

Reframing Deception: Redefining the Fraud Triangle in the Era of Ethical Governance

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ABSTRACT

This study reviews the evolution of the Fraud Triangle Theory (FTT) from 2010 to 2025 and examines how digital transformation and sustainability issues reshape its explanatory relevance. Using the PRISMA 2020 protocol, a Systematic Literature Review was conducted on 26 Scopus-indexed articles. Descriptive, content, and bibliometric analyses were applied to identify publication trends, methodological patterns, and theoretical developments. Results show that 76% of studies used qualitative or mixed methods, while only 24% employed quantitative or data-driven approaches. Research output peaked in 2022 with 12 publications, and the United States, China, and Indonesia accounted for 54% of contributions. Although FTT remains the dominant framework, 31% of studies integrated Agency Theory, Signaling Theory, or Critical Discourse Analysis. Fraud research increasingly addresses digital governance, ESG violations, and greenwashing. These findings position FTT as a dynamic model shaped by ethical, technological, and institutional forces, underscoring the need for hybrid behavior data analytical frameworks.

Keywords: fraud triangle theory, systematic literature review, corporate ethics, fraud detection.

INTRODUCTION

Fraud remains a major global issue across corporate and public sectors, requiring a stronger theoretical understanding of its underlying drivers. One of the main theories used to explain this phenomenon is the Fraud Triangle, first introduced by Cressey in 1953. The theory posits that fraud occurs when three key elements—pressure, opportunity, and rationalization come together. Fraud Triangle Theory (FTT) has been widely used across disciplines to explain why individuals commit fraud.

According to (Free, 2015) despite its strong foundation, fraud research remains fragmented. (Lokanan, 2015) also highlights several limitations of FTT in diverse socio-economic settings. (Schuchter & Levi, 2015) broadened the application of this theory to elite white-collar crime in countries like Switzerland and Austria, asserting that the elements of the Fraud Triangle remain relevant even in drastically different social environments. (Huang et al., 2017) show that FTT supports proactive fraud detection. Nonetheless, recent developments indicate that, while the Fraud Triangle remains valid, new elements must be considered, especially in light of the digital age and the rising awareness of sustainability issues.

According to (Kurpierz & Smith, 2020) extend FTT to greenwashing, showing its relevance to sustainability-related fraud. Looking ahead, many researchers suggest that factors like digital technology, ESG (environmental, social, governance) concerns, and cultural differences should be considered to enrich our understanding of fraud. Therefore, it is crucial to reframe the Fraud Triangle



theory in a broader context to delve deeper into how fraud occurs and how we can prevent it more effectively in this fast-paced, interconnected era.

However, existing reviews mainly evaluate FTT within traditional settings and do not address its relevance to modern fraud environments. (Free, 2015) do not examine how digitalization and sustainability reshape fraud mechanisms. As a result, the literature remains fragmented, lacking a cohesive synthesis that connects behavioral theories with emerging global paradigms.

Guided by gaps in prior research, this review examines the evolution of Fraud Triangle Theory (FTT) between 2010 and 2025, the influence of digital transformation and ESG imperatives on its conceptual and practical application, and the need to adapt the theory to contemporary fraud ecosystems shaped by technological, institutional, and cultural factors. Moving beyond descriptive use of FTT, the study advances an operationalized Moderated Fraud Triangle Model (FTT 2.0) in which digital governance quality systematically moderates opportunity through system integrity, access control, and algorithmic transparency, while ESG ethics moderate rationalization by shaping moral legitimacy and sustainability-related justifications. By integrating FTT with Agency Theory, Critical Discourse Analysis, Signalling Theory, and extended fraud models (Fraud Diamond/Hexagon), the review provides a cross-theoretical synthesis and thematic–bibliometric mapping that identifies emerging fraud ecosystems, including cyber-enabled fraud, ESG-based deception, and AI-driven algorithmic misconduct, thereby establishing a socio-technical framework that extends classical FTT into a digitally mediated and institutionally embedded model of modern fraud behavior.

LITERATURE REVIEW

Fundamental Theories of Fraud Research

Fraud research continues to draw heavily from (Cressey, 1953) Fraud Triangle Theory (FTT), which proposes that fraud occurs when pressure, opportunity, and rationalization coexist. Across accounting, criminology, and governance literature, FTT has remained influential because it provides a simple yet powerful behavioral model that links individual motivation to organizational conditions (Dellaportas, 2013; Free, 2015; Schuchter & Levi, 2015). Studies across diverse settings including public procurement in Indonesia (Rustiarini et al., 2019) and fraud in state-owned enterprises in Ghana (Owusu et al., 2022) show consistent relevance of the three FTT components, although the salience of each varies depending on cultural and institutional environments.

However, recent scholarship increasingly argues that FTT's explanatory capacity is partial rather than comprehensive. (Lokanan, 2015) highlights how FTT does not adequately address multi-actor fraud, systemic corruption, or conditions where organizational culture actively facilitates misconduct. Similarly, when FTT is applied in more technologically sophisticated contexts, such as automated fraud detection (Huang et al., 2017; Sánchez-Aguayo et al., 2022), the theory requires additional constructs to interpret patterns uncovered by data-driven analyses.

Recent Developments in Global Fraud Research (2010–2025)

Between 2010 and 2025, fraud research has expanded significantly across both advanced and emerging economies. Although the United States remains a major contributor, emerging markets particularly China, Indonesia, and Ghana have demonstrated rapid growth in fraud-related scholarship (Huang et al., 2023; Owusu et al., 2022; Zhu et al., 2023). Interestingly, thematic emphases differ by geography: while Western scholarship tends to concentrate on corporate misconduct and earnings manipulation, developing countries focus more on public-sector fraud, procurement-related corruption, and institutional failures.

