Manara
Qatar Research
Repository
by Qatar National Library

Toward a holistic model of sustainable investment decision-making in SMEs: a structural approach in a developing economy

Dedrix Stephenson Bindeeba, Eddy Kurobuza Tukamushaba, Rennie Bakashaba

Item type
Journal Contribution

Terms of use
This work is licensed under a CC BY 4.0 license

This version is available at
https://manara.qnl.qa/articles/journal_contribution/Toward_a_holistic_model_of_sustainable_investment_decision-making_in_SMEs_a_structural_approach_in_a_developing_economy/29652887/1
Access the item on Manara for more information about usage details and recommended citation.

Posted on Manara – Qatar Research Repository on
2025-07-28

Future Business Journal

RESEARCH Open Access

Toward a holistic model of sustainable investment decision-making in SMEs: a structural approach in a developing economy

Dedrix Stephenson Bindeeba[1*], Eddy Kurobuza Tukamushaba[2] and Rennie Bakashaba[1]

Abstract

Sustainable investment practices are increasingly recognized globally, yet their uptake among Small and Medium Enterprises (SMEs) in developing economies is insufficiently understood. This study investigates the factors influencing sustainable investment decision-making among 372 SMEs in Kampala and Wakiso, Uganda. Data were collected using convenience sampling through a mixed-mode questionnaire administered via face-to-face interviews and online forms. Integrating Institutional Theory, Resource-Based View, and the Theory of Planned Behavior, the research examines how environmental risk exposure, perceived regulatory clarity, government incentives, technological capability, financial access, competitive pressure, and business network strength shape the perceived value of sustainable investment. Employing covariance-based structural equation modeling, the study tests both direct and mediated effects. Results reveal that environmental risk negatively influences perceived value, while technological capability, financial access, network strength, and competitive pressure positively influence it. In contrast, perceptions of regulatory strength and government support do not exhibit significant effects, likely due to low enforcement and institutional trust. The perceived value of sustainable investment strongly predicts actual sustainability-oriented investments, confirming its mediating role. These findings offer practical insights for policymakers and development actors seeking to foster sustainable transitions in resource-constrained environments.

Keywords Sustainable investment, SMEs, Developing economies, Institutional theory, Resource-based view, Decision-making

Introduction

Sustainable investing has gained substantial traction on a global scale, evidenced by significant inflows into Environmental, Social, and Governance (ESG) aligned funds, which now represent over $30 trillion in sustainable assets (GSIA, 2023; [187]). A recent survey indicates that over 85 percent of institutional investors anticipate that climate-related considerations will become integral to their strategic frameworks in the near future [160]. The mainstreaming of sustainable finance is posited to reduce capital costs for responsible organizations, stimulate innovation, and facilitate a transition toward inclusive and resilient socio-economic development [126, 134, 212].

The involvement of Small and Medium Enterprises (SMEs) in this transition is critical. In Sub-Saharan Africa, SMEs account for up to 90 percent of business activity and play a vital role in employment and private-sector contributions [201, 169]. However, their potential is often curtailed by environmental degradation, resource scarcity, social inequality, and inadequate institutional frameworks [148, 167]. Such challenges underscore the increasing pressure on SMEs to integrate ESG principles

*Correspondence:
Dedrix Stephenson Bindeeba
dedrixbindeeba@gmail.com
[1] Faculty of Business and Management Sciences , Mbarara University of Science and Technology, Mbarara, Uganda
[2] University of Doha for Science and Technology, Doha, Qatar, Doha, Qatar

Springer Open

© The Author(s) 2025. **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/.

within their strategies and investment decisions [154, 170].

Uganda serves as an expressive illustration of these challenges. Enterprises classified as SMEs, defined as those with 5-99 employees and Assets between UGX 10–360 million, constitute over 90 percent of registered businesses in the country [150]. They are responsible for more than 20 percent of the national GDP and employ approximately 45 percent of the labor force (UBOS, 2023,Uganda Business Impact Survey, 2020). Nevertheless, fewer than 20 percent of these businesses have access to formal credit, often relying instead on costly informal lending sources [173]. Furthermore, the enforcement of environmental and labor regulations is inconsistent, and awareness of ESG principles among SME owner-managers remains limited [151, 234, 177]. Thus, it is imperative to comprehend how Ugandan SMEs perceive and respond to sustainability opportunities.

Recent academic literature emphasizes that investment decisions are influenced not only by external frameworks but also by internal capabilities and managerial assessments [128, 164]. Factors such as regulatory robustness, stakeholder pressure, technological preparedness, and access to financial resources are frequently identified as facilitators of green investment [208, 178]. Behavioral frameworks, including the Theory of Planned Behavior, further elucidate how attitudes, social norms, and perceived control shape investment intentions [180, 132]. At the core of these analyses lies the concept of the Perceived Value of Sustainable Investment (PVSI), which encapsulates managers' evaluations of the economic, strategic, and reputational benefits tied to sustainability initiatives [124, 198]. When the PVSI is high, even resource-limited SMEs are more inclined to engage in sustainability efforts [126, 212].

To elucidate these dynamics, this investigation targets nine essential constructs: Environmental Risk Exposure (ERE), which pertains to the perceived ecological threats that may either motivate or hinder sustainable actions [231, 236],Environmental Regulatory Strength (ERS), defined by the clarity and enforcement of environmental legislation [164, 232],and Perceived Government Support (PGS), which encompasses various incentives such as subsidies and tax relief [215, 234, 177]. Internally, Technological Capability (TC) assesses a firm's ability to adopt sustainable innovations [141, 223], while Access to Financial Resources (AFR) reflects the ease with which capital can be secured for environmentally friendly projects [183, 205]. Market-driven elements include Competitive Pressure (CP), which refers to customer or competitive forces that incentivize firms toward sustainability [165], and Business Network Strength (BNS), indicative of the quality of collaborative relationships that promote sustainability norms [199, 220]. The PVSI serves as a mediator, translating these seven drivers into managerial assessments [120, 139].

The Sustainable Investment Decision (SID) represents the dependent variable of this study, defined as a firm's intentional allocation of financial, technological, or organizational resources toward initiatives such as renewable energy adoption or the implementation of circular economy practices [149, 153, 216]. The SID is closely aligned with dynamic capability and resource-based perspectives, emphasizing organizational adaptability and long-term competitive advantage (Teece et al., 2007 [140],).

Despite the growing interest in this domain, three notable gaps persist. First, existing research often conceptualizes sustainable investment as a direct structural response, neglecting the mediating role of PVSI. Second, the behaviors of SMEs in developing economies are underrepresented in the literature compared to those in advanced markets. Third, prevalent theoretical frameworks such as Institutional Theory and the Resource-Based View tend to minimize the role of managerial agency in explaining sustainability adoption [184, 134, 139, 172].

Therefore, this research endeavors to achieve three primary objectives: (1) to identify how institutional forces (ERE, ERS, PGS), organizational capabilities (TC, AFR), and market dynamics (CP, BNS) shape the PVSI among Ugandan SMEs; (2) to quantify both the direct and indirect pathways through which these factors influence SID; and (3) to integrate Institutional Theory, the Resource-Based View, and the Theory of Planned Behavior into a cohesive model centered on PVSI.

The study contributes to theoretical discourse by illuminating how institutional signals and resource endowments are interpreted through managerial perceptions to drive sustainable investment decisions. Practically, it offers policy recommendations for government and development partners regarding financial instruments, regulatory incentives, and capacity-building initiatives that enhance the sustainability readiness of SMEs.

Empirically, the investigation utilizes survey data collected from 372 SMEs in Kampala and Wakiso and employs covariance-based Structural Equation Modeling to test both direct and mediated relationships. Through this approach, it aims to provide robust insights into the determinants influencing sustainable investment decision-making within Uganda's SME sector as well as in other resource-constrained emerging market contexts.

Literature review

Theoretical review

The process of SID within small and medium enterprises (SMEs) is characterized by its complexity, arising from a confluence of external institutional pressures, internal organizational capacities, and individual behavioral evaluations. This interplay is particularly intricate in developing economies, where SMEs often confront significant resource limitations and unstable institutional frameworks. To comprehensively analyze this multifaceted phenomenon, the present study utilizes an integrated theoretical framework that synthesizes Institutional Theory, the Resource-Based View (RBV), and the Theory of Planned Behavior (TPB). This holistic approach facilitates an exploration of structural enablers, internal competencies, and the cognitive processes of decision-makers that influence sustainability investments in resource-constrained environments.

Institutional Theory provides a foundational perspective by elucidating how external structures shape organizational behavior. Grounded in the seminal work of DiMaggio and Powell [194], this theory posits that firms operate within environments characterized by coercive (regulatory), normative (social), and mimetic (competitive) pressures. In the context of sustainability, these forces compel firms to conform to societal expectations, regulatory requirements, and industry standards. For instance, van Zanten and Rein [170] argue that national commitments to sustainable development exert a significant influence on corporate behavior, at times surpassing the mere formal adoption of Environmental, Social, and Governance (ESG) frameworks. Similarly, Mielke [208] underscores the importance of credible policy signals, such as tax incentives, subsidies, and feed-in tariffs, in promoting green investment. However, scholars such as Yalabik and Fairchild [232] caution that excessive or poorly designed institutional pressures may have counterproductive effects, particularly for SMEs operating in high-cost or high-emission sectors. Furthermore, research indicates that competitive pressures and robust business networks serve as additional institutional drivers, providing benchmarks and social cues that encourage sustainable practices [128, 191, 176]. Nonetheless, a notable critique of Institutional Theory is its propensity to depict firms as passive recipients of external pressures, often neglecting internal heterogeneity and the diverse responses of similar firms confronted with analogous external conditions.

In contrast, the Resource-Based View shifts the focus inward, emphasizing the significance of firm-level resources and strategic assets. According to Barney [184], firms can achieve sustainable competitive advantage by possessing resources that are valuable, rare, inimitable, and non-substitutable (VRIN). Within the context of SME sustainability, the RBV is particularly illuminating, as it highlights the pivotal role of technological capabilities, access to financial resources, and operational scale in shaping investment decisions. For example, Bhatia and Kumar [128] demonstrate that technological capability can mediate the relationship between stakeholder pressure and green process innovation. Additionally, research by King and Lenox [145] and Khan et al. [202] indicates that firms exhibiting strong environmental performance often realize superior financial outcomes. These findings suggest that the strategic utilization of internal resources is essential for achieving sustainability. However, a significant limitation of the RBV is its focus on resource possession without adequately addressing how decision-makers perceive or deploy these resources amidst uncertainty, an issue that is particularly relevant in SMEs, where managerial judgment plays a critical role [146, 227].

Bridging the gap between external forces and internal capacities, the Theory of Planned Behavior offers a psychological framework that elucidates how individual intentions are translated into actions. Proposed by Ajzen [120], the TPB posits that behavior is influenced by attitudes toward the behavior, subjective norms, and perceived behavioral control. In the context of SID, this theory clarifies how SME owner-managers assess the feasibility and advantages of sustainability investments. Empirical evidence supports the relevance of the TPB,Adam and Shauki [180] found that positive attitudes and strong moral norms significantly drive intentions toward socially responsible investments, while Chan et al. [132] and Abdul Razak et al. (2021) emphasize the roles of perceived behavioral control and trust as key mediators in converting sustainability intentions into actual investments. Furthermore, Prihastiwi et al. [157] highlight that financial literacy and responsible financial practices enhance SMEs' readiness to engage in sustainability investments. Collectively, these studies affirm that individual perceptions and internal motivations are critical determinants of investment behavior, particularly in environments characterized by centralized decision-making.

