INDERSCIENCE PUBLISHERS
Linking academia, business and industry through research

World Review of Entrepreneurship, Management and Sustainable Development

ISSN online: 1746-0581 - ISSN print: 1746-0573
https://www.inderscience.com/wremsd

Examining the inhibiting factors of sustainable entrepreneurship: evidence from emerging economies

Gbemisola Ogbolu, Ayotunde Adetola Adelaja, Millicent Ifeyinwa Ohanagorom, Fanar Shwedeh

DOI: 10.1504/WREMSD.2025.10075081

Article History:

Received:	28 June 2025
Last revised:	17 September 2025
Accepted:	22 September 2025
Published online:	15 December 2025

Examining the inhibiting factors of sustainable entrepreneurship: evidence from emerging economies

Gbemisola Ogbolu*

Teesside University,
Middlesbrough, England, UK
Email: gbemisola.ogbolu@tees.ac.uk
*Corresponding author

Ayotunde Adetola Adelaja

Graduate School of Business,
Universiti Sains Malaysia,
Pulau Pinang, Malaysia
Email: ayoadelaja@live.com

Millicent Ifeyinwa Ohanagorom

Teesside University,
Middlesbrough, England, UK
Email: m.ohanagorom@tees.ac.uk

Fanar Shwedeh

City University Ajman,
Ajman, UAE
Email: s.fanar@cu.ac.ae

Abstract: This study investigates the barriers to sustainable entrepreneurship in the context of emerging economies, with a particular focus on Nigeria. A quantitative research approach was adopted, using structured questionnaires distributed to entrepreneurs across the manufacturing, sales and food services sectors. From 310 valid responses, the analysis identified various challenges business owners encounter in maintaining sustainable operations. The results emphasise the importance of economic stability and financial access in supporting sustainable business practices. Without an enabling environment, long-term sustainability becomes difficult to achieve. Although widely used empirical techniques were applied, this research offers valuable findings drawn from the Nigerian MSME sector, which remains underrepresented in the literature on sustainability. The study also reflects on its theoretical foundation, highlighting the need to explore additional perspectives beyond resource-based and institutional theories. Furthermore, it calls for a more comprehensive approach to understanding government support and financial barriers. The study provides insights that can inform policy and guide future efforts to strengthen sustainable entrepreneurship in similar contexts.

Keywords: sustainable entrepreneurship; government support; technology infrastructure; economic and financial constraints.

Reference to this paper should be made as follows: Ogbolu, G., Adelaja, A.A. Ohanagorom, M.I. and Shwedeh, F. (2025) 'Examining the inhibiting factors of sustainable entrepreneurship: evidence from emerging economies', *World Review of Entrepreneurship, Management and Sustainable Development*, Vol. 21, No. 6, pp.1–26.

Biographical notes: Gbemisola Ogbolu is a Senior Lecturer in Business at the Department of Strategy, Leadership and Enterprise, Teesside University International Business School, where she also serves as the Academic Lead for the Help to Grow Management Programme. She is a Senior Fellow of the Higher Education Academy (SFHEA), a Certified Management and Business Educator (CMBE), and a Chartered Manager (CMgr MCMI). She holds a PhD in Entrepreneurship, Innovation, and Strategy from Northumbria University. Her research focuses on entrepreneurship, innovation, and strategy, with a particular interest in sustainable entrepreneurship, SME performance, social value, and entrepreneurial ecosystems.

Ayotunde Adetola Adelaja is a Senior Lecturer and former Head of Entrepreneurship, holding a PhD in Management with a focus on Entrepreneurship. He has over four years of experience in undergraduate and postgraduate teaching, curriculum development, and research supervision. He has designed and led innovative modules, published in SCOPUS and Web of Science journals, and mentored students from diverse backgrounds. His research spans marketing innovation, entrepreneurial education, and strategic management, integrating theory with practice. Committed to student-centred learning, pedagogical improvement, and cross-disciplinary engagement, he continues to advance entrepreneurship education and contemporary management practice.

Millicent Ifeyinwa Ohanagorom is a Lecturer in Marketing at the International Business School of Teesside University and a Fellow of the Higher Education Academy. She earned her PhD in Sustainable Marketing in 2019, following a master's degree completed in London. Before joining Teesside, she lectured at the University of Nigeria, where she graduated with First Class honours and later gained more than seven years' teaching experience. Her research covers sustainable marketing, green consumer behaviour, social marketing, tourism and hospitality marketing, IT use in marketing, consumer behaviour, and marketing communications.

Fanar Shwedeh is an Assistant Professor of Technology and Operations Management, noted for her research on digital transformation, innovation, and information systems. She has produced extensive work on augmented reality, artificial intelligence, smart government, sustainability, and technology adoption among small and medium-sized enterprises. Her scholarship examines how emerging digital technologies strengthen organisational performance, decision-making, and entrepreneurial activity, particularly in developing economies. With more than 50 publications, she continues to contribute to discussions on innovation management and digital capability development. Her teaching and supervision emphasise developing graduates who can thrive in technology-driven business environments.

1 Background

Interest in sustainable entrepreneurship and the idea that economic and environmental benefits can go hand in hand has been growing in academic, industrial and policy-making circles (Droege et al., 2023; Weidinger, 2014; Yu et al., 2022). Growing global awareness of resource constraints and sustainability has increased the call for sustainable business practices, especially in developing countries, where rapid industrialisation can present unique opportunities and environmental challenges. In this light, it is crucial to recognise, appreciate and solve our environmental problems concerning the historically imperfect doing of these vulnerable but responsible entities. Entrepreneurship education promotes sustainable development, aiming to prevent deterioration while integrating sustainability aspects (Adelaja et al., 2023; Cheng et al., 2024; Dean and McMullen, 2007; Hariram et al., 2023). This goes hand in hand with sustainable entrepreneurs slightly finding their way into mainstream global business. Nevertheless, developing economies struggle to benefit entirely from ongoing interference. Such challenges are often neglected in academic discourse (Amoah et al., 2023; Polas et al., 2022).