A notable methodological trend is the increasing use of hybrid approaches. Qualitative methods remain central for unpacking complex rationalizations and contextual dynamics (Free, 2015; Rustiarini et al., 2019). However, growing interest in machine learning and data mining has enabled large-scale anomaly detection and predictive modeling (Huang et al., 2017; Sánchez-Aguayo et al.,



2022). Yet despite these innovations, methodological fragmentation persists: advanced computational models are seldom grounded in behavioral theory, resulting in a disconnect between predictive accuracy and theoretical interpretation.

Governance oriented research continues to highlight leadership attributes and board characteristics as determinants of fraud risk. (Almalita, 2025) finds that directors’ age influences tendencies toward financial reporting fraud, while (Zhu et al., 2023) reveal that CSR engagement does not always inhibit unethical executive behavior. Given the diversity of theoretical approaches used to explain fraud, assessing which theories exert the greatest intellectual influence becomes essential. Table 1 presents the most frequently cited theoretical frameworks across the reviewed studies, offering insight into how scholarly attention has evolved over time.

Table 1. Most Citation Theory

No	Theory	Citation	Authors
1	Agency Theory	91	Kurpierz and Smith, 2020
2	Critical Discourse Analysis (CDA)	74	Lokanan, 2015
3	Agency Theory and Signalling Theory	7	Narsa et al., 2023
4	Fraud triangle theory and agency theory	0	Lootah et al., 2024

Source: Authors’ compilation from reviewed studies (Scopus, 2010–2025).

Major citation analysis highlights three core frameworks: Agency Theory, Critical Discourse Analysis, and ESG-oriented studies, which collectively shift fraud research from individual explanations toward institutional, discursive, and sustainability-based perspectives.

METHOD

This study employs a Systematic Literature Review (SLR) methodology, following the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) as proposed by (Page et al., 2021). PRISMA is widely regarded as a standard framework to enhance the quality of systematic reviews and their reporting across various disciplines. Accordingly, the systematic literature review conducted using the watase uake system follows several sequential stages:

- 1) defining the keywords, inclusion criteria, and scope of the review;
- 2) screening studies that meet the initial eligibility requirements;
- 3) retrieving articles from the selected sources and determining any necessary exclusions;
- 4) examining the titles, abstracts, and keywords of the shortlisted publications;
- 5) documenting the pathways and key information from each article during the data extraction phase; and
- 6) performing classification, network analysis, hypothesis development, and visualization.

To maintain the reliability and relevance of the review, a predefined set of inclusion and exclusion criteria was used to filter eligible studies. The criteria are presented in Table 2 :

Table 2. Inclusion and Exclusion Criteria for Study Selection

Category	Inclusion Criteria (IC)	Exclusion Criteria (EC)	Justification
Topic Relevance	keyword was “Fraud Triangle”	Articles unrelated to fraud theory or not addressing FTT elements.	Ensures studies directly address conceptual/theoretical components relevant to the research questions.

Timeframe	Published between 2010–2025.	Published before 2010 or after 2025.	Ensures inclusion of contemporary fraud scholarship.
Quality Indexing	Scopus-indexed journals (Q1–Q4).	Non-Scopus journals, non-peer-reviewed sources.	Maintains academic rigor and reliability.
Language	Written in English.	Non-English publications.	Ensures consistency in analysis and avoids translation bias.
Accessibility	Full text accessible.	Articles without abstract/full text.	Ensures complete data for review and coding.
Document Type	Journal articles.	Conference papers, dissertations, theses, technical reports, book chapters.	Limits the dataset to high-quality scholarly outputs.

Source: Authors' compilation from reviewed studies (Scopus, 2010–2025)

Figure 1 illustrates the flow diagram of the study selection process based on the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) methodology, detailing the progression from the initial search to the final selection of eligible studies.

The first stage of the process, Identification, involved searching for relevant articles using the keyword "fraud triangle" within the Scopus database, chosen for its comprehensive indexing of high-quality, peer-reviewed scholarly articles (Lasda Bergman, 2012; Vieira & Gomes, 2009). Scopus was preferred over other databases such as Google Scholar due to its rigorous indexing process, which ensures the inclusion of only high-quality publications and reduces the risk of duplicates or articles from predatory journals. This search resulted in an initial set of 76 articles. During the screening stage, articles published outside the 2010–2025 period, those not indexed in Scopus quartiles (Q1–Q4), and articles without abstracts were excluded, reducing the dataset to 62 studies. The eligibility stage involved assessing relevance to the Fraud Triangle framework, which led to the exclusion of 14 irrelevant articles, while access limitations prevented retrieval of 20 others, leaving 28 full-text articles. Finally, in the inclusion stage, two articles were excluded due to quality concerns, resulting in a final sample of 26 articles for in-depth analysis.