In the integrated framework proposed in this study, the construct of PVSI serves as a crucial cognitive mediator that links external institutional pressures, internal resources, and subsequent investment decisions. PVSI encapsulates how SME decision-makers evaluate the long-term benefits, feasibility, and attractiveness of sustainability investments. By integrating insights from Institutional Theory, RBV, and TPB, this framework provides a comprehensive understanding of the interactions among external environmental forces, internal strategic capabilities, and cognitive evaluations that ultimately

influence SID. This approach is particularly valuable in the context of developing economies, where SMEs must navigate a challenging landscape characterized by limited resources, volatile market conditions, and inconsistent institutional support. The combined theoretical lens not only elucidates why certain SMEs succeed in adopting sustainability initiatives but also offers guidance to policymakers and practitioners in designing more effective support mechanisms that are both structurally sound and behaviorally informed.

Table 1 presents the conceptual definitions and key supporting literature for the primary variables examined in this study, thereby establishing a foundation for the development of the structural model and associated hypotheses.

Hypothesis development

Institutional factors and the perceived value of sustainable investment

Institutional Theory, as articulated by DiMaggio and Powell [194], asserts that organizations operate within comprehensive institutional environments characterized by coercive, normative, and mimetic pressures. For small and medium-sized enterprises (SMEs), the impact of these forces is particularly pronounced due to constraints in available resources and diminished autonomy in managing uncertainties [193, 142]. Consequently, institutional signals significantly shape SMEs' perceptions regarding the value of sustainable investments [196, 221]. The PVSI is thereby influenced by the interpretation and internalization of these external pressures by SME decision-makers.

Environmental Risk Exposure encompasses perceived threats such as resource depletion, extreme climatic conditions, and overall climate instability. Although ERE may incite action among firms, SMEs frequently regard it as a source of ambiguity and potential cost increase, which inhibits their propensity to invest in sustainable practices [231, 236]. In the context of financial constraints and competitive environments, the prioritization of ESG investments becomes less likely [158]. Thus, in the absence of sufficient reserves, SMEs often view high environmental risks as a barrier rather than a catalyst for proactive investment [154]. Alternatively, ERS exerts a coercive influence by integrating sustainability mandates within compliance frameworks. Clear and systematic

Table 1 Conceptual Overview of Study Variables

Variable	Definition	Key Authors
Sustainable Investment Decision (SID)	A firm's strategic commitment to allocate financial, technological, or organizational resources toward sustainability-aligned initiatives (e.g., green tech)	Owen et al. [153],Williams [230],Martínez-Peláez et al. [149],Purwandani & Michaud [216],Dhillon et al. [136]
Perceived Value of Sustainable Investment (PVSI)	The extent to which decision-makers assess sustainability efforts as feasible and attractive, considering financial returns, strategic fit, and reputational gains	Ajzen [120],Gutsche et al. [139],Adam & Shauki [180],Chan et al. [132]
Environmental Risk Exposure (ERE)	Firms' perceptions of ecological threats like climate change and resource scarcity which may increase uncertainty and deter sustainability investments	Wu et al. [231],Zhu et al. [236]
Environmental Regulatory Strength (ERS)	The perceived clarity and enforcement of environmental regulations which can reduce uncertainty and encourage proactive investments	Siedschlag & Yan [164],Yalabik & Fairchild [232]
Perceived Government Support (PGS)	Encompasses policy incentives (e.g., subsidies, tax relief, training) that reduce sustainability investment risk for SMEs	L. Zhao et al. (2023a, b),Pulka et al. [215],Prasannath et al. [156],Yaseen et al. [175]
Technological Capability (TC)	A firm's internal ability to adopt and implement sustainability innovations and comply with related standards	Haseeb et al. [141],Szutowski [223]
Access to Financial Resources (AFR)	The availability of funding for SMEs to cover the initial costs of green or sustainable investments	Alkaraan et al. [183],
Competitive Pressure (CP)	Market and customer-driven forces that push firms toward sustainability to maintain competitiveness	Stavropoulos et al. [165]
Business Network Strength (BNS)	The strength of relational capital with external actors (e.g., suppliers, partners), which enhances exposure to sustainable practices	Hilmersson & Hilmersson [199],Scuotto et al. [220]

regulations mitigate ambiguity, enhance strategic alignment, and elevate the perceived long-term advantages of sustainability initiatives [133, 232].

Perceived Government Support functions as a facilitative institutional condition. Incentives such as tax rebates, green grants, infrastructure development, and training programs alleviate financial and operational impediments to sustainable actions [118, 132]. This support is particularly crucial in developing nations with prevalent market inefficiencies. However, the effectiveness of PGS is contingent upon its credibility and accessibility, as ineffectively implemented delivery systems may undermine its relevance [210, 163]. Ultimately, these institutional factors collectively shape the PVSI by modifying the cost–benefit perceptions that underpin SME investment decisions, aligning with the Theory of Planned Behavior.

H1a

Environmental Risk Exposure negatively influences the Perceived Value of Sustainable Investment.

H1b

Environmental Regulatory Strength positively influences the Perceived Value of Sustainable Investment.

H1c

Perceived Government Support positively influences the Perceived Value of Sustainable Investment.

Organizational capabilities and the perceived value of sustainable investment

The Resource-Based View provides an insightful framework for understanding how internal, firm-specific capabilities influence strategic decisions related to sustainable investment. According to Barney [184], competitive advantage derives from resources that are valuable, rare, inimitable, and non-substitutable. Within the context of SMEs, essential capabilities such as technological proficiency, access to financial resources, and firm size markedly influence the evaluation of sustainability initiatives in terms of their value and feasibility [140, 221]. These capabilities establish the operational groundwork upon which firms assess the costs, risks, and potential returns associated with sustainable engagement.

Technological capability serves as a critical facilitator for green innovation and digital evolution. SMEs possessing robust technological infrastructures are better equipped to implement energy-efficient processes, cleaner production systems, and environmentally-oriented digital tools [129, 188, 222]. Such readiness fosters more agile reactions to institutional and market demands [159, 174] and aids in the integration of green supply chains [219, 225]. Moreover, the availability of financial resources significantly influences decisions regarding sustainable investments. SMEs often encounter financial obstacles that deter long-term investments in sustainability owing to high initial costs and uncertain returns [202, 147]. Conversely, firms with reliable access to credit and stronger financial stability are more likely to regard these investments as attainable and beneficial [183].

Firm size also contributes to the perceived value of sustainable investment, reflecting organizational maturity, managerial expertise, and resource depth. Larger SMEs typically possess formalized structures, dedicated innovation units, and strategic foresight that enable investment in environmental and social initiatives [145, 164]. These enterprises generally engage proactively in corporate social responsibility (CSR), pollution management, and sustainability reporting [195, 233]. Collectively, these capabilities not only facilitate action but also positively impact how SMEs perceive the significance and necessity of sustainable investments.

H2a

Technological Capability positively influences the Perceived Value of Sustainable Investment.

H2b

Access to Financial Resources positively influences the Perceived Value of Sustainable Investment.

H2c

Firm Size (measured by the Number of Employees) positively influences the Perceived Value of Sustainable Investment.

Institutional norms: competitive pressure and business network strength

In addition to formal regulatory frameworks, institutional norms, specifically competitive pressure and business network strength, constitute critical external determinants that impact SMEs' perceptions regarding the value of sustainable investment. Grounded in the normative and mimetic dimensions of Institutional Theory [194], these forces compel firms to adopt sustainability practices in response to peer behaviors, societal expectations, and industry trends.

Competitive pressure is characterized by a heightened intensity of market rivalry and the necessity for strategic differentiation. In competitive industries, firms are incentivized to embrace green practices to enhance operational efficiency, bolster reputation, and foster customer loyalty [224, 226]. Research indicates that such pressures significantly influence the adoption of sustainability-oriented innovations [226]. Moreover, Pagell et al. [211] note that environmental investments often yield superior returns in dynamic, innovation-driven sectors. Thus, sustainability emerges not merely as a compliance issue but as a strategic necessity. Agrawal et al. [181] and Rusch et al. [218] suggest that firms navigating high market dynamism are more inclined to implement circular economy models and sustainability investments to sustain their competitive advantages. For SMEs, particularly within emerging markets, the apprehension of lagging behind industry counterparts frequently amplifies the perceived value of sustainability investments.

Business network strength, defined as the depth and quality of a firm's relationships with suppliers, customers, peers, and industry associations, also plays a pivotal role in shaping perceptions [199, 166]. These networks function as platforms for exchanging knowledge, sharing risks, and benchmarking against peers. Tariq et al. [166] and Pulka et al. [215] assert that firms embedded within robust networks are more likely to imitate the sustainable practices of their peers. Furthermore, Bendell [185] and Tran [224] underscore how peer legitimacy and collaborative innovation inform investment decisions. Dupire and M'Zali [137] argue that CSR strategies are frequently driven by stakeholder influence within competitive networks, thereby reinforcing the mimetic isomorphism articulated in institutional theory. For SMEs, particularly in resource-limited environments, strong networks provide legitimacy, mitigate information asymmetry, and enhance strategic clarity concerning sustainability investments.

H3a

Competitive Pressure positively influences the Perceived Value of Sustainable Investment.

H3b

Business Network Strength positively influences the Perceived Value of Sustainable Investment.

Mediating role of perceived value of sustainable investment in driving sustainable investment decisions

The Perceived Value of Sustainable Investment serves as a cognitive framework through which SME owners evaluate the attractiveness, feasibility, and financial viability of sustainability initiatives. Anchored in the Theory of Planned Behavior [120], PVSI translates attitudes, social norms, and perceived control into behavioral intentions,substantial perceived value solidifies these intentions into concrete Sustainable Investment Decisions [124, 198].

Institutional Theory elucidates how coercive, normative, and facilitative influences shape PVSI, subsequently cascading to SID. High ERE can diminish PVSI if managers interpret extreme weather events or resource shortages primarily as costs and uncertainties [231, 236]. Conversely, strong Environmental Regulatory Strength (ERS) clarifies compliance complexities and suggests long-term benefits, thus enhancing PVSI [133, 232]. Perceptions of Government Support, such as grants, tax relief, or training programs reduce implementation hurdles and further elevate PVSI, provided such initiatives are credible and accessible [118, 210]. Therefore, institutional forces do not directly instigate investment,rather, they shift the perceived cost–benefit calculus underlying PVSI, which in turn propels SID.

The Resource-Based View [184] posits that capabilities gain relevance only when managers believe they can be profitably leveraged. Technological Capability (TC) facilitates the adoption of cleaner technologies, waste reduction, and adherence to environmental standards recognized by managers when evaluating PVSI [141]. In a similar vein, enhanced AFR alleviates initial costs and improves perceived affordability, thereby increasing PVSI and indirectly influencing SID [183, 217]. Thus, the possession of resources is a necessary but insufficient condition,such resources must enhance perceived value to translate into actionable outcomes.

Competitive Pressure and BNS embody normative and mimetic forces that shape managerial perceptions. High levels of CP compel firms toward green differentiation, expanding PVSI through potential reputational or efficiency gains [165, 224]. Strong BNS facilitates the dissemination of sustainability knowledge and legitimacy, similarly reinforcing PVSI [199]. Emperical research indicates that investment choices are influenced less by objective metrics and more by the saliency and credibility of sustainability benefits as perceived by managers [198].