Previous research has demonstrated that sustainable entrepreneurship needs adequate local markets, accessible green technology and conducive government frameworks. According to previous studies, the performance of a country with clear eco-rules and regulations or one offering incentives for sustainable businesses in such countries is higher than that of a country without transparent policy systems (Gast et al., 2017; Ogbolu and Hague, 2025). Additionally, studies on sustainable tourism and the circular economy in small and medium-sized firms show that robust organisational support significantly improves these companies' long-term success (Butkouskaya et al., 2020; Chowdhury et al., 2022). However, a thorough examination is necessary due to significant issues unique to emerging nations. Sustainable entrepreneurship's systemic challenges encompass insufficient infrastructure, limited institutional support and restricted access to green technologies (Esteves et al., 2021; Kantis et al., 2020).

This research addresses a critical knowledge deficit regarding the obstacles to sustainable entrepreneurship in underdeveloped countries, particularly in environments where financial obligations typically take primacy over environmental considerations. The main problem is a lack of understanding of these barriers in their circumstances because much literature currently suggests information and solutions from affluent nations (Gu and Zheng, 2021). It is, therefore, crucial to consider the potentially disastrous consequences of failing to address and manage these negative influences effectively. The described scenario may lead to lost opportunities to promote sustainable practices essential for long-term growth and ecological balance in developing areas. Thus, investigating the barriers to sustainable entrepreneurship in Nigeria, characterised by economic challenges and environmental degradation, poses considerable difficulties for green innovation (Mathur and Tandon, 2016; Ogbolu and Adelaja, 2022; Di Vaio et al., 2022).

Addressing this issue is crucial, as the findings may offer valuable insights for decision-makers, business leaders and financiers seeking to promote sustainable entrepreneurship in economically disadvantaged areas. An exhaustive analysis of these barriers will establish the basis for targeted strategies and measures to assist entrepreneurs in surmounting these challenges. This study highlights important practical implications, indicating that a proactive and comprehensive approach to these issues may improve policy frameworks, increase resource availability for entrepreneurs and promote

the development of sustainable business models that align ecological and economic priorities (Gu and Wang, 2022; Eller et al., 2020). This study enhances the current literature on sustainable entrepreneurship by highlighting theoretical implications for underrepresented emerging nations.

2 Review of relevance literature

2.1 Concept of sustainable entrepreneurship

Communities seeking sustainable growth that harmonises economic benefits with ecological and social responsibilities have found sustainable entrepreneurship crucial for mitigating environmental degradation and promoting economic development (Dean and McMullen, 2007; Di Vaio et al., 2022). By supplying more sensible productivity criteria that minimise environmental destruction and maximise social equity, sustainable entrepreneurship aims to encourage higher levels of longer-term economic prudence (Dean and McMullen, 2007; Hariram et al., 2023). This focuses on more resilient and less resistant to change vibrant local economies through greater resource efficiency, lower waste production and geography-based business models (Chowdhury et al., 2022; Eller et al., 2020), emerging from some recent work by researchers that reveals a potential way for sustainable entrepreneurship. The United Nations Sustainable Development Goals (UNSDGs) highlight the importance of responsible resource production and consumption and heavily depend on sustainable entrepreneurship (Esteves et al., 2021; Ibn-Mohammed et al., 2021). Therefore, sustainable entrepreneurship principles are excellent ideas in theory, but face many obstacles that need to be realised, such as a lack of adequate funds, outdated instrumentation and a haphazard institutional framework for guiding policy enforcement, especially in some emerging economies.

Nevertheless, this journey continues to be an uphill one due to these realities; some recently published research on the same has highlighted that we need our efforts for entrepreneurship promotion in developing nations to work successfully over time. Scholars also agree that handling these challenges necessitates support from institutions via an enabling regulatory environment and the availability of long-term risk capital (Gobena and Kant, 2022; Kantis et al., 2020). However, entrepreneurs in emerging economies often suffer from poor access to capital and resources required for them to move forward with long-term environmental objectives (Gu and Wang, 2022; Zhao et al., 2020).

Consequently, both internal and external barriers exist to sustained enterprise. Promoting environmentally sustainable business practices through legislation and ensuring adequate infrastructure support is essential. It is crucial to address these obstacles as sustainable entrepreneurship grows to cultivate an entrepreneurial ecosystem that minimises environmental impacts while promoting social and economic advantages in emerging economies (Amoah et al., 2023; Cheng et al., 2024).

2.2 Sustainable entrepreneurship importance in developing nations

Sustainable entrepreneurship in emerging economies is increasingly acknowledged to promote economic growth and enhance environmental and social progress. This method

combines business innovation with strategies designed to reduce environmental impact, especially in emerging economies requiring sustainable resource utilisation and job creation (Dean and McMullen, 2007; Eller et al., 2020). Unlike traditional business evolution with short-term profit as the primary focus, sustainable entrepreneurship has evolved a different behaviour type that many existing scholars would also acknowledge. It deals with problems like poverty, unemployment and the scarcity of resources that will have long-term benefits. The Sustainable Development Goals (SDGs) call for reducing inequality and responsible production and consumption. In addition, these programs use local resources and add traditional knowledge (Gobena and Kant, 2022) to allow communities self-reliance, which is crucial in emerging economies.

Sustainable entrepreneurship will promote social and economic stability by creating innovations for local-scale problems that directly lead to environmental outcomes. Entrepreneurs can convert underutilised resources into valuable economic assets by promoting green business practices. These practices effectively tackle critical developmental challenges, including pollution, waste management and inefficient energy usage (Zhao et al., 2020; Gu and Wang, 2022). Moreover, public support and improved access to sustainable credit can promote the development of environmentally friendly innovations by entrepreneurs in these regions, thereby ensuring job creation and enhancing economic resilience (Di Vaio et al., 2022). Entrepreneurship for sustainable development contributes to economic growth, conserves natural resources and promotes social cohesion, a necessary element in realising comprehensive strategies to achieve sustainability in emerging economies (Kantis et al., 2020).

2.3 Crucial influencing factors of sustainable entrepreneurship

The critical steps of sustainable entrepreneurship are mainly in emerging economies where peculiar social and economic settings prevent budding entrepreneurs from reaching their objectives (Hariram et al., 2023; Musona et al., 2021; Weidinger, 2014). The research by Martin and Cuypers (2024) and Zhang et al. (2023) demonstrated that financial resources are essential; without efficient input cost management via capital, the capacity to adapt to sustainability is constrained. Environmentally friendly technologies and sustainable production processes require financial support, often obstructing the sustainability efforts of lower-income entrepreneurs in developing regions (Gu and Zheng, 2021; Zhao et al., 2020). On the other hand, favourable government support and policies are required for entrepreneurial orientation to materialise in sustainable ways, where it is demonstrated that enabling regulatory frameworks motivate entrepreneurs to take actions conducive to natural resource management behaviours driving economic benefits (Amoah et al., 2023; Dean and McMullen, 2007).

