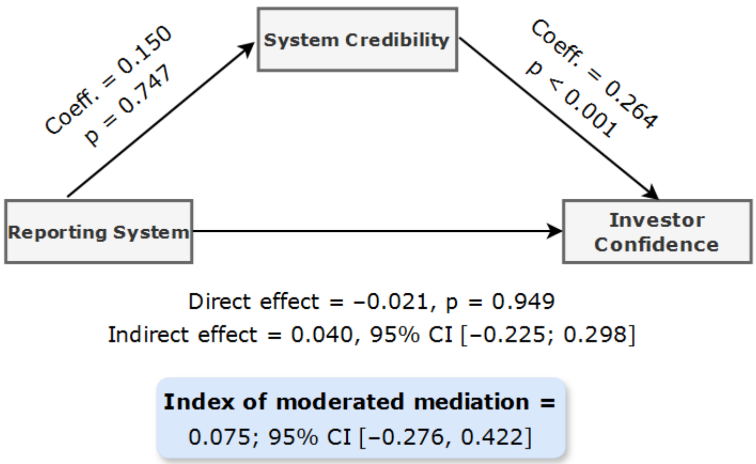


Figure 3 reports the output from a mediation analysis in the assurance present condition based on Hayes Process Macro (PROCESS Model 8) using 5,000 bootstrapped with 95% confidence intervals. The Figure separately provides results of conditional indirect effects of reporting system through perceived system credibility when capability description is provided (Panel A) and when capability description is not provided (Panel B). *Reporting system* is a manipulated variable coded 1 for traditional reporting system, and 2 for blockchain reporting system. For *Investor Confidence*, we average participants' responses to four questions commonly used in prior studies that capture investors' confidence, reliability, credibility and trustworthiness in reported information, measured on an 11-point scale anchored from 0 = "not at all assured/ reliable/ credible/ trustworthy" to 10 = "very assured/ reliable/ credible/ trustworthy." All *p*-values are two-tailed.

Figure 4: Mediation moderation analysis in the assurance absent condition – Conditional indirect effect of reporting system