Consequently, PVSI occupies a critical position at the intersection of Institutional Theory, RBV, and the Theory of Planned Behavior, translating external pressures (ERE, ERS, PGS), internal capabilities (TC, AFR), and market norms (CP, BNS) into SID. Unless managers regard sustainability initiatives as strategically advantageous and operationally viable, even the most compelling institutional mandates or abundant resource availability will not facilitate actual investment. This mediating mechanism

not only enhances theoretical comprehension but also offers a pragmatic framework: policymakers should focus on strengthening credible incentives and information dissemination, while SMEs ought to cultivate capabilities and networks that substantively enhance perceived value.

H4a Environmental Risk Exposure indirectly influences Sustainable Investment Decisions through its negative effect on the Perceived Value of Sustainable Investment.

H4b Environmental Regulatory Strength indirectly influences SID through its positive effect on PVSI.

H4c Perceived Government Support indirectly influences SID through its positive effect on PVSI.

H5a Technological Capability indirectly influences SID through its positive effect on PVSI.

H5b Access *to Financial Resources indirectly influences SID through its positive effect on PVSI.*

H6a Competitive Pressure indirectly influences SID through its positive effect on PVSI.

H6b Business Network Strength indirectly influences SID through its positive effect on PVSI.

The behavioral pathway: perceived value of sustainable investment and investment decision

The Perceived Value of Sustainable Investment acts as a vital mediator that connects external pressures and internal capabilities to actual Sustainable Investment Decisions among SMEs. Guided by the Theory of Planned Behavior [120], PVSI encapsulates the evaluative judgments made by SME managers concerning the feasibility, advantages, and risks, both financial and non-financial sustainability initiatives. Despite the presence of strong external stimuli or internal capabilities, the ultimate decision to invest is contingent upon the positive perception of these initiatives [124, 131, 198].

Institutional Theory elucidates how external factors, including Environmental Risk Exposure, Environmental Regulatory Strength, and Perceived Government Support, exert coercive and normative influences. However, these factors do not directly engender Sustainable Investment Decisions; their effects are intermediated through PVSI. For example, ERE may discourage investments due to perceived uncertainties and cost burdens, while supportive ERS and PGS can enhance PVSI by mitigating risks and clarifying benefits [191, 210, 231]. Likewise, the Resource-Based View indicates that internal enablers such as TC and AFR impact SID only if they serve to elevate PVSI [183, 130]. Market dynamics, including CP and Business Network Strength (BNS), also function to augment PVSI, reinforcing its role as a pivotal determinant of SID.

H7 The Perceived Value of Sustainable Investment positively influences Sustainable Investment Decisions.

Figure 1 presents the conceptual framework of the study, which synthesizes elements of Institutional Theory, the Resource-Based View, and the Theory of Planned Behavior. The framework delineates several critical predictors that are classified into three categories: Institutional-Environmental Drivers, Internal Capabilities, and Market Dynamics. These predictors collectively exert an influence on the PVSI. Furthermore, the PVSI is posited to mediate the relationship between these factors and SID, thereby highlighting the integrative role of external pressures, internal resources, and managerial perceptions in determining the sustainability investment strategies of SMEs.

Methodology

Research design, sampling, and data collection

This study employed a quantitative cross-sectional design to investigate the determinants of SID among SMEs in Uganda. The research focused on SMEs in Kampala and Wakiso districts due to their high density of registered enterprises and active commercial environments (Uganda Bureau of Statistics [UBOS], 2023). SMEs were defined in line with Uganda's official classification: small enterprises (5–49 employees) and medium enterprises (50–99 employees), while microenterprises were excluded due to their informal nature and limited strategic engagement in sustainability investments (Ministry of Trade, Industry and Cooperatives [MTIC], 2022). The target population consisted of formally registered SMEs across the manufacturing, service, and trade sectors. A minimum sample size of 387 SMEs was determined using Krejcie and Morgan's [204] sample size table for populations exceeding 100,000. Listings of potential respondents were obtained from official website databases of Uganda Investment Authority (UIA), Uganda Manufacturers Association (UMA), and Uganda Revenue Authority (URA). Given practical challenges in contacting firms and anticipated non-responses, a non-probability convenience sampling method was applied, which is commonly used in SME-focused research in low-resource settings.

Data were collected using a multi-modal strategy including Google Forms, email, WhatsApp, drop-and-pick survey delivery, and structured face-to-face

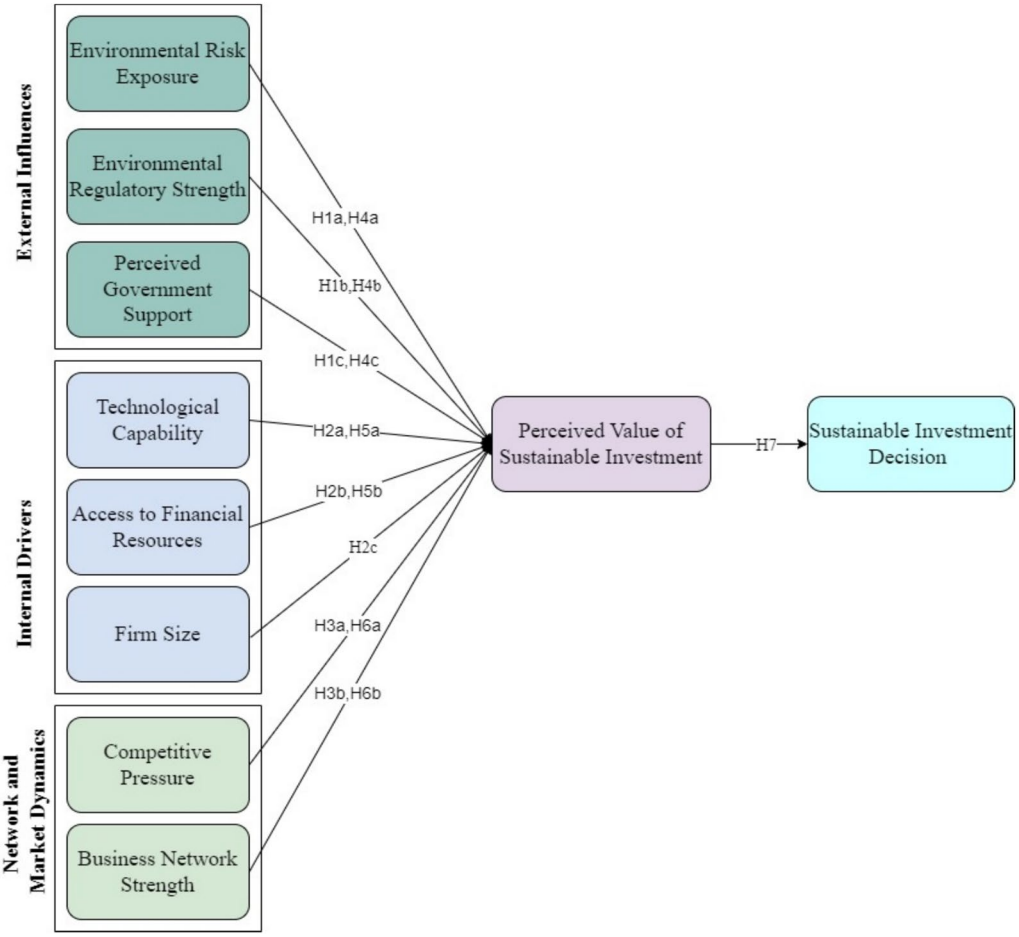


Fig. 1 Structural equation model showing direct and indirect effects of external, internal, and market dynamics on sustainable investment decisions among SMEs. Arrows represent hypothesized paths (H1a–H7). PVSI mediates multiple relationships, consistent with RBV, TPB, and Institutional Theory

interviews. This approach helped to improve response rates and inclusion across diverse business types [192]. A total of 372 valid responses were obtained from 528 firms, yielding a response rate of 70.5%, which exceeds minimum thresholds for structural equation modeling [197, 203]. Of these, 270 (72.6%) were collected via face-to-face interviews, 67 (18.0%) via drop-and-pick, and 35 (9.4%) through online platforms. Respondents were primarily strategic decision-makers, with 57.8% (n = 215) being business owners and 42.2% ($n = 57$) being senior managers or supervisors, an appropriate profile for studies on investment decisions. All participants were informed about the purpose and voluntary nature of the study. Online respondents provided consent via a checkbox, while trained research assistants obtained and recorded verbal consent for face-to-face interviews. No personally identifying information was collected, and all responses were anonymized to ensure privacy and confidentiality [162].

Measurement constructs and validation

A structured questionnaire was developed based on validated scales drawn from sustainability, institutional theory, and SME investment literature. The instrument measured nine constructs: ERE, ERS, PGS, TC, AFR, CP, BNS, PVSI, and SID. All items used a five-point Likert scale ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"), as recommended in behavioral intention studies [120, 155]. ERE items were adapted from Nuryakin et al. [152, 231],ERS from Wang et al. (2022a, b, Oteng-Abayie et al. [210], and B. B. Tyler et al. [168],and PGS was adapted from Makhloufi et al. [206], H. Zhu et al. [235] and Pulka et al. [215]. TC was measured using items from Hughes et al. [143], Prakasa & Fauzan [213], Aljanabi [122], while AFR items were adapted from Wahab Aidoo [228], Bin et al. [186] and Alice Arinaitwe et al. [182]. CP and BNS measures were based on Dupire & M'Zali [137], Pagell et al. [211], Bendell [185], Pulka et al. [215], Karami & Tang [144] and Tran [224]. PVSI was operationalized

using constructs adapted from Adam & Shauki [180] and Gutsche et al. [139], in alignment with the Theory of Planned Behavior [120]. SID items were derived from Alkaraan et al. [183], Rutkauskas et al. [161], Chandra et al. [190], and Li et al. [147].

To enhance content validity, the instrument underwent expert review by two scholars with expertise in SME sustainability and behavioral research. A pilot study involving 40 SMEs was conducted to assess item clarity and reliability. Items with Cronbach's Alpha scores below 0.70 were reviewed and reworded or dropped to improve scale reliability [209]. Data analysis was performed using SPSS v27 and AMOS v24. Internal consistency was assessed via Cronbach's Alpha and Composite Reliability (CR), with a threshold of 0.70 as acceptable [197]. Convergent validity was evaluated using Average Variance Extracted (AVE), and discriminant validity was tested using the Fornell–Larcker criterion [138]. Common Method Bias (CMB) was examined using Harman's single-factor test and split-sample reliability checks, consistent with procedures in Podsakoff et al. [155]. Model fit for the structural equation model was assessed using CMIN/DF, RMSEA, CFI, and TLI, adhering to guidelines from Hair et al. [197] and Kline [203]. Mediation analysis was conducted using bias-corrected bootstrapping with 5,000 resamples, following recommendations from Preacher & Hayes [214].

Ethics and consent statement

This study received ethical approval from the Mildmay Uganda Research Ethics Committee (MUREC), reference REC REF 0403–2025. A waiver for written consent was granted due to the study's minimal risk and use of digital tools. Online participants gave digital consent via a checkbox in the Google Form, while trained interviewers obtained and recorded verbal consent for face-to-face respondents. All participants were informed about the study's purpose, voluntary nature, and confidentiality. No personally identifiable information was collected, and all responses were anonymized to uphold strict privacy and data protection standards.