The technological infrastructure and access to innovation also have the potential for greater sustainability, as many sustainable practices require sophisticated technology (from a high-level resource management perspective or better management and waste reduction) (Cheng et al., 2021; Polas et al., 2022). Nonetheless, technology gaps constrain the capacity of entrepreneurs in emerging economies to implement green processes and products (Eller et al., 2020; Cheng et al., 2024). Moreover, social and cultural norms influence sustainable entrepreneurship considerably, as community attitudes regarding sustainability can affect entrepreneurial decision-making. In numerous developing regions, traditional practices and limited awareness of the benefits of sustainability can either support or hinder sustainable entrepreneurship (Gobena and

Kant, 2022). At the same time, a sustainable business is susceptible to market demand for it if end consumers are indifferent regarding sustainable goods and services that this innovative enterprise can produce, its further growth will be impossible (Butkouskaya et al., 2020; Di Vaio et al., 2022). All of those factors are important for turning on or off the sustainable entrepreneurship capacity and other things that should be taken into effect concerning Sustainable development in emerging economies.

Government support is crucial to entrepreneurial sustainability (Patashnik, 2003). Government policies assist entrepreneurship, protecting it and allowing successful businesses to endure. This support may lead to long-term economic stability and employment creation (Díaz-López et al., 2021). Tax incentives and regulatory frameworks minimise the cost of entrepreneurship and help enterprises expand economically (Gadenne et al., 2009; Chan et al., 2009). As discussed by Díaz-López et al. (2021), support from the government and spreading awareness of entrepreneurship significantly influence the factors that push the entrepreneur to incorporate sustainable practices.

Likewise, market access and appropriate marketing tools help entrepreneurial success (Chan et al., 2009). Such tactics allow firms to avoid barriers to entry that stifle competition. The economy benefits from tax incentives and increased accessibility (Gadenne et al., 2009), leading to better income streams and cost minimisation in sustainable business practices.

2.4 Impediments of sustainable entrepreneurship in emerging economies

Sustainable entrepreneurship in underdeveloped countries meets many obstacles that lessen its capacity. These reasons include a lack of financial resources, official resistance and support from government circles, a considerable deficiency in entrepreneurial education formation or development and disfavourable market conditions (Adelaja et al., 2023). However, many entrepreneurs' lack of financial resources may still be the most insidious barrier to establishing and sustaining eco-enterprises (Amoah et al., 2023). The example of green support is influenced by poor governmental support, lack of policies in terms of sustainability and lack of strict policies for sustainable practices within businesses due to absurd decision-making processes from top organisations (Weidinger, 2014). In this way, the environment is not conducive to entrepreneurs who want to grow their businesses. It shows less attention towards training and entrepreneurship education (Adelaja et al., 2023; Barba-Sánchez et al., 2022; Gadenne et al., 2009), which novice entrepreneurs fail to understand or lack in implementing sustainable practices, an essential element for accomplishing needed exercises (Mathur and Tandon, 2016). Finally, unfavourable market conditions resulting from a restricted demand for sustainable products and services worsen the above problems, decreasing the chances for sustainability entrepreneurs to succeed (Eller et al., 2020).

In order to understand the empirical evidence for these inhibiting factors further, it is necessary to explain why only four key areas were selected (financial constraints and government support) of vocational education and training in collaboration with other market conditions). Money in capital and investment is vital to climate action in any organisation. Without finance, the best ideas will fizzle without capital investment, allowing entrepreneurs and companies to purchase resiliency (Yang, 2020). Similarly, government support is also critical, providing the right atmosphere for entrepreneurial and sustainable business (Pulka et al., 2021; Sadiq et al., 2022). Entrepreneurs respond to

policies that promote sustainability and innovation in green practices (Dean and McMullen, 2007). The second issue is that without proper capacity-building education, the development path of sustainable entrepreneurship would be blocked. Education can help instil sustainability and entrepreneurial culture in entrepreneurs (Adelaja et al., 2023; Mathur and Tandon, 2016). A third element is market conditions; if consumers have limited interest in sustainable products, entrepreneurs will be less likely to invest in eco-friendly solutions (Gast et al., 2017). Therefore, targeting these constraints is vital to enhancing sustainable entrepreneurship in emerging economies.

Findings from scholars, not limited to Bradley et al. (2021), Emon and Khan (2023) and Lüdeke-Freund (2020), also reveal that financial constraints, government support, training and education and market conditions shape sustainable entrepreneurship. Thus, financial resources are the cornerstone of entrepreneurs' ability to follow sustainable practices in their innovative pursuits. Not only is this seen as the most significant inhibitor to several sustainability efforts and their positive environmental outcomes (Gu and Wang, 2022). In addition, government support creates a conducive environment for sustainable entrepreneurship by offering incentives and reducing bureaucratic obstacles. Therefore, government action could go a long way in supporting them to make their ventures more sustainable (Gu and Zheng, 2021).

Moreover, education and training prepare the ground for green understanding, supporting skill development to increase the chances of sustainable entrepreneurship (Hummels and Argyrou, 2021). At the highest level, market conditions can foster or impede sustainable entrepreneurship. It is essential to draw entrepreneurs to address green initiatives and the strong demand for environmentally sound products (Esteves et al., 2021). Therefore, identifying and suggesting ways to alleviate these barriers is crucial to fostering sustainable entrepreneurship in emerging economies.

Addressing these significant inhibiting factors necessitates collaboration among diverse stakeholders, including governmental entities, educational institutions and financial organisations. Emerging economies can promote sustainable entrepreneurship by investing in infrastructure, enhancing education and training and establishing an appropriate regulatory framework. This method will also support the economy and help long-term environmental sustainability for present and future generations (Ibn-Mohammed et al., 2021).

2.5 Research hypothesis

From the above review, the following hypotheses are empirically investigated.