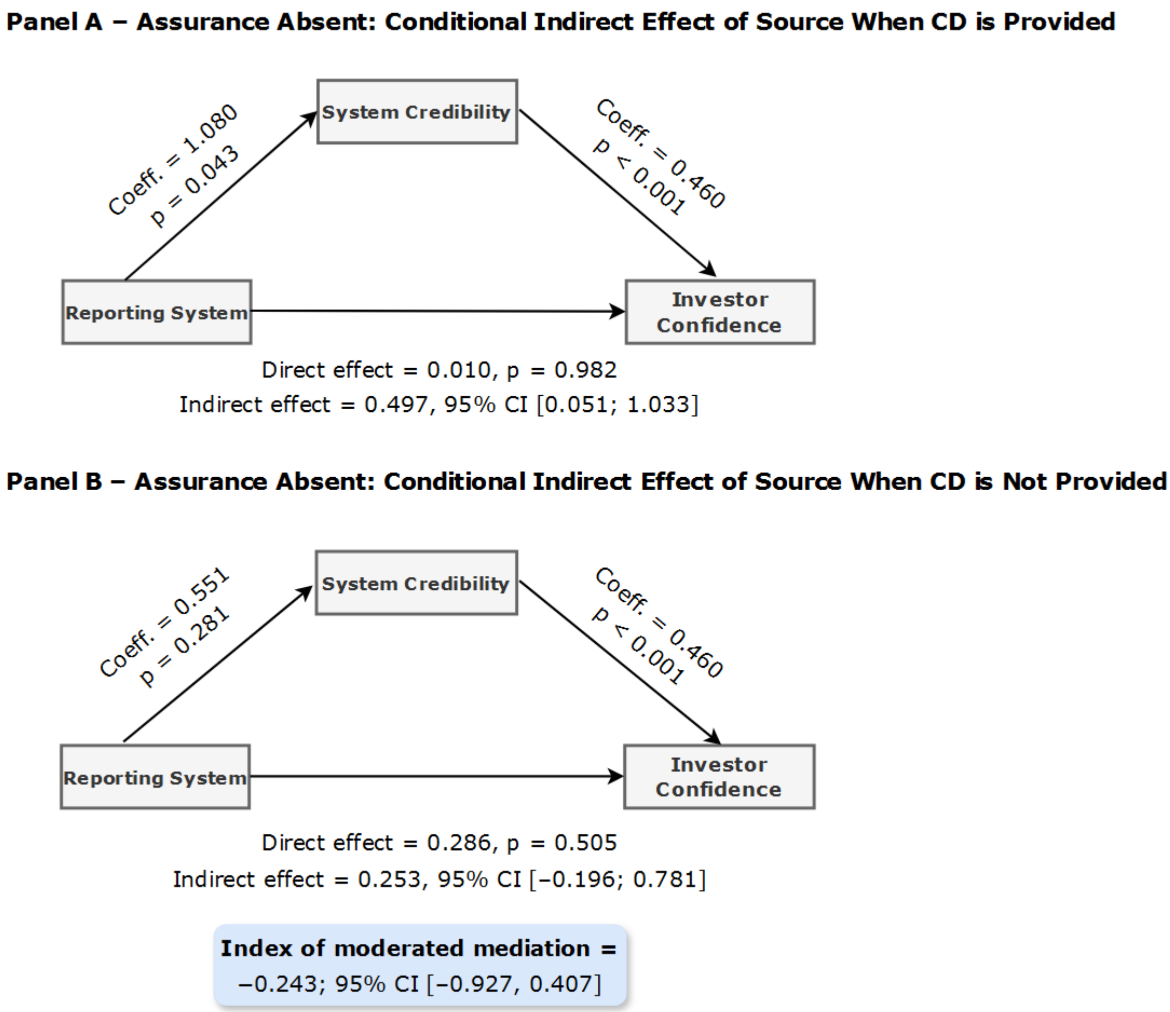


Figure 4 reports the output from a mediation analysis in the assurance absent condition based on Hayes Process Macro (PROCESS Model 8) using 5,000 bootstrapped with 95% confidence intervals. The Figure separately provides results of conditional indirect effects of reporting system through perceived system credibility when capability description is provided (Panel A) and when capability description is not provided (Panel B). *Reporting system* is a manipulated variable coded 1 for traditional reporting system, and 2 for blockchain reporting system. For *Investor Confidence*, we average participants' responses to four questions commonly used in prior studies that capture investors' confidence, reliability, credibility and trustworthiness in reported information, measured on an 11-point scale anchored from 0 = "not at all assured/ reliable/ credible/ trustworthy" to 10 = "very assured/ reliable/ credible/ trustworthy." All *p*-values are two-tailed.

Table 1: All participants' perceived confidence in the reported information

Panel A: Investor Confidence Mean (SD) [Sample Size]

	Assurance				
	Assurance Present		Assurance Absent		
Conditions	CD Provided	CD Not Provided	CD Provided	CD Not Provided	Overall
Traditional	7.77 (1.22) [n = 40]	7.54 (1.43) [n = 40]	6.79 (1.92) [n = 31]	6.07 (1.93) [n = 33]	7.10 (1.74) [n = 144]
Blockchain	7.32 (1.91) [n = 38]	7.56 (1.59) [n = 40]	7.30 (1.78) [n = 32]	6.61 (2.28) [n = 35]	7.21 (1.91) [n = 145]
Overall	7.55 (1.60) [n = 78]	7.55 (1.50) [n = 80]	7.05 (1.85) [n = 63]	6.35 (2.12) [n = 68]	7.16 (1.82) [n = 289]
	7.55 (1.55) [n = 158]		6.68 (2.02) [n = 131]		

Panel B: Three-way ANOVA of Investor Confidence

Reporting system of variation	SS	df	MS	*F*	*p*-value
Reporting System	1.671	1	1.671	0.536	0.465
Capability Description [CD]	8.795	1	8.795	2.821	0.094
Assurance	52.157	1	52.157	16.728	<0.001
Reporting System × CD	1.136	1	1.136	0.364	0.547
Reporting System × Assurance	9.788	1	9.788	3.139	**0.039***
CD × Assurance	9.028	1	9.028	2.895	**0.045***
System × CD × Assurance	0.863	1	0.863	0.277	0.599
Error	876.150	281	3.118		