Sample profile

To contextualize the data and assess representativeness, the demographic and organizational characteristics of the 372 SME respondents are presented in Table 2. Most respondents were aged 35–44 years (48.9%), followed by 45–54 years (26.1%) and 55 years and above (23.1%), indicating an experienced sample. Gender distribution was fairly balanced, with 54.8% male and 45.2% female respondents. Tertiary education was the most common qualification (70.2%), suggesting a sample with high decision-making competence. Most respondents were business owners (57.8%), with the rest being supervisors or managers. Sector-wise, service (41.4%), trading (40.1%), and manufacturing (18.6%) were all represented. Finally, small enterprises (79.8%) formed the bulk of the sample, while 20.2% were medium-sized enterprises.

Results

Assessment of the measurement model

The evaluation of the measurement model's reliability and validity was conducted through a series of four systematic steps: (1) assessment of reliability and convergent

Table 2 Demographic and Organizational Characteristics of Respondents (N = 372)

Variable	Category	Frequency (n)	Percentage (%)
Age of Respondent	25–34 years	7	1.9
	35–44 years	182	48.9
	45–54 years	97	26.1
	55 and above	86	23.1
Gender of Respondent	Female	168	45.2
	Male	204	54.8
Education Level	No formal education	1	0.3
	Vocational/Technical	110	29.6
	Tertiary	261	70.2
Position in the Firm	Business Owner	215	57.8
	Supervisor or Manager	157	42.2
Industry Type	Manufacturing	69	18.6
	Service	154	41.4
	Trading	149	40.1
Number of Employees	Small (5–49 employees)	297	79.8
	Medium (50–99 employees)	75	20.2

validity, (2) examination of discriminant validity, (3) investigation of common-method bias and factor structure, and (4) collinearity diagnostics.

Reliability and convergent validity

To establish the measurement model's robustness, the reliability and convergent validity of the constructs were evaluated, as summarized in Table 3. The majority of the standardized factor loadings were found to exceed the threshold of 0.60, indicating satisfactory indicator reliability. One item (ERE1) recorded a factor loading of 0.593, which, while slightly below the general standard, remains within an acceptable range. The Average Variance Extracted (AVE) values for the constructs varied from 0.500 to 0.755, thereby surpassing the recommended minimum threshold of 0.50 and supporting claims of convergent validity, as posited by Fornell and Larcker [138]. Furthermore, Composite Reliability (CR) values were consistently above 0.757 across the constructs surveyed, signifying a high level of internal consistency. Additionally, Cronbach's Alpha coefficients were observed to range from 0.751 to 0.926, reinforcing the

Table 3 Scale Properties, Including Factor Loadings, Average Variance Extracted, Composite Reliability, and Cronbach's Alpha

Factor	Item	Std. Loading	AVE	CR	Cronbach's α
Environmental Risk Exposure (ERE)	ERE1	0.593	0.500	0.798	0.795
	ERE2	0.756			
	ERE3	0.793			
	ERE4	0.669			
Environmental Regulatory Strength (ERS)	ERS1	0.868	0.681	0.894	0.905
	ERS2	0.834			
	ERS3	0.911			
	ERS4	0.665			
Technological Capability (TC)	TC1	0.680	0.547	0.857	0.856
	TC2	0.695			
	TC3	0.795			
	TC4	0.719			
	TC5	0.801			
Perceived Government Support (PGS)	PGS1	0.689	0.539	0.778	0.776
	PGS2	0.751			
	PGS3	0.760			
Access to Financial Resources (AFR)	AFR1	0.739	0.671	0.859	0.856
	AFR2	0.877			
	AFR3	0.836			
Competitive Pressure (CP)	CP1	0.632	0.513	0.757	0.751
	CP2	0.824			
	CP3	0.678			
Business Network Strength (BNS)	BNS1	0.914	0.755	0.925	0.926
	BNS2	0.779			
	BNS3	0.840			
	BNS4	0.934			
Perceived Value of Sustainable Investment (PVSI)	PVSI1	0.605	0.502	0.833	0.855
	PVSI2	0.667			
	PVSI3	0.793			
	PVSI4	0.667			
	PVSI5	0.791			
Sustainable Investment Decision (SID)	SID1	0.792	0.578	0.873	0.874
	SID2	0.786			
	SID3	0.754			
	SID4	0.729			
	SID5	0.739			

strong reliability of the measurement scales employed, as recommended by Nunnally and Bernstein [209].

Evaluation of discriminant validity utilizing the Fornell-Larcker criterion

To evaluate discriminant validity, the Fornell-Larcker criterion was employed [138], as presented in Table 4. The analysis revealed that the square roots of the Average Variance Extracted (AVE) values, represented as the diagonal elements, exceeded the inter-construct correlations indicated by the off-diagonal elements. This finding signifies an acceptable level of discriminant validity, thereby affirming that each construct maintains a distinct identity relative to the others.

Evaluation of common method bias, factor structure, and collinearity

To ensure the validity of the findings and reduce measurement bias, a Principal Component Analysis (PCA) was conducted to evaluate potential Common Method Bias (CMB), as the study relied on self-reported survey data (refer to Table 5). The analysis revealed that the first factor extracted accounted for only 25.48% of the total variance, which is below the 50% threshold commonly cited in the literature, suggesting that CMB is not a significant issue in this context [155]. Additionally, the PCA identified nine components with eigenvalues exceeding 1.0, collectively explaining 70.32% of the variance. This outcome is indicative of the multidimensional nature of the constructs and supports the construct validity of the measures across various domains, including Environmental Risk Exposure, Technological Capability, and Sustainable Investment Decisions [197].

Furthermore, collinearity diagnostics were employed to verify the robustness of the model (see Table 6). The results demonstrated that all predictors exhibited satisfactory Tolerance and Variance Inflation Factor (VIF) values, thereby alleviating concerns related to multicollinearity and reinforcing the integrity of the structural model [197, 203].

Correlation analysis

Table 7 delineates the results of the Pearson correlation analysis conducted among the various constructs within

Table 4 Fornell-Larcker Criterion for the Evaluation of Discriminant Validity Among Constructs

	ERE	ERS	TC	PGS	CP	PVSI	SID	BNS	AFR
ERE	**0.707**								
ERS	0.187	**0.825**							
TC	0.176	0.277	**0.740**						
PGS	0.342	0.278	0.394	**0.734**					
CP	0.240	0.268	0.378	0.358	**0.716**				
PVSI	0.074	0.250	0.429	0.302	0.378	**0.708**			
SID	0.010	0.138	0.226	0.181	0.212	0.256	**0.760**		
BNS	0.226	0.294	0.375	0.359	0.311	0.295	0.120	**0.869**	
AFR	0.269	0.343	0.346	0.398	0.391	0.435	0.168	0.324	**0.819**

Bold values represent the square roots of the Average Variance Extracted (AVE). Discriminant validity is affirmed when thesevalues exceed the corresponding inter-construct correlations

Table 5 Total Variance Explained from Principal Component Analysis (Assessment of Common Method Bias and Factor Structure)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.426	25.476	25.476	9.426	25.476	25.476
2	3.321	8.975	34.451	3.321	8.975	34.451
3	2.734	7.389	41.840	2.734	7.389	41.840
4	2.433	6.577	48.416	2.433	6.577	48.416
5	2.232	6.032	54.448	2.232	6.032	54.448
6	1.881	5.083	59.531	1.881	5.083	59.531
7	1.407	3.803	63.334	1.407	3.803	63.334
8	1.324	3.578	66.912	1.324	3.578	66.912
9	1.263	3.412	70.324	1.263	3.412	70.324

Table 6 Collinearity Diagnostics—Tolerance and Variance Inflation Factor (VIF)

Predictor Variable	Tolerance	VIF
Environmental Risk Exposure	0.833	1.201
Environmental Regulatory Strength	0.817	1.225
Technological Capability	0.680	1.470
Perceived Government Support	0.683	1.464
Competitive Pressure	0.718	1.392
Perceived Value of Sustainable Investment	0.684	1.461
Business Network Strength	0.755	1.325
Access to Financial Resources	0.658	1.520

the study. Most of the examined variables exhibited statistically significant positive correlations at the 0.01 level. Specifically, a robust correlation was observed between TC and PVSI (r = 0.429), as well as with PGS (r = 0.394). Furthermore, AFR demonstrated the most pronounced correlations, with PVSI (r = 0.435) and PGS (r = 0.398). These results underscore the assertion that technological, financial, and institutional factors are pivotal in influencing sustainable investment decisions. Collectively, the observed correlation patterns lend support to the proposed conceptual model, emphasizing the synergistic effects of capability, regulatory frameworks, and network dynamics in the context of sustainable investment decision-making.

Structural model

Model fit and explained variance

Table 8 presents the model fit indices, indicating an overall strong and acceptable model fit. The Chi-square/df ratio is 2.231, well within the recommended threshold of ≤ 3 (Kline, 2015). Notably, the RMSEA value of 0.058 reflects an excellent fit (< 0.08), confirming the model's robustness [189]. Although the CFI (0.891), TLI (0.883), and NFI (0.820) are marginally below the conventional 0.90 cutoff [200], they remain within an acceptable range, especially considering the model's complexity and the number of parameters involved. The R-squared value for PVSI is 31.6%, suggesting that the model explains a substantial proportion of the variance in PVSI. The structural relationships among the study constructs, including both direct and indirect pathways influencing SID among SMEs, are illustrated in Fig. 2.

Figure 2 presents the final structural equation model tested in this study. The model illustrates the direct and indirect relationships between external influences (e.g., Environmental Risk Exposure, Regulatory Strength), internal drivers, e.g., Technological Capability, Access to Financial Resources, and market dynamics, e.g., Competitive Pressure, Business Network Strength) on PVSI, which in turn predicts SID. Each path is labeled with the corresponding hypothesis (H1a–H7). Significant paths, e.g., from TC, AFR, and CP to PVSI, and PVSI to SID, are supported by standardized estimates discussed in Table 9. The model accounts for 31.6% of the variance in PVSI, confirming its mediating role in SME investment behavior.