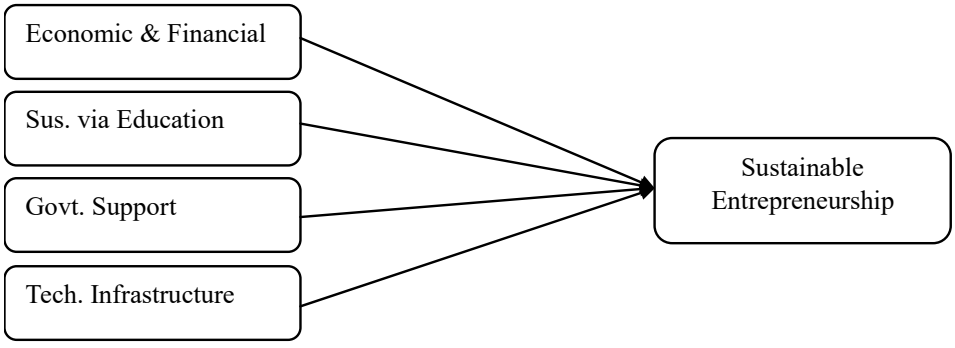
H1: There is a significant relationship between economic and financial constraints and sustainable entrepreneurship among SMEs in emerging economies.

H2: Sustainability awareness through education significantly influences sustainable entrepreneurship among SMEs in emerging economies.

H3: Favourable government support policies significantly influence sustainable entrepreneurship among SMEs in emerging economies.

H4: Technology infrastructure availability significantly promotes sustainable entrepreneurship among SMEs in emerging economies.

Figure 1 Research framework



2.6 Underpinning theory

2.6.1 Institutional theory and resource-based theory

Both institutional perspective and Resource-Based Theories (RBT) have contributed to structural roots for understanding the factors determining organisational behaviours and resources to foster sustainable competitive practices. Institutional theory Posits That Institutional forces lead to pressure mechanisms that cause actions and conformity within an organisation's environment (Bradley et al., 2021; Shibin et al., 2020). It postulates that organisations adopt certain practices that require legitimacy from their environment to garner support for sustainable entrepreneurship and development due to external pressures and societal expectations (Dean and McMullen, 2007). Meanwhile, the resource-based theory that has developed alongside this highlights firms' internal resources to build long-term competitive advantages (Barney et al., 2023; Zahra, 2021). Thus, creating an atmosphere for innovation while coping with environmental imperatives helps organisations achieve their long-term strategic goals through distinct capabilities and resources (Khanra et al., 2022; He et al., 2020).

Based on these theories, this study analyses how external pressures (economic and financial constraints, government support policies) and internal resources (technology infrastructure) determine and facilitate sustainable entrepreneurship. The institutional theory also reflects an institutional explanation in which societal and regulatory expectations of the firm align with sustainable goals (Ye et al., 2020; Emon and Khan, 2023); being externally focused may lead to job pressure. Therefore, the resource-based view emphasises that performance can be achieved by effectively utilising an organisation's available resources to encourage sustainable practices (Lüdeke-Freund, 2020; Johnson and Schaltegger, 2020). Hence, both theories emphasise vital processes through which organisations react to external and internal circumstances to create a favourable context for innovation and sustainability (Andersen, 2021; Amoah et al., 2023).

3 Methodology

This study employs a quantitative research approach using structured questionnaires distributed to entrepreneurs across various sectors in an emerging economy (Nigeria). The sectors included fabrication and manufacturing, sales and services, food and beverages and skincare products. Eligible participants were required to be registered with the Nigerian Corporate Affairs Commission (CAC), the regulatory body responsible for the legal recognition of business entities in the country. Owing to the unavailability of a comprehensive database of SMEs, random sampling was not feasible; therefore, a non-probability purposive sampling approach was adopted. This allowed for the intentional selection of SMEs likely to have engaged with sustainability practices. Using G*Power (Thomas and Krebs, 1997; Serdar et al., 2021), a minimum required sample size of 129 was estimated. To account for potential non-responses, 500 questionnaires were distributed across Lagos and Oyo States. Data were collected between March and May 2024 through both online and physical channels. A total of 350 responses were received (70% response rate), of which 40 were excluded due to incompleteness or invalid entries. The final sample comprised 310 valid responses. While this sampling method limits generalisability, the study's findings are applicable to similarly profiled MSMEs operating in comparable socio-economic contexts.

3.1 Construct measurement and instrumentation

The constructs investigated in this study were measured by adapting items from various empirical investigations and established sustainability scales. For example, the construct entrepreneurship sustainability was measured by adapting six (6) items from the studies of Dean and McMullen (2007), Eller et al. (2020), Esteves et al. (2021), Hariram et al. (2023) and Ibn-Mohammed et al. (2021) the statement of the adapted items focuses on the three crucial determinants of sustainability, which are environment, economic and social stability. However, the items adapted focus on the impediments to entrepreneurship sustainability.

Similarly, the items measuring sustainability awareness through education investigate respondents' knowledge of sustainability awareness, skills and values that promote the three arms of entrepreneurial sustainability (i.e., the economic, environmental and social) (Barba-Sánchez et al., 2022; Gadenne et al., 2009). Given this, we adapt the items used in this regard from studies that include Amoah et al. (2023), Mathur and Tandon (2016) and Eller et al. (2020). Initially, eleven (11) items were adapted. However, during instrument validation, the items were reduced to six (6).

Furthermore, items measuring government support for entrepreneurship sustainability include respondents' opinions on the consistency of entrepreneurship and its long-term effects, support for advocacy and public awareness, market access and promotion, tax incentives and regulatory frameworks. Given this, the adapted items capture the opinion of the targeted entrepreneurs concerning perceived government support for sustainable entrepreneurs. Hence, the items used were adapted from studies that included Amoah et al. (2023), Dean and McMullen (2007), Díaz-López et al. (2021), Gadenne et al. (2009) and Patashnik (2003). Given this, six (6) items were adapted for this investigation.

Lastly, the items used in measuring the influence of technology include AI and other forms, namely, social media and machinery that help entrepreneurs to reduce waste and production time, protect the environment and get their products to final consumers, are

measured by adapting items from Cheng et al. (2024), Eller et al. (2020), Esteves et al. (2021), Gu and Zheng (2021), Kantis et al. (2020) and Zhao et al. (2020). Additionally, all the items used were measured using the 5-point Likert scale following propositions by Batterton and Hale (2017), Jebb et al. (2021) and Joshi et al. (2015).