Note: Panel A and B of Table 1 summarize the descriptive statistics and three-way ANOVA results for participants' confidence judgements. We manipulate (1) reporting system (traditional versus blockchain), (2) capability description of the reporting system (provided versus not provided) and (3) disclosure assurance (present versus absent). The dependent variable, *Investor Confidence*, is the average of participants' responses to four questions commonly used in prior studies that capture investors' confidence, reliability, credibility and trustworthiness in reported information, measured on an 11-point scale anchored from 0 = "not at all assured/ reliable/ credible/ trustworthy" to 10 = "very assured/ reliable/ credible/ trustworthy." Reported p-values with * are one-tailed, given our directional predictions. All other p-values are two-tailed.

Table 2: Investor confidence in traditional condition: Test of Hypothesis 1

Panel A: Two-way ANOVA of Investor Confidence

Source of variation	SS	df	MS	*F*	*p*-value
Capability Description [CD]	8.075	1	8.075	3.074	0.082
Assurance	53.229	1	53.229	20.262	<0.001
CD × Assurance	2.141	1	2.141	0.815	0.368
Error	367.788	140	2.627		

Panel B: Simple effects

Source of variation	df	t-test	*p*-value
Effect of assurance when capability description is provided	140	2.471	**0.008***
Effect of assurance when capability description is not provided	140	3.776	**<0.001***
Effect of capability description when assurance is present	140	0.625	0.533
Effect of capability description when assurance is absent	140	1.745	**0.042***

Note: Panel A of Table 2 presents two-way ANOVA results for participants' confidence judgements in the traditional condition. Panel B shows the follow-up simple effect test results. We manipulate (1) capability description of the reporting system (provided versus not provided) and (2) disclosure assurance (present versus absent). The dependent variable, *Investor Confidence*, is the average of participants' responses to four questions commonly used in prior studies that capture investors' confidence, reliability, credibility and trustworthiness in reported information, measured on an 11-point scale anchored from 0 = "not at all assured/ reliable/ credible/ trustworthy" to 10 = "very assured/ reliable/ credible/ trustworthy." Reported p-values with * are one-tailed, given our directional predictions. All other p-values are two-tailed.

Table 3: Investor confidence in blockchain condition: Test of Hypothesis 1

Panel A: Two-way ANOVA of Investor Confidence

Source of variation	SS	df	MS	*F*	*p*-value
Capability Description [CD]	1.816	1	1.816	0.504	0.479
Assurance	8.432	1	8.432	2.339	0.128
CD × Assurance	7.785	1	7.785	2.159	0.144
Error	508.362	141	3.605		

Panel B: Simple effects

Source of variation	df	t-test	*p*-value
Effect of assurance when capability description is provided	141	0.041	0.967
Effect of assurance when capability description is not provided	141	2.151	**0.017***
Effect of capability description when assurance is present	141	−0.557	0.579
Effect of capability description when assurance is absent	141	1.479	**0.071***

Note: Panel A of Table 3 reports two-way ANOVA results for participants' confidence judgements in the blockchain condition. Panel B shows the follow-up simple effect test results. We manipulate (1) capability description of the reporting system (provided versus not provided) and (2) disclosure assurance (present versus absent). The dependent variable, *Investor Confidence*, is the average of participants' responses to four questions commonly used in prior studies that capture investors' confidence, reliability, credibility and trustworthiness assessments, measured on an 11-point scale anchored from 0 = "not at all assured/ reliable/ credible/ trustworthy" to 10 = "very assured/ reliable/ credible/ trustworthy." Reported p-values with * are one-tailed, given our directional predictions. All other p-values are two-tailed.