Figure 2 illustrates the final structural equation model that was evaluated in this study. The model delineates the direct and indirect relationships among various

Table 8 SEM Model Fit Indices and R-Squared Value

Fit Index	Observed Value	Threshold
R-Squared (PVSI)	31.6%	N/A
Chi-Square/df (χ^2/df)	2.231	≤ 3
RMSEA	0.058	< 0.08
CFI	0.891	≥ 0.90
TLI (NNFI)	0.883	≥ 0.90
NFI	0.820	≥ 0.90

Table 7 Inter-Construct Correlation Matrix

Constructs	ERE	ERS	TC	PGS	CP	PVSI	SID	BNS	AFR
ERE	1								
ERS	.187**	1							
TC	.176**	.277**	1						
PGS	.342**	.278**	.394**	1					
CP	.240**	.268**	.378**	.358**	1				
PVSI	.074	.250**	.429**	.302**	.378**	1			
SID	.010	.138**	.226**	.181**	.212**	.256**	1		
BNS	.226**	.294**	.375**	.359**	.311**	.295**	.120*	1	
AFR	.269**	.343**	.346**	.398**	.391**	.435**	.168**	.324**	1

** = *Correlation is significant at the 0.01 level (2-tailed)*

* = *Correlation is significant at the 0.05 level (2-tailed)*

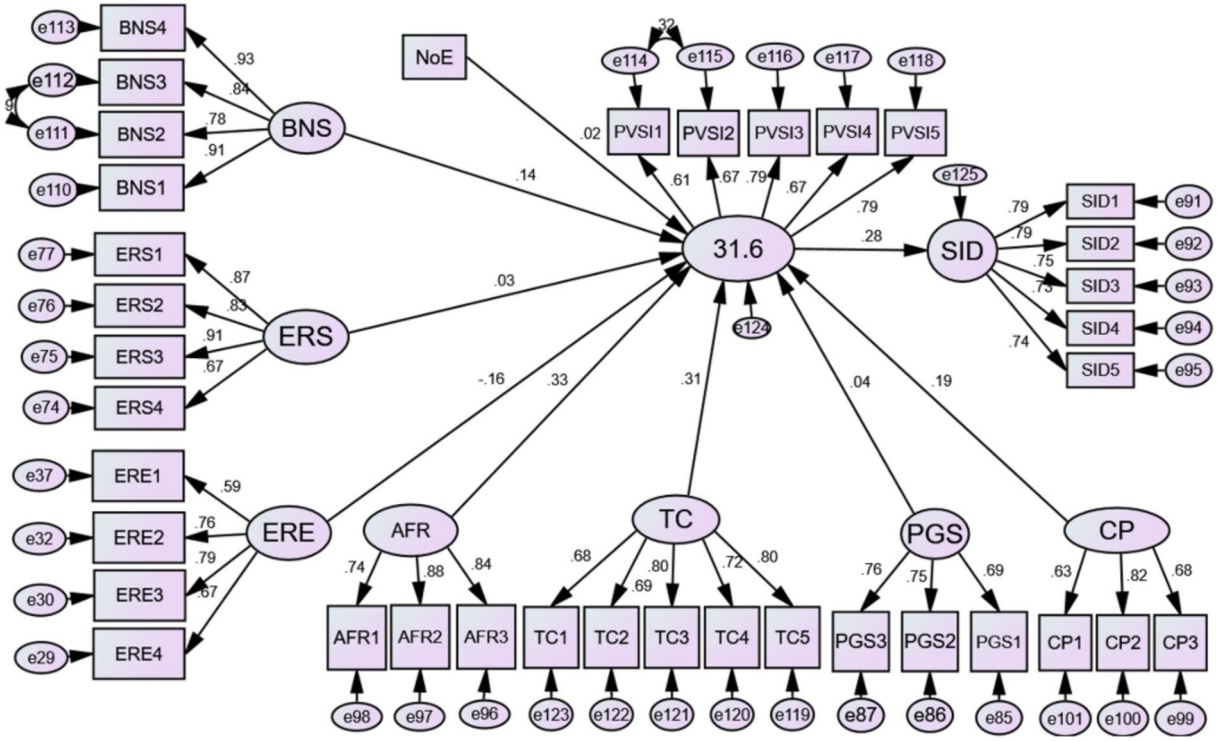


Fig. 2 Structural equation model showing direct and indirect effects of external, internal, and market dynamics on sustainable investment decisions among SMEs. Arrows represent hypothesized paths (H1a–H7). PVSI mediates multiple relationships, consistent with RBV, TPB, and Institutional Theory

external influences (such as Environmental Risk Exposure and Regulatory Strength), internal drivers (including Technological Capability and Access to Financial Resources), and market dynamics (notably Competitive Pressure and Business Network Strength) regarding their impact on PVSI, which subsequently predicts SID. Each path within the model is labeled with its corresponding hypothesis (H1a–H7). Significant pathways, particularly those from Technological Capability, Access to Financial Resources, and Competitive Pressure to PVSI, as well as the pathway from PVSI to SID, are supported by the standardized estimates presented in Table 9. The model's ability to account for 31.6% of the variance in PVSI further confirms its mediating role in the investment behavior of SMEs.

Table 9 Direct Effects of Internal and External Drivers on Perceived Value of Sustainable Investment and Sustainable Investment Decisions

Hypothesis	Path	β (Standardized)	SE	P-value	Supported?
H1a	ERE → PVSI	−0.160	0.071	0.024	Yes
H1b	ERS → PVSI	0.029	0.058	0.620	No
H1c	PGS → PVSI	0.036	0.100	0.720	No
H2a	TC → PVSI	0.310	0.079	< .001	Yes
H2b	AFR → PVSI	0.330	0.069	< .001	Yes
H2c	Firm Size → PVSI	0.025	0.058	0.670	No
H3a	CP → PVSI	0.193	0.078	0.014	Yes
H3b	BNS → PVSI	0.136	0.065	0.036	Yes
H7	PVSI → SID	0.284	0.082	0.001	Yes

Direct effects on perceived value of sustainable investment (PVSI) and sustainable investment decision (SID)

The study investigated the systematic structural model to confirm the hypotheses developed using RBV, TPB, and Institutional Theory. As shown in Table 9, the direct effects reveal several statistically significant relationships. Specifically, ERE had a significant negative effect on PVSI (H1a: β = −0.160, SE = 0.071, $p = 0.024$), indicating that heightened environmental risk reduces the perceived value of sustainable investment, thus supporting H1a. However, ERS (H1b: β = 0.029, SE = 0.058, p = 0.620) and PGS (H1c: β = 0.036, SE = 0.100, $p = 0.720$) were not statistically significant, hence H1b and H1c were not supported. Drawing from RBV, TC (H2a: β = 0.310, SE = 0.079, $p < 0.001$) and AFR (H2b: β = 0.330, SE = 0.069, $p < 0.001$) showed strong positive effects on PVSI, supporting H2a and H2b, while Firm Size (H2c: β = 0.025, SE = 0.058, $p = 0.670$) was not significant, indicating no support for H2c. Furthermore, CP (H3a: β = 0.193, SE = 0.078, $p = 0.014$) and BNS (H3b: β = 0.136, SE = 0.065, $p = 0.036$) demonstrated significant positive relationships with PVSI, thus supporting H3a and H3b. Finally, PVSI had a statistically significant effect on SID (H7: β = 0.284, SE = 0.082, $p = 0.001$), reinforcing its mediating role in translating internal capabilities, external pressures, and institutional factors into sustainable investment decisions.

Mediation analysis

The structural equation model revealed several indirect effects via PVSI. As shown in Table 10, H4a was not supported, indicating that Environmental Risk Exposure had a non-significant negative indirect effect on SID via PVSI (β = −0.046, SE = 0.026, $p = 0.076$), while H4b (ERS: β = 0.008, SE = 0.017, $p = 0.640$) and H4c (PGS: β = 0.010, SE = 0.030, $p = 0.740$) were also not supported. In contrast, both H5a and H5b were supported, with Technological Capability (β = 0.088, SE = 0.038, $p = 0.020$) and Access to Financial Resources (β = 0.094, SE = 0.035, $p = 0.007$) demonstrating significant positive indirect effects on SID via PVSI. Similarly, H6a was supported, as Competitive Pressure had a significant positive indirect effect (β = 0.055, SE = 0.029, $p = 0.047$), whereas H6b was not supported since Business Network Strength (β = 0.039, SE = 0.024, $p = 0.103$) did not yield a significant effect. These findings reinforce the central mediating role of PVSI and validate the relevance of the RBV and contingency theory in explaining sustainable investment behavior.

Discussion and conclusions

This study investigates how institutional factors, organizational capabilities, and cognitive evaluations converge to shape sustainable investment decision-making among SMEs in a developing economy, using Uganda as a case study. Drawing on Institutional Theory, the Resource-Based View, and the Theory of Planned Behavior, we reveal how external pressures, internal resources, and individual perceptions jointly influence sustainability-oriented investments in contexts where resource constraints and weak institutional frameworks prevail. In such environments, formal policies may be poorly enforced, while SMEs often struggle with limited technology and financing. These conditions underscore the importance of comprehensively examining both external constraints and firm-level capabilities, particularly since resource scarcity can amplify the challenges of pursuing sustainable growth.

A key finding is that ERE exerts a significant negative influence on PVSI, supporting H1a and aligning with research indicating that heightened volatility discourages sustainable investment (Wu, Yao & Wu, 2020; [236]). In uncertain environments, SMEs are more cautious, fearing that returns on green initiatives may not materialize quickly or reliably. Scarce financial buffers intensify risk aversion, causing decision-makers to deprioritize environmental, social, and governance (ESG) priorities despite acknowledging their potential benefits. Pursiainen et al. [158] further note that high uncertainty, coupled with a lack of risk-mitigation mechanisms and

Table 10 Indirect Effects via PVSI

Hypothesis	Indirect Path	β (Standardized)	SE	*P*-value	Supported?
H4a	ERE → PVSI → SID	−0.046	0.026	0.076	No
H4b	ERS → PVSI → SID	0.008	0.017	0.640	No
H4c	PGS → PVSI → SID	0.010	0.030	0.740	No
H5a	TC → PVSI → SID	0.088	0.038	0.020	Yes
H5b	AFR → PVSI → SID	0.094	0.035	0.007	Yes
H6a	CP → PVSI → SID	0.055	0.029	0.047	Yes
H6b	BNS → PVSI → SID	0.039	0.024	0.103	No

financial safety nets, amplifies such deterrence, reducing the likelihood of sustainability-focused investments. However, alternative perspectives highlight that uncertainty can, under balanced external pressures, act as a spur to innovation: Yalabik & Fairchild [232] show that when regulatory and customer pressures are maintained at moderate levels, firms may respond to environmental uncertainty by investing in cleaner technologies to gain competitive advantage, suggesting that the ERE–PVSI relationship is contingent on broader incentive structures.

Contrasting with the pronounced impact of ERE, ERS, and PGS do not significantly affect PVSI, leading to the rejection of H1b and H1c. While Institutional Theory underscores the importance of coercive pressures for shaping firm behavior [194], weak enforcement and bureaucratic inefficiencies in Uganda appear to undermine regulatory credibility. Firms often perceive regulations as inconsistent or irrelevant to pressing operational challenges, dampening their effectiveness in shifting investment behavior [164]. Mielke [208] observes that policy measures must be seen as credible and readily accessible to drive meaningful change, a condition not met when resources for regulatory oversight are stretched thin or dispersed. Yet, evidence from other contexts suggests that implementation quality can reverse this dynamic: Zhao et al. [234, 177] find that well-designed subsidies and tax rebates in China significantly improve green-investment efficiency, while Delmas & Toffel [135] argue that rigorous enforcement can transform environmental mandates into strategic opportunities, underscoring that developing countries' challenge lies more in policy execution than in the principles of regulation itself.

Our findings highlight the paramount role of internal organizational capabilities. TC and AFR both positively influence PVSI, confirming H2a and H2b and aligning with RBV's emphasis on the strategic value of unique resources [184, 172]. Greater technological readiness helps SMEs reframe sustainability as an opportunity for efficiency, innovation, and market differentiation, as demonstrated by Bhatia & Kumar [128]. Robust financing options similarly enable firms to absorb the initial costs of green initiatives, turning perceived sustainability value into concrete action [183, 157]. However, some studies caution that resources alone do not guarantee sustainability uptake: Rutkauskas et al. [161], stress the importance of multi-criteria decision frameworks that integrate reliability with financial metrics, reminding us that capability advantages must be complemented by robust decision processes to realize ESG outcomes.