4 Data analysis and discussion

We observed from the retrieved 350 questionnaires that ten (10) were not filled out, and 30 were incorrectly or half-filled (selecting two or more choices for the questionnaire statements). This indicates a lack of interest in the survey; therefore, forty (40) questionnaires were deleted, and the remaining 310 were used for data analysis. We employ frequency distribution to analyse the data characteristics, which include respondents' gender, age of business, business operating sectors and business registration status (to determine the respondents' qualifications).

4.1 Frequency distribution

The frequency results reveal that most of the respondents in this study are female, with 51% (158) of respondents, followed by their male counterparts who have 49% (152). Furthermore, insights into the data reveal that most of the entrepreneurs 42.9% (133) started businesses between the past one (1) to three (3) years, followed by those who are less than a year in business with 23.2% (72) and those who started their ventures over five (5) years ago with 19% (59). Meanwhile, those entrepreneurs with experience between three (3) and five (5) years took the last spot in this investigation, with 14.8% (46) of respondents. The results thus imply that within the past five years, the respondents in the investigation context (emerging economy) chose to be entrepreneurs.

Table 1 Demographic data

Variable		*Sample (n)*	*Percentage (%)*
Gender	Female	158	51.00
	Male	152	49.00
Age of business	Less than one (1) years	72	23.20
	One to three years (1–3)	133	42.90
	Three to five years (3–5)	46	14.80
	Above five (5) years	59	19.00
Operating Sector	Fabricating and Manufacturing	50	16.10
	Sales and Services	130	41.90
	Food and Beverages	23	7.40
	Skin Care products	107	34.50
Business Registration Status	Yes	310	100.00%
	No		

Among the sectors investigated, it was observed that entrepreneurs who operated within the sales and services industry had the highest respondent rate, followed by skincare products with 41.9% (130) and 34.5% (107) respondents, respectively. This might justify why female entrepreneurs' rates seem higher in this investigation. The sector with the least representation in this investigation is food and beverages, followed by manufacturing and fabricating, with 7.4% (23) and 16.1% (50) respondents, respectively.

4.2 Inferential statistics (model evaluation)

Furthermore, we test the hypothesis by employing the SEM analysis via the SmartPLS analytic tool (Memon et al., 2021; Ramayah et al., 2018). We use this analytic tool to conduct the measurement and structural model analysis. Regarding the measurement model, we assess the Average Variance Extracted (AVE), Composite Reliability (CR) and the item loadings as proposed by Hair (2021) and Hair et al. (2020). As suggested by Purwanto and Sudargini (2021), the rule of thumb for the AVE is that the value should be greater than 0.5 (50%) and the composite reliability greater than 0.7. Furthermore, as evidenced in the study of Cheung et al. (2024), the conditions were not met if the rules for AVE and CR were violated. Items with the lowest loadings can be excluded from the model, provided the model employs reflective order, as Hair and Alamer (2022) remark.

Figure 2 Measurement model (see online version for colours)

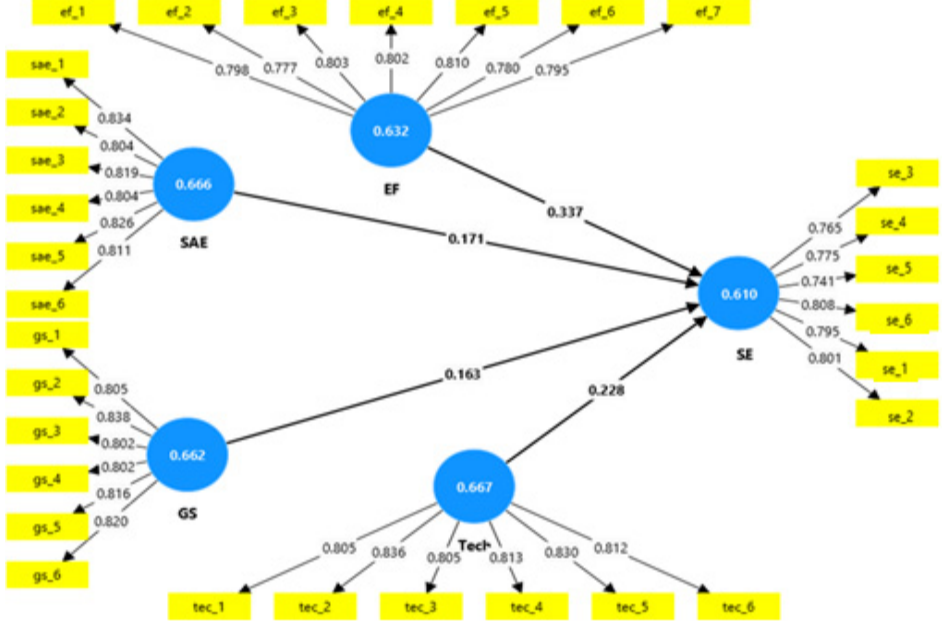


Table 2 Construct, item, item loadings, CR and AVE

Construct	*Items*	*Item Loadings*	*CR*	*(AVE)*	*Discriminant validity*
EF	ef_1	0.798	0.903	0.632	Achieved
	ef_2	0.777			
	ef_3	0.803			
	ef_4	0.802			
	ef_5	0.810			
	ef_6	0.780			
	ef_7	0.795			
GS	gs_1	0.805	0.898	0.662	Achieved
	gs_2	0.838			
	gs_3	0.802			
	gs_4	0.802			
	gs_5	0.816			
	gs_6	0.820			
SAE	sae_1	0.744	0.900	0.666	Achieved
	sae_2	0.834			
	sae_3	0.804			
	sae_4	0.819			
	sae_5	0.804			
	sae_6	0.826			
SE	se_1	0.811	0.874	0.610	Achieved
	se_2	0.801			
	se_3	0.765			
	se_4	0.775			
	se_5	0.741			
	se_6	0.808			
Tech	tec_1	0.805	0.901	0.667	Achieved
	tec_2	0.836			
	tec_3	0.805			
	tec_4	0.813			
	tec_5	0.830			
	tec_6	0.812			

Tables 3 and 4 assess the discriminant validity of the measurement model. Table 3 presents the Heterotrait–Monotrait (HTMT) ratios of correlations. All HTMT values are below the conventional threshold of 0.85 (Henseler et al., 2015), indicating that the constructs are empirically distinct. Table 4 applies the Fornell–Larcker criterion, which requires that each construct's square root of the Average Variance Extracted (AVE) (shown on the diagonal) must exceed the construct's highest correlation with any other construct. This condition is met across all constructs, providing further evidence of satisfactory discriminant validity.