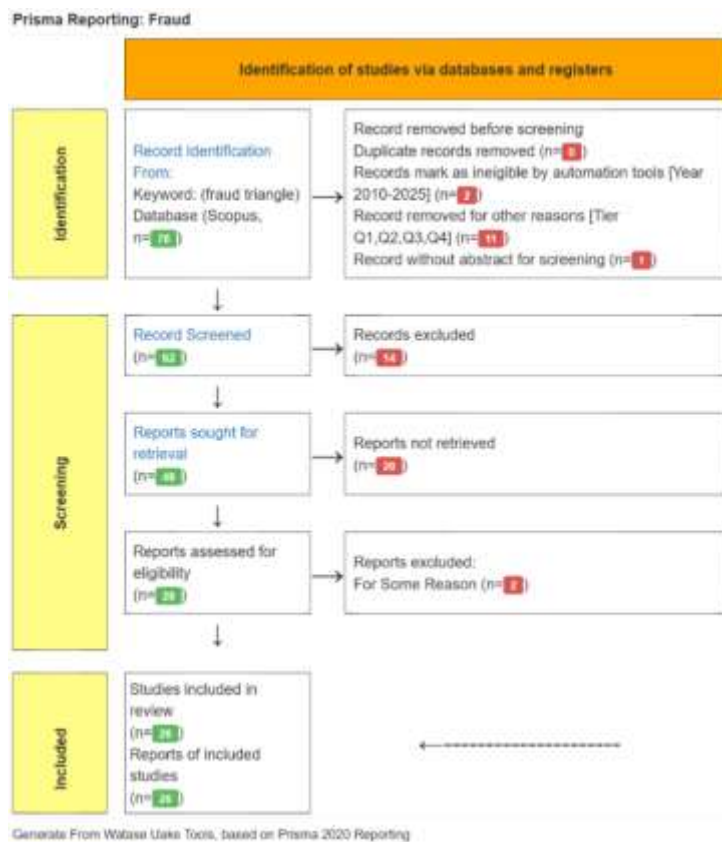


Figure 1: Identification, screening, and inclusion steps
Source: Watase Ueka Tools

Risk of Bias Assessment

To ensure methodological rigor, a risk of bias assessment was conducted following PRISMA 2020 recommendations. Three categories of bias were evaluated across all included studies: (1) Selection Bias. Potential bias stems from the use of a single database (Scopus). This was mitigated by applying strict inclusion and exclusion criteria and by documenting the entire selection process through the PRISMA flow diagram. (2) Publication Bias. Only peer-reviewed journal articles (Q1–Q4) were included; grey literature was excluded. This may limit variance, but it enhances the scholarly reliability of the dataset. (3) Methodological Bias. Studies used heterogeneous methods (qualitative, mixed, quantitative), which may influence thematic interpretation. To minimize this bias, cross-study comparison and thematic convergence analysis were conducted. Overall risk level is moderate.

Protocol Registration

A structured protocol was prepared prior to data collection to minimize bias and strengthen methodological transparency. The protocol specified the review’s aims, eligibility criteria, search strategy, study selection procedures, data extraction plan, and analytical framework. The review was conducted in compliance with PRISMA 2020 standards. Although the protocol has not been prospectively registered in a public registry, it is archived by the authors and may be accessed upon request. No deviations from the planned protocol were made during the conduct of the review.



RESULT

Trend Analysis

Content analysis was applied to identify recurring themes within the articles, and bibliometric analysis was used to examine patterns in publication frequency and institutional affiliations. This multi-faceted approach provided a comprehensive overview of the literature on the *Fraud Triangle* and its application across different contexts.

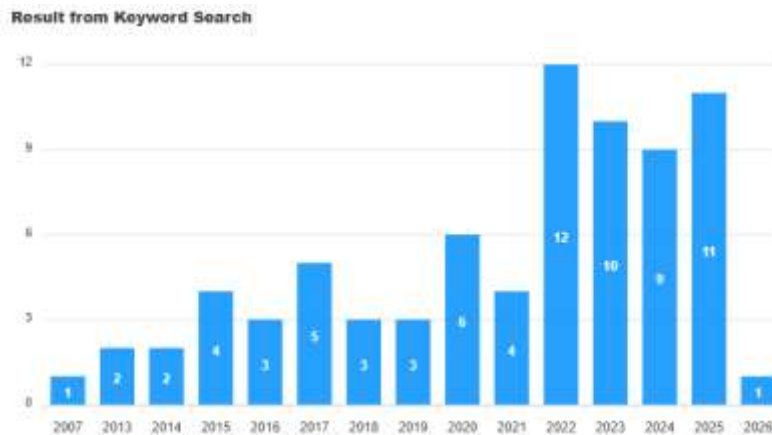


Figure 3 : Publication Trend of Fraud Triangle Research (2010–2025)
Source: Authors' analysis, 2025

Research on the fraud triangle demonstrates a clear upward trend from 2007 to 2026, reflecting growing academic attention to fraud-related issues. Publications were sparse between 2007 and 2015, indicating an early and exploratory phase of research. From 2016 onward, output increased markedly, peaking in 2020 and surging sharply in 2022, which recorded the highest number of publications, likely driven by heightened concerns over corporate misconduct, digitalization, cybersecurity, and sustainability. Although publication numbers slightly declined after 2022, interest remains strong through 2023–2025, and the projected output for 2026 suggests that fraud triangle research continues to evolve in response to emerging fraud risks and changing institutional and technological contexts.

Geographical Distribution of Fraud Research

The global distribution of studies indicates that research on the Fraud Triangle Theory (FTT) has expanded significantly beyond its Western origins. As depicted in Figure 3, the United States continues to dominate publication output, reflecting its historical influence in fraud and criminology scholarship (Dellaportas, 2013; Free, 2015). However, a notable rise in research activity has been observed in emerging economies such as China, Indonesia, Ghana, and Nigeria. These countries contribute distinctive perspectives, particularly on public sector corruption, governance failures, and institutional integrity (Owusu et al., 2022; Rustiarini et al., 2019; Simbolon, 2025). This expansion reflects the adaptability of FTT across diverse cultural and economic contexts, reinforcing its relevance as a global analytical framework for understanding fraudulent behavior.