Contrary to literature suggesting firm size facilitates resource leverage [211], we find that Size (as number of employees) does not significantly affect PVSI (H2c). In Uganda, persistent challenges, including inadequate infrastructure, limited expertise, and high cost of capital, can overshadow any advantages of being medium-sized. Notably, Siedschlag & Yan [164] observe that in Ireland, larger firms, especially importers, are more likely to invest in pollution control and cleaner technologies, indicating that size effects emerge where external support systems such as supply-chain pressure and global customer scrutiny are stronger. This discrepancy suggests that firm-size advantages are conditional on the broader ecosystem in which SMEs operate.

Institutional norms remain impactful. CP and BNS significantly shape PVSI (H3a, H3b), aligning with Institutional Theory's notion that normative and mimetic forces guide firm behavior. Competition spurs sustainability adoption as firms seek differentiation in dynamic markets, while robust networks foster legitimacy, collaboration, and the exchange of best practices [185, 199]. Still, the direction of competitive influence is not universal: Pursiainen et al. [158] find that in more fluid markets, intense rivalry is associated with lower ESG scores, suggesting that peer and mimetic pressures can undermine sustainability investments.. Likewise, Bendell [185] warns that peer pressure may suppress innovation when environmental action risks reputational backlash.

Comparatively, internal capabilities appear more decisive than formal institutions in driving sustainable investment decisions. TC and AFR stand out as dominant predictors of PVSI, emphasizing RBV's relevance in settings where policy support may be perceived as weak or inconsistent. Though CP and BNS also enhance PVSI, ERS and PGS remain less influential in shaping final decisions. Our results reinforce TPB's assertion that decision-making hinges on subjective evaluations and perceived control: PVSI strongly predicts SID (H7), especially in SMEs with centralized leadership structures. Mediation analyses reveal that ERE's negative impact on SID is not fully mediated by PVSI, indicating that heightened risk can occasionally trump cognitive appraisals, whereas BNS fails to significantly mediate the link between PVSI and SID. However, TC, AFR, and CP exhibit meaningful indirect paths, suggesting that strategic resources, financing flexibility, and competitive dynamics can collectively translate supportive perceptions into concrete investments [198]. Moreover, Masini & Menichetti [207] indicate that even well-resourced investors may hesitate if policy frameworks appear unstable, highlighting the synergistic substitutive nature of resource and institutional enablers.

Further, the behavioral dimension warrants closer attention. While our model captures PVSI as the key cognitive mediator, studies rooted in TPB, such as Adam

& Shauki [180] and Chan et al. [132], demonstrate that moral norms, subjective norms, and substantially shape sustainable investment intentions. Future research should explicitly incorporate these behavioral constructs to capture the full spectrum of decision drivers.

Overall, this integrative model enriches the understanding of SME sustainable investment in resource-constrained contexts. By blending Institutional Theory, RBV, and TPB, our study shows that while external regulations and government mandates have limited sway when enforcement is weak, robust internal resources and strategic evaluations substantially drive SID. International evidence underscores that credible policy incentives [234, 177], balanced competitive environments [211], and supportive cultural norms [230] can tip the scales in favor of sustainability even for capability-poor firms**.** In Uganda, strengthening technological and financial capacity, alongside leveraging competitive pressure and cohesive business networks, appears more effective than relying solely on inconsistent policy directives. Policymakers should craft targeted, credible measures that address the real needs of SMEs and facilitate easier access to financing and technological tools. This underscores the need for coordinated efforts among public agencies, private lenders, and local communities to align incentives, reduce bureaucratic hurdles, and build capacity for environmental stewardship. Concurrently, managers can prioritize building stronger networks, investing in relevant technologies, and fostering a clear internal narrative around sustainability's potential benefits. Ultimately, empowering firms through supportive ecosystems and policy interventions can foster inclusive, sustainable growth, even where institutional environments remain uncertain and risk levels are high.

Implications

Practical implications

For SME managers, converting sustainability ambitions into everyday operations starts with a focused pilot. Select one affordable, high-impact technology, such as a 2-kilowatt solar water heater in a small food processor, a moisture meter for agro-dryers, or a basic e-commerce site with mobile payments for a retailer, and trial it for one month. Track two clear KPIs (e.g., kilowatt-hours saved or number of online sales) and, upon seeing a 10–20 percent improvement, roll it out in phases across your business. Simultaneously, maintain accurate financial records and prepare a concise, one-page "sustainability pitch" that quantifies cost savings or revenue gains. Use this when applying for green finance; many lenders now offer preferential rates or longer terms for projects with measurable efficiency improvements. Finally, join your local chamber's green working group or an industry sustainability forum, pool small orders for bulk discounts (for example, LED lighting), and learn from peers' vendor experiences.

Theoretical implications

This study refines Institutional Theory, RBV, and TPB by demonstrating that resources and regulations drive investment decisions only when filtered through managerial perceptions of value. Our findings show that perceived feasibility and benefit captured in the Perceived Value of Sustainable Investment mediate the effects of technology, finance, competition, and regulation on actual investment behavior. Future research should apply our model across different developing-country contexts (e.g., Kenya, Tanzania) using longitudinal, mixed-methods designs. By combining follow-up surveys with in-depth interviews six months after policy or technology pilots, scholars can unpack how risk perceptions and value appraisals evolve and identify which resource–institution combinations most reliably trigger sustainable investment decisions.

Policy implications

Policymakers can dramatically lower barriers to SME sustainability by streamlining green finance and rolling out targeted incentives. First, create a unified online portal co-owned by the government, banks, and development partners, where SMEs submit a single application form plus their one-page sustainability pitch. Automate fast-track approvals for loans under a modest threshold (e.g., USD 10,000) without extra collateral, and back the portal with a small guarantee fund covering a fixed share of defaults to de-risk lending. Second, implement sector-specific sustainability vouchers: for example, USD 500 for textile workshops' lighting assessments and USD 300 for agroprocessors' water-efficiency audits. Validate service providers through trade associations, and publicize the vouchers via local business councils, SMS alerts, and digital platforms. By focusing on these two high-leverage reforms, the designated green finance and targeted audits, governments can address credit access and upfront cost hurdles without overburdening administrative resources.

Strengths, limitations, and future research directions

A major strength of this study lies in its integrative model that combines Institutional Theory, the Resource-Based View, and the Theory of Planned Behavior to explain sustainable investment decision-making in SMEs. By incorporating institutional-environmental drivers, internal capabilities, and market dynamics, the model provides a holistic understanding

of how external and internal forces interact through the mediating role of Perceived Value of Sustainable Investment. This structure not only highlights key drivers like technological capability and financial access but also reveals context-specific inconsistencies, such as the limited impact of perceived government support prompting reflection on the real-world effectiveness of regulatory mechanisms in developing economies.

However, several limitations should be acknowledged. The cross-sectional design restricts causal interpretation and fails to capture temporal changes in SID behavior. Additionally, reliance on self-reported data may introduce bias, while convenience sampling could limit the generalizability of findings. Some unexpected outcomes such as the weak influence of formal institutional support may stem from contextual or measurement issues rather than theoretical shortcomings.

Future studies should adopt longitudinal or experimental designs to better assess causality and temporal dynamics. Employing more representative sampling and incorporating objective performance indicators could reduce bias and improve validity. Researchers are also encouraged to examine additional predictors, such as entrepreneurial orientation, digital readiness, and leadership style, and conduct cross-sectoral comparisons to enhance contextual relevance and practical applicability for SMEs and policymakers alike.

Abbreviations

SID	Sustainable Investment Decision
PVSI	Perceived Value of Sustainable Investment
ERE	Environmental Risk Exposure
ERS	Environmental Regulatory Strength
PGS	Perceived Government Support
TC	Technological Capability
AFR	Access to Financial Resources
CP	Competitive Pressure
BNS	Business Network Strength
SMEs	Small and Medium-sized Enterprises
RBV	Resource-Based View
TPB	Theory of Planned Behavior
SEM	Structural Equation Modeling

Author contribution

DSB conceptualized the study, led the development of the theoretical framework, designed the methodology, and conducted the data collection and analysis. He also drafted the original manuscript. EKT provided critical guidance on the theoretical positioning, model structuring, and refinement of hypotheses, and contributed to the manuscript's review and editing. RB supported instrument validation, data interpretation, and the discussion of results in the context of developing economies. He also contributed to manuscript review and quality assurance. All authors read and approved the final manu.

Funding

No funding was received for this study.

Availability of data materials

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Declarations

Consent for Publication

Not applicable. This manuscript does not contain individual person's data, images, or case reports that require consent for publication.

Competing interests

The authors declare no competing interests.

Received: 19 April 2025 Accepted: 11 July 2025
Published online: 28 July 2025

References

1. Abdul Razak D, Abdisalan Nor B, Fatimah Mohamed Noor S (2024) Factors influencing sustainability investment intentions: an empirical investigation. Labuan e-J Muamalat Soc 18(2):1–13
2. Adam AA, Shauki ER (2014) Socially responsible investment in Malaysia: behavioral framework in evaluating investors' decision making process. J Clean Prod 80:224–240. https://doi.org/10.1016/j.jclepro.2014.05.075
3. Adomako S, Simms C, Vazquez-Brust D, Nguyen HTT (2023) Stakeholder green pressure and new product performance in emerging countries: a cross-country study. Br J Manage 34(1):299–320. https://doi.org/10.1111/1467-8551.12595
4. Agrawal R, Wankhede VA, Kumar A, Upadhyay A, Garza-Reyes JA (2022) Nexus of circular economy and sustainable business performance in the era of digitalization. Int J Product Perform Manag 71(3):748–774. https://doi.org/10.1108/IJPPM-12-2020-0676
5. Ajzen I (1991) The theory of planned behavior. Organ Behav Hum Decis Process 50(2):179–211. https://doi.org/10.1016/0749-5978(91)90020-T
6. Alice Arinaitwe U, Mwesigwa R, Arinaitwe A (2015) *Improving Credit Accessibility among SME's in*. https://www.researchgate.net/publication/295009881
7. Aljanabi AQRA (2018) The mediating role of absorptive capacity on the relationship between entrepreneurial orientation and technological innovation capabilities. Int J Entrepreneurial Behav Res 24(4):818–841. https://doi.org/10.1108/IJEBR-07-2017-0233
8. Alkaraan F, Elmarzouky M, Hussainey K, Venkatesh VG (2023) Sustainable strategic investment decision-making practices in UK companies: the influence of governance mechanisms on synergy between industry 4.0 and circular economy. Technol Forecast Soc Change. https://doi.org/10.1016/j.techfore.2022.122187
9. Bähr K, Fliaster A (2023) The twofold transition: framing digital innovations and incumbents' value propositions for sustainability. Bus Strateg Environ 32(2):920–935. https://doi.org/10.1002/bse.3082
10. Barney JB (1991) Firm resources and sustained competitive advantage. J Manage 17(1):99–120. https://doi.org/10.1177/014920639101700108
11. Bauer R, Ruof T, Smeets P, Hartzmark S, Jiao P, Laudi M, Korevaar M, Mertens J, Perik L, Peter F, Post T, Prelec D, Rodrigues P, Schotman P, Sol L, Strobel M, Tissen C, Wibral M, Wolk L (2021) *Get Real! Individuals Prefer More Sustainable Investments*.
12. Bendell BL (2022) Environmental investment decisions of family firms—an analysis of competitor and government influence. Bus Strat Environ 31(1):1–14. https://doi.org/10.1002/bse.2870
13. Bhatia MS, Kumar S (2022) Linking stakeholder and competitive pressure to Industry 4.0 and performance: mediating effect of environmental commitment and green process innovation. Bus Strat Environ 31(5):1905–1918. https://doi.org/10.1002/bse.2989
14. Bin JM, Diangha SN, Ofeh MA (2021) Impact of access to credit on the sustainability of small and medium sized enterprises in Cameroon. Am J Ind Bus Manage 11(06):705–718. https://doi.org/10.4236/ajibm.2021.116046
15. Bindeeba DS, Tukamushaba EK, Bakashaba R (2025) Digital transformation and its multidimensional impact on sustainable business performance: evidence from a meta-analytic review. Future Bus J 11(1):90. https://doi.org/10.1186/s43093-025-00511-z
16. Bloomberg (2022) *Sustainable fund inflows break records*. https://www.bloomberg.com