Table 3 HTMT correlations

	EF	*GS*	*SAE*	*SE*
GS	0.636			
SAE	0.286	0.012		
SE	0.132	0.320	0.129	
Tech	0.463	0.395	0.007	0.325

Table 4 Fornell–Larcker criterion

	EF	*GS*	*SAE*	*SE*	*Tech*
EF	0.795				
GS	0.570	0.814			
SAE	0.489	0.510	0.816		
SE	0.328	0.415	0.325	0.781	
Tech	0.268	0.195	0.306	0.621	0.817

Tables 5 and 6 present the VIF for the items and the constructs. On the items' Vif, the value ranges between 1.778 and 2.477. Likewise, the constructs' Vif values are less than the maximum threshold of five (5), as Kalnins and Praitis Hill (2023) presented, indicating that the model is free from collinearity and multicollinearity issues.

Table 5 Vif (Items)

Item	*VIF*
ef_1	2.079
ef_2	1.947
ef_3	2.194
ef_4	2.140
ef_5	2.192
ef_6	1.939
ef_7	2.062
gs_1	2.145
gs_2	2.477
gs_3	2.110
gs_4	2.047
gs_5	2.191
gs_6	2.190
sae_1	2.310
sae_2	2.057
sae_3	2.197
sae_4	2.071
sae_5	2.251

Table 5 Vif (Items) (continued)

Item	*VIF*
sae_6	2.162
se_1	2.065
se_2	2.009
se_3	1.841
se_4	1.885
se_5	1.778
se_6	2.155
tec_1	2.108
tec_2	2.372
tec_3	2.099
tec_4	2.154
tec_5	2.266
tec_6	2.184

Table 6 Vif (Construct)

Construct	*SE*
EF	1.939
GS	2.562
SAE	2.162
Tech	2.382

Figure 3 Structural model (hypothesis testing) (see online version for colours)

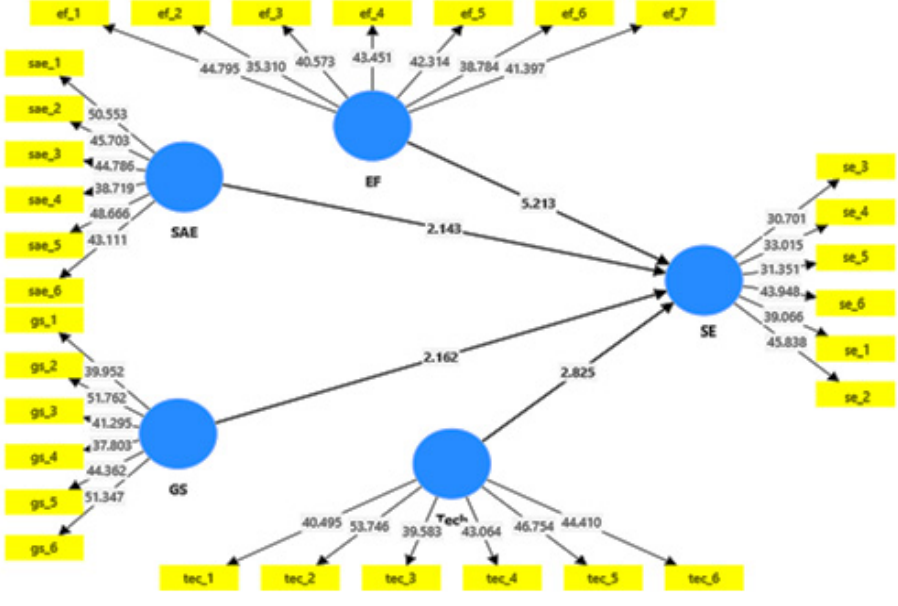


Table 7 Hypothesis testing

Hypothesis	*Relationship*	*β*	*STDEV*	*T stat*	*P-values*
H_1	EF -> SE	0.337	0.065	5.213	0.000
H_2	SAE -> SE	0.171	0.080	2.143	0.032
H_3	GS -> SE	0.163	0.075	2.162	0.031
H_4	Tech -> SE	0.228	0.081	2.825	0.005

The findings on the relationship between Economic and Financial constraints (EF) and Sustainable Entrepreneurship (SE) present a significant positive relationship ($\beta = 0.337$, $T = 5.213$), $p < 0.05$. The finding implies that the more favourable the economy and financial availability are, the more sustainable the enterprise operations are. The observation thus attests to findings not limited to those of Emon and Khan (2023); Lüdeke-Freund (2020) and Yang (2020), who all concluded that an unfavourable economy and unavailability of financial resources strained the sustainability of several entrepreneurship ventures.

Similarly, we found a significant relationship between Sustainable Awareness through Education (SAE) and sustainable entrepreneurship practices ($\beta = 0.177$, $T = 2.143$), $p < 0.05$. The observation implies that creating awareness of sustainable practices is crucial for entrepreneurs. The findings thus attest to Adelaja et al. (2023); Amoah et al. (2023); Barba-Sánchez et al. (2022) and Gadenne et al. (2009), who concluded that entrepreneurs failed to implement sustainable practices because they lack sustainable education exposure and sustainability awareness. On this note, we conclude that sustainability awareness via education significantly influences entrepreneurship sustainability practices.

Furthermore, the SEM results attest to the crucial role of government support in entrepreneurship sustainability practices, having ($\beta = 0.163$, $T = 2.162$) $p < 0.05$. Our empirical observation signifies that the more support entrepreneurs get from the government concerning sustainable practices, the higher their chances of implementing such initiatives in their business models. Hence, our empirical claim attests to findings from earlier investigations that are not limited to Bradley et al. (2021), Emon and Khan (2023), Lüdeke-Freund (2020), Gu and Wang (2022), Pulka et al. (2021) and Sadiq et al. (2022), where they all agree the crucial role of government supports in terms of financial or tax incentives, favourable policies and infrastructural supports.

Lastly, the relationship between technology infrastructure, including e-commerce, artificial intelligence and other technological platforms, was observed to significantly influence sustainable entrepreneurship practices among the surveyed respondents in the research context, having $\beta = 0.228$, $T = 2.825$, $p < 0.05$. The findings imply that the more available technologies entrepreneurs embed in their business model, the higher the chances of heading towards sustainable practices. The observed result in this regard attests to findings from earlier investigations that include Esteves et al. (2021), Gast et al. (2017), Kantis et al. (2020) and Zhao et al. (2020), where they all agree on the significant role of technology and technological platforms in sustainable business practices among entrepreneurs from different locations around the world.