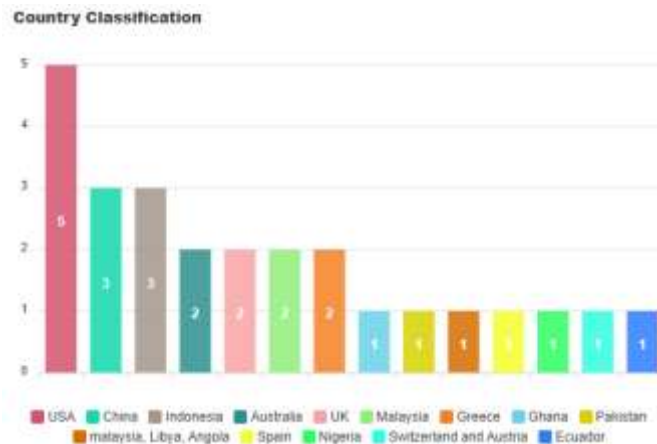


Figure 4. Geographic Distribution of Fraud Triangle Studies
 Source: Authors' analysis, 2025

The diversification of geographic research focus highlights a shift from a Western-centric narrative toward a more pluralistic interpretation of fraud. Studies from China and Indonesia, for example, illustrate how localized governance systems and socio-cultural dynamics influence fraud typologies (Zhu et al., 2022; Wang et al., 2024). In contrast, Western research continues to emphasize corporate and financial reporting fraud. This contrast underscores the contextual nature of fraud determinants where pressures, opportunities, and rationalizations differ across governance systems, economic maturity, and cultural norms. The cross-national breadth of current research thus enriches the theoretical utility of the Fraud Triangle in analyzing institutional and ethical misconduct globally.

Methodological Approaches in Fraud Studies

The review of methodologies used in the included studies reveals a predominant reliance on qualitative and mixed-method approaches. As illustrated in Figure 5, qualitative research methods, including case studies and interviews, have been the most commonly employed. This is in line with earlier findings by (Free, 2015), who emphasized the need for deeper qualitative analysis to understand the psychological and social dynamics of fraud. While quantitative approaches, such as surveys and statistical analyses, are also used, the literature suggests a gap in large-scale quantitative studies that could offer more generalizable findings across different industries and contexts.

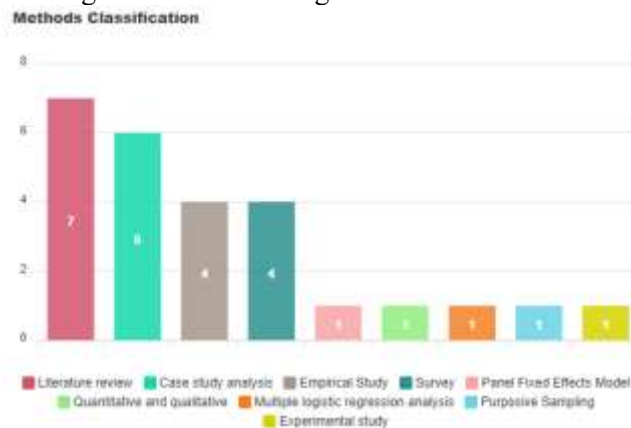


Figure 5 : Methodological Approaches in Fraud Studies
 Source: Authors' analysis, 2025



Recent findings (Figure 5) show that qualitative and mixed-method approaches dominate the empirical landscape of fraud studies, aligning with earlier observations by (Free, 2015) that qualitative analysis offers deeper insights into the psychological and social mechanisms driving fraudulent behavior. Case studies and interviews remain the most frequent methods, allowing researchers to capture the nuanced interplay of pressure, opportunity, and rationalization. Nevertheless, the limited use of large-scale quantitative methods suggests a continuing methodological gap that restricts the generalizability of findings across industries. Addressing this gap through data-driven techniques such as machine learning and data mining could enhance empirical robustness (Sánchez-Aguayo et al., 2022).

Recent advancements advocate for a complementary approach that bridges behavioral insights with technological tools. By combining qualitative depth with computational breadth, researchers can generate more robust empirical models of fraud detection and prevention. This hybrid methodology not only strengthens theoretical testing but also enhances predictive accuracy aligning academic inquiry with practical governance and audit applications. The limited adoption of such integrative methods highlights an enduring gap between traditional behavioral theories and the potential of digital analytics to transform fraud research.

Thematic Meta-Synthesis of Fraud Research (2010–2025)

A thematic meta-synthesis identified four dominant clusters of modern fraud: (1) Cyber-enabled fraud (algorithmic manipulation, digital procurement abuse); (2) ESG-related fraud (greenwashing, CSR misreporting); (3) Governance and leadership fraud (board misconduct, elite manipulation); (4) Data-driven fraud detection (machine learning, anomaly mining). Each cluster reveals different dominant FTT drivers: cyber-fraud amplifies *opportunity*, ESG fraud strengthens *rationalization*, while governance fraud intensifies *pressure* from reputation and performance metrics. This thematic clustering provides a deeper synthesis beyond descriptive trend reporting. Table 4 presents the thematic meta-synthesis derived from the 26 reviewed studies. Four dominant research themes were identified, each representing a cluster of related theoretical developments and empirical findings.

Table 3. Thematic Meta-Synthesis of Fraud Triangle Research (2010–2025)

Theme	Supporting Studies and Key Insights
1. Cyber-Enabled Fraud	• <i>Huang et al. (2017)</i> apply Fraud Triangle risk factors to detect fraud patterns within digital information systems, showing that digitalization amplifies opportunity.
	• <i>Sánchez-Aguayo et al. (2022)</i> use data-mining and machine learning techniques to identify algorithmic anomalies, highlighting new digital vectors for fraud.
	• Studies on digital procurement emphasize vulnerabilities in access controls, authentication, and system integrity as enablers of cyber-fraud.
2. ESG-Related Fraud (Greenwashing and Sustainability Misconduct)	• <i>Kurpierz & Smith (2020)</i> introduce the “Greenwashing Triangle,” extending FTT to ESG deception contexts.
	• <i>Wang et al. (2024)</i> demonstrate that ESG pressures and performance expectations can generate new forms of rationalization and misreporting incentives.
	• <i>Zhu et al. (2023)</i> find that CSR engagement may legitimize unethical executive behavior rather than mitigating fraud risk.
3. Governance	• <i>Almalita (2025)</i> shows that board attributes influence financial reporting fraud tendencies, linking pressure to governance characteristics.