17. Borodako K, Berbeka J, Rudnicki M, Łapczyński M (2023) The impact of innovation orientation and knowledge management on business services performance moderated by technological readiness. Eur J Innov Manag 26(7):674–695. https://doi.org/10.1108/EJIM-09-2022-0523
18. Böttcher TP, Empelmann S, Weking J, Hein A, Krcmar H (2024) Digital sustainable business models: using digital technology to integrate ecological sustainability into the core of business models. Inf Syst J 34(3):736–761. https://doi.org/10.1111/isj.12436
19. Brammer S, Hoejmose S, Marchant K (2012) Environmental management in SMEs in the UK: practices, pressures and perceived benefits. Bus Strat Environ 21(7):423–434. https://doi.org/10.1002/bse.717
20. Browne MW, Cudeck R (1993) Alternative ways of assessing model fit. In: Bollen KA, Long JS (eds) Testing structural equation models. Sage, pp 136–162
21. Chan KH, Chong LL, Ng TH, Ong WL (2022) A model of green investment decision making for societal well-being. Heliyon. https://doi.org/10.1016/j.heliyon.2022.e10024
22. Chandra H, Hutagaol-Martowidjojo Y, Widjaja A (2024) Sustainable investment perception influence in investment decision. E3S Web Conf. https://doi.org/10.1051/e3sconf/202457103004
23. Chen S, Lakkanawanit P, Suttipun M, Xue H (2023) Environmental regulation and corporate performance: the effects of green financial management and top management's environmental awareness. Cogent Bus Manage. https://doi.org/10.1080/23311975.2023.2209973
24. Chu Z, Xu J, Lai F, Collins BJ (2018) Institutional theory and environmental pressures: the moderating effect of market uncertainty on innovation and firm performance. IEEE Trans Eng Manag 65(3):392–403. https://doi.org/10.1109/TEM.2018.2794453
25. Crona B, Eriksson K, Lerpold L, Malmström M, Sanctuary M, Sandberg J (2021) Transforming toward sustainability through financial markets: four challenges and how to turn them into opportunities. One Earth 4(5):599–601. https://doi.org/10.1016/j.oneear.2021.04.021
26. Dawadi S, Shrestha S, Giri RA (2021) Mixed-methods research: a discussion on its types, challenges, and criticisms. J Pract Stud Educat 2(2):25–36. https://doi.org/10.46809/jpse.v2i2.20
27. Delmas MA, Toffel MW (2010) Institutional Pressures and Organizational Characteristics: Implications for Environmental Strategy.
28. Delmas M, Toffel MW (2004) Stakeholders and environmental management practices: an institutional framework. Bus Strat Environ 13(4):209–222. https://doi.org/10.1002/bse.409
29. Dhillon, L. K., Talwar, R., & Bansal, A. (2024). Motivation and Determinants of Sustainable Investment Behaviour: The Perspective of Sustainability. In *Emerging Technology, Environment and Social Justice- A Sustainable Approach* (pp. 83–106). QTanalytics India. https://doi.org/10.48001/978-81-966500-3-2-7
30. DiMaggio PJ, Powell WW (1983) The iron cage revisited: institutional isomorphism and collective rationality in organizational fields. Am Sociol Rev 48(2):147–160. https://doi.org/10.2307/2095101
31. Dupire M, M'Zali B (2018) Csr strategies in response to competitive pressures. J Bus Ethics 148(3):603–623. https://doi.org/10.1007/s10551-015-2981-x
32. Escrig-Olmedo E, Muñoz-Torres MJ, Fernández-Izquierdo MÁ (2013) Sustainable development and the financial system: society's perceptions about socially responsible investing. Bus Strat Environ 22(6):410–428. https://doi.org/10.1002/bse.1755
33. Fornell C, Larcker DF (1981) Evaluating structural equation models with unobservable variables and measurement error. J Mark Res 18(1):39–50. https://doi.org/10.2307/3151312
34. Franco AC, Franco LS (2022) An Institutional Theory Investigation: Analysis of the Main Trends in Innovation. *Revista Brasileira de Gestão e Inovação*, *9*(2), 126–144. https://doi.org/10.18226/23190639.v9n2.06
35. Gutsche G, Nakai M, Arimura TH (2021) Revisiting the determinants of individual sustainable investment—the case of Japan. J Behav Exp Finance. https://doi.org/10.1016/j.jbef.2021.100497
36. Hair JF, Black WC, Babin BJ, Anderson RE (2019) *Multivariate data analysis* (8th ed.). Cengage Learning.
37. Hart SL, Dowell G (2011) A natural-resource-based view of the firm: fifteen years after. J Manag 37(5):1464–1479. https://doi.org/10.1177/0149206310390219
38. Hartzmark SM, Sussman AB (2019) Do investors value sustainability? A natural experiment examining ranking and fund flows. J Finance 74(6):2789–2837. https://doi.org/10.1111/jofi.12841
39. Haseeb M, Hussain HI, Ślusarczyk B, Jermsittiparsert K (2019) Industry 4.0: a solution towards technology challenges of sustainable business performance. Soc Sci. https://doi.org/10.3390/socsci8050154
40. Hilmersson FP, Hilmersson M (2021) Networking to accelerate the pace of SME innovations. J Innov Knowl 6(1):43–49. https://doi.org/10.1016/j.jik.2020.10.001
41. Hoffman AJ, Jennings PD (2015) Institutional theory and the natural environment: research in (and on) the Anthropocene. Organ Environ 28(1):8–31. https://doi.org/10.1177/1086026615575331
42. Hu LT, Bentler PM (1999) Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. Struct Equ Model Multidiscip J 6(1):1–55. https://doi.org/10.1080/10705519909540118
43. Hughes A, Urban MA, Wójcik D (2021) Alternative ESG ratings: how technological innovation is reshaping sustainable investment. Sustainability. https://doi.org/10.3390/su13063551
44. International Trade Centre (2020) *Promoting SME competitiveness in Africa: Data for de-risking investment*. https://intracen.org
45. Karami M, Tang J (2019) Entrepreneurial orientation and SME international performance: the mediating role of networking capability and experiential learning. Int Small Bus J Res Entrepreneursh 37(2):105–124. https://doi.org/10.1177/0266242618807275
46. Khan RU, Arif H, Sahar NE, Ali A, Abbasi MA (2022) The role of financial resources in SMEs' financial and environmental performance; the mediating role of green innovation. Green Finance 4(1):36–53. https://doi.org/10.3934/GF.2022002
47. King AA, Lenox MJ (2001) Does it really pay to be green? An empirical study of firm environmental and financial performance. J Ind Ecol 5(1):105–116. https://doi.org/10.1162/108819801753358526
48. Kline RB (2016) *Principles and practice of structural equation modeling* (4th ed.). Guilford Press.
49. Kraaijenbrink J, Spender JC, Groen AJ (2010) The resource-based view: a review and assessment of its critiques. J Manage 36(1):349–372. https://doi.org/10.1177/0149206309350775
50. Krejcie RV, Morgan DW (1970) Determining sample size for research activities. Educ Psychol Meas 30(3):607–610. https://doi.org/10.1177/001316447003000308
51. Li Y, Zhang Y, Solangi YA (2023) Assessing ESG factors and policies of green finance investment decisions for sustainable development in China using the fuzzy AHP and fuzzy DEMATEL. Sustainability. https://doi.org/10.3390/su152115214
52. Liu S, Xu R, Chen X (2021) Does green credit affect the green innovation performance of high-polluting and energy-intensive enterprises? Evidence from a quasi-natural experiment. Environ Sci Pollut Res Int 28(46):65265–65277. https://doi.org/10.1007/s11356-021-15217-2
53. Mady K, Abdul Halim MAS, Omar K, Battour M, Abdelkareem RS (2023) Environmental pressures and eco-innovation in manufacturing SMEs: the mediating effect of environmental capabilities. Int J Innov Sci. https://doi.org/10.1108/IJIS-08-2022-0163
54. Makhloufi L, Vasa L, Rosak-Szyrocka J, Djermani F (2023) Understanding the impact of big data analytics and knowledge management on green innovation practices and organizational performance: the moderating effect of government support. Sustainability. https://doi.org/10.3390/su15118456
55. Martínez-Peláez R, Escobar MA, Félix VG, Ostos R, Parra-Michel J, García V, Ochoa-Brust A, Velarde-Alvarado P, Félix RA, Olivares-Bautista S, Flores V, Mena LJ (2024) Sustainable digital transformation for SMEs: a comprehensive framework for informed decision-making. Sustainability. https://doi.org/10.3390/su16114447
56. Masini A, Menichetti E (2012) The impact of behavioural factors in the renewable energy investment decision making process: conceptual framework and empirical findings. Energy Policy 40(1):28–38. https://doi.org/10.1016/j.enpol.2010.06.062
57. Mbaguta D (2003) *Definition and classification of small and medium enterprises in Uganda*. Ministry of Trade, Industry and Cooperatives.
58. Mielke J (2019) Signals for 2°C: the influence of policies, market factors and civil society actions on investment decisions for green