The results presented in Table 8 demonstrate that the structural model explains a moderate proportion of variance in sustainable entrepreneurship (SE), with an R^2-value of 0.439 and an adjusted R^2 of 0.437. According to Chin (1998), R^2-values between 0.33 and

0.67 indicate moderate explanatory power, suggesting that the selected predictors offer a meaningful explanation for SE outcomes.

Table 8 Variance explained r-sq. (r^2), effect size (f^2)

Outcome variable	*R^2*	*Adjusted R^2*
Sustainable Entrepreneurship (SE)	0.439	0.437
Goodness Fit index	*Value*	*Threshold interpretation*
SRMR (Standardised Root Mean Square Residual)	0.038	< 0.08 = Good fit
NFI (Normed Fit Index)	0.901	> 0.90 = Acceptable
R^2_SE	0.439	Moderate explanatory power
Predictor construct	*f^2 Effect size*	*q^2 predictive relevance*
Economic & Financial Constraints (EF)	0.041 (Small)	0.045 (Small)
Sustainability Awareness via Education (SAE)	0.208 (Medium)	0.165 (Medium)
Government Support (GS)	0.089 (Small–Medium)	0.072 (Small)
Technology Infrastructure (Tech)	0.170 (Medium)	0.122 (Medium)

In terms of effect sizes, Sustainability Awareness through Education (SAE) exhibited the highest effect size ($f^2 = 0.208$), which is considered medium according to Cohen's (1988) guidelines. Technology Infrastructure (Tech) also demonstrated a medium effect ($f^2 = 0.170$), while Government Support (GS) showed a small-to-medium effect ($f^2 = 0.089$). Economic and Financial Constraints (EF) had a smaller but significant effect ($f^2 = 0.041$).

The predictive relevance of the model, assessed using q^2-values, further confirms the importance of SAE and Tech. SAE yielded a q^2 of 0.165 and Tech a q^2 of 0.122, meeting the medium predictive relevance threshold. Meanwhile, GS ($q^2 = 0.072$) and EF ($q^2 = 0.045$) demonstrate small but non-negligible predictive relevance, indicating their continued contribution to the model's explanatory capacity.

Model fit indices further support the robustness of the structural model. The Standardised Root Mean Square Residual (SRMR) was 0.038, well below the conventional threshold of 0.08, indicating a good model fit. The Normed Fit Index (NFI) was 0.901, exceeding the commonly accepted cut-off of 0.90, confirming the model's acceptable comparative fit.

Therefore, these results offer strong support for the proposed research model. They highlight the central role of sustainability awareness through education and access to technological infrastructure in shaping sustainable entrepreneurship, while also acknowledging the supportive but comparatively smaller effects of financial constraints and government support.

Furthermore, our findings in this study align with previous conceptual and SEM-based research (e.g., Adelaja et al., 2023; Shamsudin et al., 2018) conducted in other emerging economies such as Vietnam (Nguyen and Nguyen, 2024) and Indonesia (Agung and Sutadji, 2023), where institutional support and technology infrastructure have likewise emerged as strong predictors of sustainable entrepreneurial intentions. However, the present study contributes further by offering empirical evidence from Nigeria, an economy underrepresented in sustainability-driven entrepreneurship research. This enhances the cross-regional validity of theoretical frameworks such as the Resource-

Based Theory (RBT) and underscores the relevance of tailored, context-specific interventions for MSMEs in developing regions.

5 Practical implications of findings

The findings from this investigation unearth some practical importance crucial to realising entrepreneurship sustainability not only in the study context but also as a lesson to other contexts that might be interested in ensuring the sustainability of entrepreneurship ventures in their locality. The first practical implication of this investigation is guaranteeing economic stability and financial availability. However, we investigated the influence of an opposing view to avoid response bias to favour economic and financial constraints. Nevertheless, our findings concur with earlier investigations affirming the crucial role of enabling environments for entrepreneurship sustainability through favourable economic conditions and the availability of needed finance. To run the affairs of the entrepreneurship ventures

Furthermore, the findings from our investigation reveal the crucial role of technology infrastructure in ensuring entrepreneurship sustainability. That is, sustaining entrepreneurship ventures might not be feasible without using various technology infrastructures that will ease the production process, limit production costs, minimise resource wastages, assist in delivering the product and services offered to the intended consumers and receive prompt customer feedback if the need arises.

Table 9 Policy and practice matrix for promoting sustainable entrepreneurship

Driver	*Actionable practice/policy*	*Key performance indicator (KPI)*
Economic & Financial Constraints (EF)	- Provide access to green credit lines - Tax incentives for sustainable investments	- % of MSMEs accessing green finance - Reduction in startup capital barriers
Sustainability Awareness via Education (SAE)	- Embed sustainability in entrepreneurship curricula - Offer MSME-targeted training workshops	- % of entrepreneurs trained in sustainability - Adoption rate of sustainable business practices
Government Support (GS)	- Streamline regulatory processes - Launch public procurement preferences for green MSMEs	- Time to register/apply for support - % of MSMEs benefiting from government initiatives
Technology Infrastructure (Tech)	- Subsidise access to digital platforms/tools - Promote shared clean-tech hubs	- % of firms adopting digital tools - % reduction in operational waste or energy use

On the significant contribution of several government support programs and sustainability awareness through education to entrepreneurs, our findings suggest their necessity and considerable role in ensuring sustainable entrepreneurship in emerging economies. Hence, to ensure sustainable practices among entrepreneurial ventures,

governments and stakeholders must intensify awareness creation through education and several governmental supports must be tailored to the entrepreneurial needs.

This study's findings contribute directly to sustainable development goals by identifying the role of education, technology and institutional support in fostering environmentally responsible and economically viable entrepreneurship. By enabling MSMEs to integrate sustainability into their business models, these drivers enhance long-term competitiveness at the local level. The emphasis on inclusive support mechanisms and capacity building aligns with SDG targets on industry innovation and decent work. This reinforces the value of targeted policies that empower small enterprises as engines of sustainable growth in emerging economies.