and Leadership-Driven Fraud	<ul style="list-style-type: none"> • <i>Zhu et al. (2023)</i> reveal CEO-level wrongdoing shaped by organizational culture and reporting expectations. • <i>Owusu et al. (2022)</i> and <i>Rustiarini et al. (2019)</i> highlight weak institutional environments and collusion practices in public-sector and SOE fraud. • <i>Schuchter & Levi (2015)</i> expand FTT to elite white-collar fraud, emphasizing social context and collective rationalization.
4. Data-Driven Detection and Methodological Innovation	<ul style="list-style-type: none"> • <i>Free (2015)</i> calls for expanding fraud research beyond descriptive FTT applications and integrating novel methods. • <i>Sánchez-Aguayo et al. (2022)</i> bridge FTT with machine-learning models but note a persistent theory–data gap. • <i>Huang et al. (2017)</i> validate FTT concepts through predictive analytics, confirming its usability in automated detection. • Multiple studies in the dataset indicate a methodological divide between computational fraud detection and behavioral theory.

Source: Authors’ compilation from reviewed studies (Scopus, 2010–2025)

Overall, the thematic structure illustrates that modern fraud is socio-technical in nature, requiring an expanded Fraud Triangle that integrates behavioral, organizational, ESG-driven, and digital-technological dimensions.

Modern Fraud Categorization

Modern fraud has evolved beyond traditional behavioral explanations and now reflects a socio-technical landscape shaped by digital infrastructures, sustainability pressures, and algorithmic decision-making. Based on the reviewed studies, three major categories of contemporary fraud emerged: cyber-enabled fraud, ESG-related fraud, and AI/algorithmic fraud. Each category reflects distinct mechanisms through which pressure, opportunity, and rationalization operate within the Fraud Triangle framework.

Table 4. Modern Fraud Categorization and Its Relationship to Fraud Triangle Components

Fraud Category	Definition & Key Mechanisms	Dominant FTT Drivers
Cyber-Enabled Fraud	Fraud committed through digital systems, networks, or automated processes, including manipulation of procurement systems, unauthorized access, data exfiltration, and algorithmic misuse. Digitalization significantly expands the scale and speed of fraudulent activity.	Opportunity (primary): weak digital controls, system vulnerabilities, authentication failures. Pressure: real-time digital performance demands. Rationalization: framing misconduct as “technical shortcuts” or system errors.

<p>ESG-Related Fraud (Greenwashing & Sustainability Misrepresentation)</p>	<p>Misreporting or manipulating environmental, social, and governance information to create a misleading appearance of sustainability compliance or ethical performance. Often involves selective disclosure or inflated ESG metrics.</p>	<p>Rationalization (primary): ethical justification and narrative framing. Opportunity: complexity and low verifiability of ESG metrics. Pressure: investor, regulatory, and reputational demands for ESG performance.</p>
<p>AI-Based / Algorithmic Fraud</p>	<p>Fraud enabled by exploiting or manipulating machine-learning systems, automated decision engines, or algorithmic processes (e.g., model poisoning, automated approvals, biased credit scoring manipulation).</p>	<p>Opportunity (primary): algorithmic opacity, lack of model governance, automation gaps. Pressure: competitive incentives to optimize AI-driven business outcomes. Rationalization: justifying model manipulation as “optimization” or efficiency enhancement.</p>

Source: Authors’ compilation from reviewed studies (Scopus, 2010–2025)

Together, these categories illustrate how modern fraud is increasingly shaped by digital capabilities, sustainability expectations, and algorithmic systems. Cyber-enabled and AI-based fraud primarily expand the opportunity dimension of the Fraud Triangle through technological vulnerabilities, while ESG-related fraud reshapes rationalization by leveraging ethical narratives. These emerging fraud types highlight the need to broaden traditional fraud theories to incorporate socio-technical and institutional dynamics.

Theory Mapping and Variable Network Analysis

The theory-mapping visualization Figure 6 provides a consolidated representation of the key determinants of fraud identified across the 26 studies included in this review. The central placement and larger size of the Fraud node reflect its role as the primary outcome variable examined in contemporary fraud research, while the surrounding nodes represent theoretical constructs and organizational factors that function as drivers, moderators, or contextual amplifiers of fraud risk. The mapping confirms the continued dominance of the three core elements of the Fraud Triangle Theory—Pressure, Opportunity, and Rationalization—each of which appears prominently and in close proximity to the fraud node. This positioning highlights their role as the most consistently validated behavioral predictors of fraud across empirical studies. These constructs form the foundation upon which additional governance, demographic, and firm-level variables exert their influence.





Figure 6 : Theory Mapping of Fraud Determinants Based on Fraud Triangle and Organizational Governance Variables
Source: Authors' analysis, 2025

The mapping diagram highlights fraud as the central outcome influenced by both behavioral and structural determinants. The core elements of the Fraud Triangle pressure, opportunity, and rationalization appear as the most prominent drivers, reflecting their consistent empirical support across the reviewed studies. Surrounding governance and organizational variables, such as independent director ratio, presence of female legislators, audit firm size, leverage, liquidity, and return on equity, function as contextual factors that shape these behavioral pathways by altering levels of pressure or enabling opportunities for misconduct. The connection to employee fraud further illustrates how individual wrongdoing emerges within broader institutional and financial environments, reinforcing the conclusion that fraud is a multidimensional phenomenon shaped by the interplay of psychological, organizational, and governance-related forces.