Table 4: All participants' perceived system credibility

Panel A: Perceived System Credibility Mean (SD) [Sample Size]

	Assurance				
	Assurance Present		Assurance Absent		
Conditions	CD Provided	CD Not Provided	CD Provided	CD Not Provided	Overall
Traditional	5.48 (1.79) [n = 40]	5.15 (2.19) [n = 40]	4.44 (2.09) [n = 31]	4.61 (2.09) [n = 33]	4.96 (2.06) [n = 144]
Blockchain	5.34 (2.11) [n = 38]	5.30 (2.18) [n = 40]	5.52 (1.89) [n = 32]	5.16 (2.29) [n = 35]	5.32 (2.11) [n = 145]
Overall	5.41 (1.94) [n = 78]	5.23 (2.17) [n = 80]	4.98 (2.05) [n = 63]	4.89 (2.19) [n = 68]	5.14 (2.09) [n = 289]
	5.32 (2.06) [n = 158]		4.94 (2.12) [n = 131]		

Panel B: Three-way ANOVA of Perceived System Credibility

Source of variation	SS	df	MS	*F*	*p*-value
Reporting System	12.146	1	12.146	2.795	0.096
Capability Description [CD]	1.377	1	1.377	0.317	0.574
Assurance	10.779	1	10.779	2.481	0.116
Reporting System × CD	0.271	1	0.271	0.062	0.803
Reporting System × Assurance	11.647	1	11.647	2.681	0.103
CD × Assurance	0.144	1	0.144	0.033	0.856
System × CD × Assurance	2.947	1	2.947	0.678	0.411
Error	1220.905	281	4.345		

Note: Panel A and B of Table 4 summarize the descriptive statistics and three-way ANOVA results for participants' perceived system credibility. We manipulate (1) reporting system (traditional versus blockchain), (2) capability description of the reporting system (provided versus not provided) and (3) disclosure assurance (present versus absent). The dependent variable, *Perceived System Credibility*, is the average of participants' responses to two questions asking about participants' perceived system familiarity and reliability measured on an 11-point scale anchored from 0 = "very unfamiliar/ uncomfortable" to 10 = "very familiar/ comfortable." All reported *p*-values are two-tailed.

Table 5: All participants' perceived greenwashing

Panel A: Perceived Greenwashing Mean (SD) [Sample Size]

	Assurance				
	Assurance Present		Assurance Absent		
Conditions	CD Provided	CD Not Provided	CD Provided	CD Not Provided	Overall
Traditional	2.40 (1.09) [n = 40]	2.29 (1.37) [n = 40]	2.52 (1.53) [n = 31]	3.01 (1.55) [n = 33]	2.53 (1.39) [n = 144]
Blockchain	2.54 (1.77) [n = 38]	2.42 (1.45) [n = 40]	2.33 (1.20) [n = 32]	3.13 (1.68) [n = 35]	2.60 (1.56) [n = 145]
Overall	2.46 (1.45) [n = 78]	2.35 (1.40) [n = 80]	2.42 (1.36) [n = 63]	3.07 (1.61) [n = 68]	2.57 (1.48) [n = 289]
	2.41 (1.42) [n = 158]		2.76 (1.52) [n = 131]		

Panel B: Three-way ANOVA of Perceived Greenwashing

Source of variation	SS	df	MS	*F*	*p*-value
Reporting System	0.191	1	0.191	0.089	0.766
Capability Description [CD]	4.953	1	4.953	2.304	0.130
Assurance	8.115	1	8.115	3.775	0.053
Reporting System × CD	0.383	1	0.383	0.178	0.673
Reporting System × Assurance	0.508	1	0.508	0.236	0.627
CD × Assurance	10.277	1	10.277	4.781	**0.015***
System × CD × Assurance	0.447	1	0.447	0.208	0.649
Error	603.986	281	2.149		

Note: Panel A and B of Table 5 summarize the descriptive statistics and three-way ANOVA results for participants' perceived greenwashing. We manipulate (1) reporting system (traditional versus blockchain), (2) capability description of the reporting system (provided versus not provided) and (3) disclosure assurance (present versus absent). The dependent variable, *Perceived Greenwashing*, is the average of participants' responses to five questions commonly used in prior studies to capture perceived greenwashing, measured on an 11-point scale anchored from 0 = "strongly disagree" to 10 = "strongly agree." Reported p-values with * are one-tailed, given our directional predictions. All other p-values are two-tailed.