infrastructure. J Sustain Financ Invest 9(2):87–115. https://doi.org/10.1080/20430795.2018.1528809
59. National Planning Authority (2020) *Annual report 2020*. Kampala, Uganda: Author.
60. Nunnally JC, Bernstein IH (1994) *Psychometric theory* (3rd ed.). McGraw-Hill.
61. Nurjanah Nuryakin A, Ardyan E (2022) Open innovation strategies and smes' performance: the mediating role of eco-innovation in environmental uncertainty. Manag Syst Prod Eng 30(3):214–222. https://doi.org/10.2478/mspe-2022-0027
62. Oteng-Abayie EF, Mensah G, Duodu E (2022) The role of environmental regulatory quality in the relationship between natural resources and environmental sustainability in sub-Saharan Africa. Heliyon. https://doi.org/10.1016/j.heliyon.2022.e12436
63. Owen A, Owen AL, College H, Qian Y (2008) *Determinants of Socially Responsible Investment Decisions*. https://www.researchgate.net/publication/241677762
64. Pagell M, Yang CL, Krumwiede DW, Sheu C (2004) Does the competitive environment influence the efficacy of investments in environmental management? J Supply Chain Manag 40(2):30–39. https://doi.org/10.1111/j.1745-493X.2004.tb00172.x
65. Park SR, Jang JY (2021) The impact of ESG management on investment decision: institutional investors' perceptions of country-specific ESG criteria. Int J Financial Stud. https://doi.org/10.3390/ijfs9030048
66. Pastor L, Stambaugh RF, Taylor LA (2019) Sustainable investing in equilibrium (NBER Working Paper No. 26549). National Bureau of Economic Research. https://doi.org/10.3386/w26549
67. Podsakoff PM, MacKenzie SB, Lee JY, Podsakoff NP (2003) Common method biases in behavioral research: a critical review of the literature and recommended remedies. J Appl Psychol 88(5):879–903. https://doi.org/10.1037/0021-9010.88.5.879
68. Prakasa Y, Fauzan N (2024) Understanding the technological-organizational-environmental concepts on SMEs' performance in emerging market. KnE Soc Sci. https://doi.org/10.18502/kss.v9i11.15756
69. Prasannath V, Adhikari RP, Gronum S, Miles MP (2024) Impact of government support policies on entrepreneurial orientation and SME performance. Int Entrep Manag J. https://doi.org/10.1007/s11365-024-00993-3
70. Preacher KJ, Hayes AF (2008) Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. Behav Res Methods 40(3):879–891. https://doi.org/10.3758/BRM.40.3.879
71. Prihastiwi DA, Fatimah AN, Nurcahya YA (2023) Determinants of Indonesian MSMEs' green investment choices towards inclusive and sustainable economic growth. IOP Conf Ser Earth Environ Sci. https://doi.org/10.1088/1755-1315/1248/1/012015
72. Pulka BM, Ramli A, Mohamad A (2021) Entrepreneurial competencies, entrepreneurial orientation, entrepreneurial network, government business support and SMEs performance. The moderating role of the external environment. J Small Bus Enterp Dev 28(4):586–618. https://doi.org/10.1108/JSBED-12-2018-0390
73. Pursiainen V, Sun H, Xiang Y, Ceccarelli M, Chen S, Couvert M, Döttling R, Florackis C, Gao H, Gounopoulos, D, Huang S, Lin T.-C, Liu X, Luu E, Karmaziene E, Kölbel J, Von Meyerinck F, Moreau Q, Newton D., … Zou K (2023) *Competitive Pressure and ESG **. https://www.unilever.com/news/news-search/2021/no-trade-off-between-purpose-and-performance/
74. Purwandani JA, Michaud G (2021) What are the drivers and barriers for green business practice adoption for SMEs? Environ Syst Decis 41(4):577–593. https://doi.org/10.1007/s10669-021-09821-3
75. Qureshi MS, Aziz N, Mian SA (2017) How marketing capabilities shape entrepreneurial firm's performance? Evidence from new technology based firms in Turkey. J Glob Entrepreneurship Res 7(1):15. https://doi.org/10.1186/s40497-017-0071-5
76. Rahman MM, Sadik N (2025) Nexus of digital financial service adoption, decent work and environmental sustainability: results from SEM-NCA approaches. Discover Sustain 6(1):164. https://doi.org/10.1007/s43621-025-00972-w
77. Robeco (2023) *Global Climate Investing Survey 2023: Keeping the faith*. https://www.robeco.com/en/insights/2023/03/global-climate-investing-survey-2023.html
78. Rusch M, Schöggl JP, Baumgartner RJ (2023) Application of digital technologies for sustainable product management in a circular economy: a review. Bus Strateg Environ 32(3):1159–1174. https://doi.org/10.1002/bse.3099
79. Rutkauskas AV, Miečinskiene A, Stasytyte V (2008) Investment decisions modelling along sustainable development concept on financial markets. Technol Econ Dev Econ 14(3):417–427. https://doi.org/10.3846/1392-8619.2008.14.417-427
80. Sarkar A, Qian L, Peau AK, Shahriar S (2021) Modeling drivers for successful adoption of green business: an interpretive structural modeling approach. Environ Sci Pollut Res Int 28(1):1077–1096. https://doi.org/10.1007/s11356-020-10490-z
81. Saunders M, Lewis P, Thornhill A (2009) *Research methods for business students* (5th ed.). Pearson Education.
82. Scuotto V, Del Giudice M, Carayannis EG (2017) The effect of social networking sites and absorptive capacity on SMEs' innovation performance. J Technol Transf 42(2):409–424. https://doi.org/10.1007/s10961-016-9517-0
83. Sendawula K, Turyakira P, Ikiror CM, Bagire V (2021) Regulatory compliance and environmental sustainability practices of manufacturing entrepreneurial ventures in Uganda. Asia Pac J Innov Entrep 15(1):62–74. https://doi.org/10.1108/apjie-08-2020-0122
84. Shibin KT, Dubey R, Gunasekaran A, Hazen B, Roubaud D, Gupta S, Foropon C (2020) Examining sustainable supply chain management of SMEs using resource based view and institutional theory. Ann Oper Res 290(1–2):301–326. https://doi.org/10.1007/s10479-017-2706-x
85. Siedschlag I, Yan W (2021) Firms' green investments: what factors matter? J Clean Prod. https://doi.org/10.1016/j.jclepro.2021.127554
86. Sorooshian S, Khiavi SF, Karimi F, Mina H (2024) Link between sustainable circular supply chain and Internet of Things technology in electric vehicle battery manufacturing industry: a business strategy optimization for pickup and delivery. Bus Strat Environ. https://doi.org/10.1002/bse.3905
87. Stavropoulos S, Wall R, Xu Y (2018) Environmental regulations and industrial competitiveness: evidence from China. Appl Econ 50(12):1378–1394. https://doi.org/10.1080/00036846.2017.1363858
88. Szutowski D (2021) The impact of eco-innovation on the stock returns of technology-based KIBS: role of eco-innovation type and its degree of novelty. Sustain Account Manag Policy J 12(1):130–155. https://doi.org/10.1108/SAMPJ-10-2019-0375
89. Tariq A, Sumbal MSUK, Dabić M, Raziq MM, Torkkeli M (2024) Interlinking networking capabilities, knowledge worker productivity, and digital innovation: a critical nexus for sustainable performance in small and medium enterprises. J Knowl Manag 28(11):179–198. https://doi.org/10.1108/JKM-09-2023-0788
90. Tran TAP (2025) The role of customer expectations and competitive pressure in shaping firm innovation decisions towards sustainability: mediating effects of innovation perception. Cogent Bus Manage. https://doi.org/10.1080/23311975.2025.2462272
91. Triguero A, Moreno-Mondéjar L, Davia MA (2016) Leaders and laggards in environmental innovation: an empirical analysis of SMEs in Europe. Bus Strateg Environ 25(1):28–39. https://doi.org/10.1002/bse.1854
92. Tseng ML, Tan PA, Jeng SY, Lin CWR, Negash YT, Darsono SNAC (2019) Sustainable investment: interrelated among corporate governance, economic performance and market risks using investor preference approach. Sustainability. https://doi.org/10.3390/su11072108
93. Tyler BB, Lahneman B, Cerrato D, Cruz AD, Beukel K, Spielmann N, Minciullo M (2024) Environmental practice adoption in SMEs: the effects of firm proactive orientation and regulatory pressure. J Small Bus Manage 62(5):2211–2246. https://doi.org/10.1080/00472778.2023.2218435
94. Tyler B, Lahneman B, Beukel K, Cerrato D, Minciullo M, Spielmann N, Discua Cruz A (2020) SME managers' perceptions of competitive pressure and the adoption of environmental practices in fragmented industries: a multi-country study in the wine industry. Organ Environ 33(3):437–463. https://doi.org/10.1177/1086026618803720
95. Uganda Investment Authority (2022) *Annual Investment Abstract Report 2022*. https://www.ugandainvest.go.ug
96. Uyanik M (2023) Resource-based view in marketing literature. J Bus Manag Stud Res-Based View Market Lit. https://doi.org/10.32996/jbms

97. van Zanten JA, Rein B (2023) Who owns (un)sustainable companies? Examining institutional determinants of sustainable investing. J Clean Prod. https://doi.org/10.1016/j.jclepro.2023.138542
98. Wahab Aidoo A (2019) Heritage and sustainable development the impact of access to credit on process innovation. Herit Sustain Dev 1(2):48–63
99. Wang F, Sun Z, Feng H (2022) Can media attention promote green innovation of Chinese enterprises? Regulatory effect of environmental regulation and green finance. Sustainability. https://doi.org/10.3390/su141711091
100. Wang M, He Y, Zhou J, Ren K (2022) Evaluating the effect of Chinese environmental regulation on corporate sustainability performance: the mediating role of green technology innovation. Int J Environ Res Public Health. https://doi.org/10.3390/ijerph19116882
101. Wernerfelt B (1984) A resource-based view of the firm. Strateg Manage J 5(2):171–180. https://doi.org/10.1002/smj.4250050207
102. Williams G (2007) Some determinants of the socially responsible investment decision: a cross-country study. J Behav Finance 8(1):43–57. https://doi.org/10.1080/15427560709337016
103. World Bank (2021) *Small and Medium Enterprises (SMEs) Finance: Improving SMEs' access to finance and finding innovative solutions to unlock sources of capital*. https://www.worldbank.org/en/topic/smefinance
104. Wu S, Yao X, Wu G (2020) Environmental investment decision of green supply chain considering the green uncertainty. Complexity. https://doi.org/10.1155/2020/8871901
105. Xi X, Yang J, Wang C (2024) Can digital transformation improve sustainable performance of manufacturing firms? Empirical evidence based on core technology capabilities. Chin Manag Stud. https://doi.org/10.1108/CMS-01-2024-0054
106. Yalabik B, Fairchild RJ (2011) Customer, regulatory, and competitive pressure as drivers of environmental innovation. Int J Prod Econ 131(2):519–527. https://doi.org/10.1016/j.ijpe.2011.01.020
107. Yaseen M, Sajjad W, Visetnoi S, Amanah S, Saqib SE (2024) Entrepreneurial orientation and SMEs efficiency with government financial and non-financial incentives as moderators. SAGE Open. https://doi.org/10.1177/21582440241281259
108. Yusof N, Tabassi AA, Esa M (2020) Going beyond environmental regulations—the influence of firm size on the effect of green practices on corporate financial performance. Corp Soc Responsib Environ Manag 27(1):32–42. https://doi.org/10.1002/csr.1771
109. Zhang XE, YangXTengLi LY (2024) External pressure, internal managerial interpretation and green entrepreneurial orientation. Manag Decis. https://doi.org/10.1108/MD-02-2023-0177
110. Zhao G, Jones P, Liu S, Lopez C, Dennehy D, Chen X (2023) Analysis of the drivers of industry 4.0 technology deployment to achieve agri-food supply chain sustainability: a hybrid approach. Int Symp Technol Soc Proc. https://doi.org/10.1109/ISTAS57930.2023.10306146
111. Zhao L, Zhang YQ, Sadiq M, Hieu VM, Ngo TQ (2023) Testing green fiscal policies for green investment, innovation and green productivity amid the COVID-19 era. Econ Change Restruct 56(5):2943–2964. https://doi.org/10.1007/s10644-021-09367-z
112. Zhu H, Chen Z, Zhang S, Zhao W (2022) The role of government innovation support in the process of Urban green sustainable development: a spatial difference-in-difference analysis based on China's innovative city pilot policy. Int J Environ Res Public Health. https://doi.org/10.3390/ijerph19137860
113. Zhu Q, Sarkis J (2007) The moderating effects of institutional pressures on emergent green supply chain practices and performance. Int J Prod Res 45(18–19):4333–4355. https://doi.org/10.1080/00207540701440345
114. Zhu X, Du J, Boamah KB, Long X (2020) Dynamic analysis of green investment decision of manufacturer. Environ Sci Pollut Res Int 27(14):16998–17012. https://doi.org/10.1007/s11356-020-08144-1

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.