DISCUSSION

Alignment and Divergence with Previous Studies

Consistent with the foundational insights of (Cressey, 1953), subsequent studies (Free, 2015; S. Y. Huang et al., 2017) have shown that the triadic model continues to provide a useful lens for understanding fraud. Yet, interestingly, the evidence presented here suggests that the nature of these three drivers is shifting in light of digital transformation and evolving governance practices. Unlike earlier SLRs that centered primarily on financial or corporate fraud, this review highlights the expansion of fraud research into areas such as ESG manipulation, digital deception, and reputational misconduct. These findings extend the work of (Wang et al., 2024) and (Zhu et al., 2023), who began linking sustainability metrics to fraudulent behavior, by demonstrating that ESG-related misconduct has become an increasingly salient form of organizational fraud. The rise of greenwashing and ethical misrepresentation, discussed by (Kurpierz & Smith, 2020), exemplifies this shift toward more complex, non-financial dimensions of deception.

Moreover, while previous literature generally supported qualitative exploration of fraud (Free, 2015), the current synthesis reveals a persistent methodological imbalance. Many studies continue to rely on case-based approaches without integrating advanced data analytics. This observation both aligns with and diverges from (Sánchez-Aguayo et al., 2022), who advocated for the use of machine learning in fraud detection. The current review emphasizes that behavioral theories such as the FTT and computational approaches remain a limitation that constrains the field's progress. Therefore, this study extends earlier findings by suggesting that future fraud research must weave



together behavioral insights with technological innovation to build more predictive, adaptive frameworks.

Theoretical Advancement and Novel Contribution

This review advances the literature by reframing the Fraud Triangle as a dynamic and context-sensitive framework rather than a static explanatory model. Unlike prior research that applied FTT descriptively, this study interprets it as an evolving construct capable of incorporating variables such as ESG performance, digital governance, and organizational ethics. In doing so, it extends the interdisciplinary dialogue initiated by (Lokanan, 2015) and (Narsa et al., 2023), highlighting that fraud is both a behavioral and systemic phenomenon. Interestingly, this review also deepens the interpretation of rationalization by engaging with Critical Discourse Analysis (Lokanan, 2015), which exposes how corporate language and narratives normalize unethical acts. By examining rationalization as a socially embedded process rather than merely an individual cognitive bias, this review adds conceptual depth to one of the most elusive elements of the Fraud Triangle.

This review highlights that ESG ethics act as a moral constraint that weakens rationalization, while weak ESG governance creates new rationalization pathways such as ‘ethical justification’ for misleading sustainability metrics. Meanwhile, digital governance moderates opportunity by strengthening access controls and real-time surveillance, but simultaneously creates new digital loopholes (algorithmic opacity) that expand fraudulent opportunities. Digital workload and performance pressure also intensify pressure, making FTT more complex in digital ecosystems.

ESG and Digital Governance as Moderators of the Fraud Triangle

This review demonstrates that ESG ethics and digital governance function not only as contextual variables but as *moderating forces* that reshape how pressure, opportunity, and rationalization translate into fraud. Digital governance moderates the opportunity pathway by altering access control, system transparency, and the detectability of misconduct; strong digital oversight reduces the feasibility of fraud, whereas weak or fragmented systems amplify opportunity. ESG ethics, in contrast, moderate rationalization by shaping the moral and discursive legitimacy of fraudulent acts. Organizations with genuine ESG cultures constrain rationalization by reinforcing ethical norms, while symbolic ESG practices or greenwashing incentives may create new rationalization narratives that justify misconduct. Both ESG expectations and digital performance pressures also influence the pressure component of the Fraud Triangle, indicating that modern fraud is produced through the interaction of behavioral motives and institutional systems. Together, these moderators constitute a more adaptive “Fraud Triangle Theory 2.0,” in which structural governance forces condition the behavioral mechanisms traditionally assumed to drive fraudulent behavior.

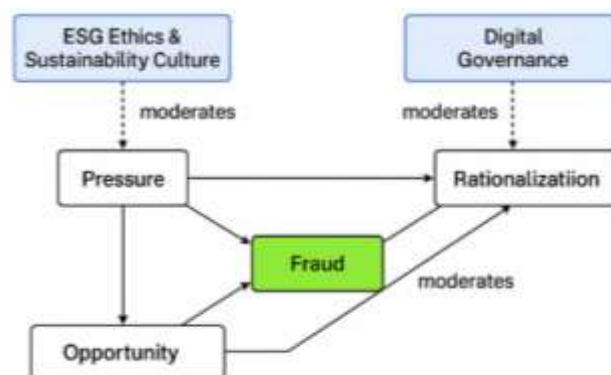


Figure 7: Moderated Fraud Triangle Model (FTT 2.0)

Source: Authors' analysis, 2025



The diagram illustrates how ESG ethics and digital governance operate as moderating mechanisms that reshape the behavioral pathways of the Fraud Triangle. Digital governance moderates the opportunity and pressure elements by influencing system integrity, access control, and operational demands, while ESG ethics moderate the rationalization and pressure pathways by shaping ethical norms and sustainability expectations within the organization.

Comparative and Contextual Insights

Geographically, the analysis confirms that research on FTT remains concentrated in the United States, echoing trends identified by (Free, 2015) and (Rustiarini et al., 2019). However, it also highlights a noteworthy increase in contributions from emerging economies such as China, Indonesia, and Ghana. These regions, as shown in studies by (Wang et al., 2024) and (Simbolon, 2025), offer valuable perspectives on public sector corruption and institutional fraud, thereby enriching the global discourse. Contrary to earlier assumptions that FTT is predominantly Western in scope, the evidence suggests a growing localization of fraud theories, where cultural, political, and regulatory contexts significantly shape how pressure, opportunity, and rationalization are conceptualized. This diversification not only expands the empirical base of fraud research but also adds nuance to the theoretical adaptability of FTT across socio-economic landscapes.

Theoretical and Practical Implications

The findings of this review indicate that while the Fraud Triangle remains a relevant behavioral foundation, its explanatory sufficiency is increasingly limited in addressing contemporary forms of misconduct such as ESG manipulation, digital deception, and algorithmic fraud. The analysis reveals several critical gaps in the existing literature, including the lack of integration between FTT and data-driven fraud analytics, the inadequate theorization of ESG-related deceit (e.g., carbon-reporting distortion), and the tendency to treat rationalization solely as an individual cognitive process rather than a socially constructed discourse. Moreover, the cross-cultural variability in how pressure, opportunity, and rationalization manifest remains insufficiently explored, highlighting the need for frameworks that account for institutional, regulatory, and cultural contexts.

To address these gaps, this review proposes the Fraud Triangle 2.0, an integrated behavioral–structural–technological model. This framework retains the core behavioral drivers of the original FTT but extends them through two additional dimensions: structural amplifiers, including governance weaknesses and ESG signaling incentives, and technological enablers such as digital manipulation capacities and algorithmic exploitation. Conceptualizing fraud as the outcome of interaction among psychological motives, organizational design, and digital infrastructures provides a more comprehensive understanding of modern fraud ecosystems. The proposed model thus advances the field by offering a forward-looking theoretical foundation capable of capturing the systemic, networked, and technologically mediated nature of contemporary fraudulent behavior.

CONCLUSION

This systematic literature review evaluates the development and application of Fraud Triangle Theory (FTT) from 2010 to 2025, reaffirming the relevance of Cressey’s pressure, opportunity, and rationalization framework while highlighting the need for theoretical expansion in response to contemporary fraud contexts. The findings show that emerging phenomena such as ESG manipulation, digital and algorithmic fraud expose limitations of the traditional model, necessitating a more adaptive and multidimensional perspective that integrates technological, structural, and sustainability-related factors. By identifying trends linking ESG practices, governance transparency, and advanced technologies such as artificial intelligence and data analytics to fraud prevention, the review underscores the growing importance of hybrid approaches that combine behavioral theory



with digital tools and broader socio-economic and cultural perspectives across diverse institutional settings.

Practical Implications

The findings carry several practical implications. For regulators, the results underscore the need to embed ESG reporting standards, digital transparency requirements, and governance indicators within regulatory frameworks to reduce structural opportunities for fraud. For auditors, the review suggests incorporating data-analytic procedures and ESG risk assessments into audit planning, allowing for more comprehensive fraud detection. For organizations, strengthening internal controls, improving ethical culture, and adopting technology-enabled monitoring systems are essential to mitigating both traditional and emerging fraud risks. Together, these implications highlight the importance of aligning behavioral insights with institutional and technological safeguards.

Future Research Agenda

Based on the findings of this review, several structured research directions emerge. (1) Theoretical Gaps: Future studies should operationalize the proposed moderated Fraud Triangle Model (FTT 2.0) by specifying measurable constructs of ESG ethics, digital governance, and their directional moderating effects on pressure, opportunity, and rationalization. Furthermore, fraud theory should be extended to capture socio-technical dynamics, including discursive rationalization, collective collusion, and technology-enabled opportunity structures. (2) Methodological Gaps: There is a need for mixed-method and longitudinal designs capable of capturing dynamic fraud behaviors, incorporating machine learning, behavioral experiments, and qualitative offender-based studies to complement predominantly cross-sectional designs in the current literature. (3) Data Gaps: Future research should employ richer datasets digital audit logs, ESG disclosure metadata, procurement transaction chains, and algorithmic decision trails to observe fraud mechanisms in real time. Cross-country and multi-industry datasets are also required to validate the generalizability of FTT 2.0. (4) Ecosystem Gaps: Research must investigate emerging fraud ecosystems, including cyber-enabled schemes, ESG-related greenwashing, and AI-driven algorithmic manipulation. These domains require theory-driven models linking institutional governance, digital infrastructure, and sustainability pressures to new forms of fraudulent behavior.

Taken together, these directions establish a forward-looking agenda for advancing fraud research beyond its behavioral origins toward a socio-technical, governance-embedded, and evidence-based scientific paradigm.

Limitations

Despite its contributions, this review has several limitations. First, it focuses on peer-reviewed literature published between 2010 and 2025, potentially excluding relevant insights from earlier or non-indexed sources. Second, the review synthesizes findings across diverse contexts, which may limit the specificity of conclusions for particular industries or countries. Third, due to constraints in available empirical studies, especially those employing advanced data analytics, some emerging trends remain underexplored. Future research should consider meta-analytic approaches, longitudinal designs, and deeper integration of behavioral and computational methods to address these limitations.

REFERENCES

- Almalita, Y. (2025). Decoding Financial Fraud: The Impact of Corporate Governance and the Fraud Triangle on F-Score. *Global Research Review in Business and Economics*, 11(2), 59–66.



- Bertucci, A., Skufca, T., & Boyer-Davis, S. (2021). Section 806 of the Sarbanes-Oxley act: Can the fraud triangle prevent fraud in the finance sector? *Journal of Corporate Accounting & Finance*, 32(4), 158–167. <https://doi.org/10.1002/jcaf.22520>
- Cressey, D. R. (1953). *Other people's money; a study of the social psychology of embezzlement* (p. 191). Free Press.
- Daigle, R. J., Hayes, D. C., & Morris, P. W. (2014). Dr. Phil and Montel help AIS students “Get Real” with the fraud triangle. *Journal of Accounting Education*, 32(2), 146–159. <https://doi.org/10.1016/j.jaccedu.2014.03.004>
- Darmawan, R. D., & Almalita, Y. (2025). The Role of Corporate Responsibility, Board Reputation, and Gender in Overcoming Financial distress during Covid-19. *South East Asia Journal of Contemporary Business, Economics and Law*, 34(1), 12–21.
- Dellaportas, S. (2013). Conversations with inmate accountants: Motivation, opportunity and the fraud triangle. *Accounting Forum*, 37(1), 29–39. <https://doi.org/10.1016/j.accfor.2012.09.003>
- Free, C. (2015). Looking through the fraud triangle: A review and call for new directions. *Meditari Accountancy Research*, 23(2), 175–196. <https://doi.org/10.1108/MEDAR-02-2015-0009>
- Huang, J., Kombate, B., Li, Y., Kouadio, K. R., & Xie, P. (2023). Effective risk management in the shadow of COVID-19 pandemic: The evidence of Indonesian listed corporations. *Heliyon*, 9(5). <https://doi.org/10.1016/j.heliyon.2023.e15744>
- Huang, S. Y., Lin, C.-C., Chiu, A.-A., & Yen, D. C. (2017). Fraud detection using fraud triangle risk factors. *Information Systems Frontiers*, 19(6), 1343–1356. <https://doi.org/10.1007/s10796-016-9647-9>
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360.
- Kurpierz, J. R., & Smith, K. (2020). The greenwashing triangle: Adapting tools from fraud to improve CSR reporting. *Sustainability Accounting, Management and Policy Journal*, 11(6), 1075–1093. <https://doi.org/10.1108/SAMPJ-10-2018-0272>
- Lasda Bergman, E. M. (2012). Finding Citations to Social Work Literature: The Relative Benefits of Using Web of Science, Scopus, or Google Scholar. *The Journal of Academic Librarianship*, 38(6), 370–379. <https://doi.org/10.1016/j.acalib.2012.08.002>
- Lim, W. M., Rasul, T., Kumar, S., & Ala, M. (2022). Past, present, and future of customer engagement. *Journal of Business Research*, 140, 439–458. <https://doi.org/10.1016/j.jbusres.2021.11.014>
- Lokanan, M. E. (2015). Challenges to the fraud triangle: Questions on its usefulness. *Accounting Forum*, 39(3), 201–224. <https://doi.org/10.1016/j.accfor.2015.05.002>
- Lootah, M., Gleason, K., Smith, D., & Zoubi, T. (2025). Fraud risk of sovereign wealth funds: Fraud triangle and agency theory perspectives. *Journal of Financial Crime*, 32(3), 515–529. <https://doi.org/10.1108/JFC-05-2024-0155>
- Narsa, N. P. D. R. H., Afifa, L. M. E., & Wardhaningrum, O. A. (2023). Fraud triangle and earnings management based on the modified M-score: A study on manufacturing company in Indonesia. *Heliyon*, 9(2), e13649. <https://doi.org/10.1016/j.heliyon.2023.e13649>
- Owusu, G. M. Y., Koomson, T. A. A., Alipoe, S. A., & Kani, Y. A. (2022). Examining the predictors of fraud in state-owned enterprises: An application of the fraud triangle theory. *Journal of Money Laundering Control*, 25(2), 427–444. <https://doi.org/10.1108/JMLC-05-2021-0053>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, n71. <https://doi.org/10.1136/bmj.n71>

- Rahman, M. J., & Jie, X. (2024). Fraud detection using fraud triangle theory: Evidence from China. *Journal of Financial Crime*, 31(1), 101–118. <https://doi.org/10.1108/JFC-09-2022-0219>
- Rustiarini, N. W., Sutrisno, S., Nurkholis, N., & Andayani, W. (2019). Fraud triangle in public procurement: Evidence from Indonesia. *Journal of Financial Crime*, 26(4), 951–968. <https://doi.org/10.1108/JFC-11-2018-0121>
- Said, J., Alam, Md. M., Karim, Z. A., & Johari, R. J. (2018). Integrating religiosity into fraud triangle theory: Findings on Malaysian police officers. *Journal of Criminological Research, Policy and Practice*, 4(2), 111–123. <https://doi.org/10.1108/JCRPP-09-2017-0027>
- Sánchez-Aguayo, M., Urquiza-Aguiar, L., & Estrada-Jiménez, J. (2022). Predictive Fraud Analysis Applying the Fraud Triangle Theory through Data Mining Techniques. *Applied Sciences*, 12(7), 3382. <https://doi.org/10.3390/app12073382>
- Schuchter, A., & Levi, M. (2015). Beyond the fraud triangle: Swiss and Austrian elite fraudsters. *Accounting Forum*, 39(3), 176–187. <https://doi.org/10.1016/j.accfor.2014.12.001>
- Simbolon, R. (2025). The presence of female legislators: Fraud triangle elements and fraud. *Journal of Financial Crime*, 32(4), 804–824. <https://doi.org/10.1108/JFC-06-2024-0183>
- Vieira, E. S., & Gomes, J. A. N. F. (2009). A comparison of Scopus and Web of Science for a typical university. *Scientometrics*, 81(2), 587–600. <https://doi.org/10.1007/s11192-009-2178-0>
- Wang, J., Chen, Y., & Wang, S. (2024). Exploring the relationship between corporate ESG performance and corporate violation: Based on the fraud triangle theory. *Corporate Social Responsibility and Environmental Management*, 31(6), 5606–5626. <https://doi.org/10.1002/csr.2882>
- Zhu, C., Zeng, R., Wang, R., & Xiao, Y. (2023). Corporate social responsibility and chief executive officer wrongdoing: A fraud triangle perspective. *Corporate Social Responsibility and Environmental Management*, 30(2), 874–888. <https://doi.org/10.1002/csr.2394>