The matrix above in Table 9 translates the study's empirical findings into practical, policy-relevant strategies for fostering sustainable entrepreneurship. Linking each key driver to measurable actions offers a framework that local governments, development agencies and SME associations can implement and monitor effectively.

5.1 Theoretical implications

The theoretical findings of this investigation through the lens of the underpinning theories reveal the following: the first revelation using the RBT theory shows that entrepreneur ventures that navigate effectively limited resources in the face of an unfavourable economy and financial constraints through innovative financial strategies or leveraging scarce resources could develop unique, unimitable ways of achieving sustainable practices.

Similarly, the significant relationship between technology infrastructure and awareness through education on entrepreneurship sustainability aligns with the notion of RBT in the sense that judicious use of internal resources gives firms unparalleled advantages over other firms, thus sustaining their competitive edge by ensuring prompt awareness of the latest trends, and updated technologies that allow operational flexibilities in such a way that leads to sustainable entrepreneurship practices. Even though RBT is a theory that focuses more on internal resources and governmental support, which is a crucial external factor, the entrepreneurship firm might internalise the governmental support, transforming it into competitive resources specifically for innovative and scalable outcomes.

Additionally, the institutional theory confirmed the crucial role of external forces (governmental support and education) in ensuring sustainable practices among entrepreneurs in an emerging economy through awareness creation and assistance in easing the harsh economic and financial conditions most emerging economy faces.

5.2 Limitations and recommendations

In this study, we acknowledged that constructs such as government support and economic and financial constraints should be treated as multidimensional constructs. However, we treat these as uni-dimensional constructs due to the limited research scope. Given this, we believe these to be among the crucial limitations of this investigation. Therefore, we urge future scholars to demystify these constructs using their various dimensions. Other limitations observed that might warrant the attention of future scholars' efforts lie in the overreliance of this investigation on RBT and institutional theory.

Meanwhile, other theories that might capture the detailed fluidity of the environment could be employed to give a thorough insight. Also, the data used in this investigation is cross-sectional, and the unquantifiable opinions of respondents might not be duly captured numerically. Given this, we implore future scholars to adopt methodologies that can analyse the respondents' unquantifiable opinions in future investigations.

Although the model explained significant variance in sustainable entrepreneurship, the study did not include robustness checks using control variables such as firm age or sector. This limits our ability to assess whether the observed relationships hold consistently across enterprise types, and future studies are encouraged to address this gap.

5.3 Conclusion

To sum up this investigation, in our capacity, we investigated sustainable practices issues among entrepreneurs in emerging economies. Given this, factors such as unfavourable economic and financial conditions prevalent in such an emerging environment, availability of technological infrastructure and awareness of sustainable practices through education and government support were considered. Our analysis findings reveal that all the examined variables were crucial in ensuring the sustainability of entrepreneurship in emerging economies. Hence, it is paramount that these factors are integrated to form strategic competencies to cushion the influence of harsh economic conditions that could impede entrepreneurship sustainability in emerging economies. Although the methodological approach employed (PLS-SEM and survey design) aligns with established empirical standards, the novelty of this study lies in its context-specific application within the Nigerian MSME sector. It offers empirical insights with regional relevance and comparative value for sustainability-focused entrepreneurship research in emerging economies.

Declarations

All authors declare that they have no conflicts of interest.

References

Adelaja, A.A., Akinbami, C.A.O., Jiboye, T. and Ogbolu, G. (2023) 'Students' intention towards self-employment: an application of ELT theory on the effectiveness of entrepreneurial education types', *The International Journal of Management Education*, Vol. 21, No. 2. Doi: 10.1016/j.ijme.2022.100738.

Agung, A.I. and Sutadji, E. (2023) 'Factors influencing entrepreneurial intention in Indonesia: perceptions of vocational high school students', *Eurasian Journal of Educational Research*, Vol. 104. Doi: 10.2991/978-94-6463-100-5_11.

Amoah, J., Odoom, R.K., Yankey, E.A., Baidoo, P. and Aidoo, B. (2023) 'Reassessing the inhibiting factors of entrepreneurship development in the SME segment', *European Conference on Management Leadership and Governance*, Vol. 19, No. 1, pp.593–598.

Andersen, J. (2021) 'A relational natural-resource-based view on product innovation: the influence of green product innovation and green suppliers on differentiation advantage in small manufacturing firms', *Technovation*, Vol. 104. Doi: 10.1016/j.technovation.2021.102254.

Asparouhov, T. and Muthén, B. (2018) *SRMR in Mplus*. Available online at: https://www.statmodel.com/download/SRMR2.pdf

Barba-Sánchez, V., Mitre-Aranda, M. and Del Brío-González, J. (2022) 'The entrepreneurial intention of university students: an environmental perspective', *European Research on Management and Business Economics*, Vol. 28, No. 2. Doi: 10.1016/j.iedeen.2021.100184.

Barney, J.B., Mackey, T.B. and Mackey, A. (2023) 'Why has it been so hard to define competitive advantage?' *Strategic Management Review*, Vol. 4, No. 1, pp.1–13. https://doi.org/10.1177/01492063211014276

Batterton, K.A. and Hale, K.N. (2017) 'The Likert scale what it is and how to use it', *Phalanx*, Vol. 50, No. 2, pp.32–39. https://www.jstor.org/stable/26296382

Bradley, S.W., Kim, P.H., Klein, P.G., McMullen, J.S. and Wennberg, K. (2021) 'Policy for innovative entrepreneurship: Institutions, interventions, and societal challenges', *Strategic Entrepreneurship Journal*, Vol. 15, No. 2, pp.167–184.

Butkouskaya, V., Romagosa, F. and Noguera, M. (2020) 'Obstacles to sustainable entrepreneurship amongst tourism students: a gender comparison', *Sustainability*, Vol. 12, No. 5. Doi: 10.3390/su12051812.

Chan, E.H., Qian, Q.K. and Lam, P.T. (2009) 'The market for green building in developed Asian cities – the perspectives of building designers', *Energy Policy*, Vol. 37, No. 8, pp.3061–3070.

Cheng, X., Yan, C., Ye, K. and Chen, K. (2024) 'Enhancing resource efficiency through the utilisation of the green bond market: an empirical analysis of Asian economies', *Resources Policy*, Vol. 89. Doi: 10.1016/j.resourpol.2023.104623.

Cheung, G.W., Cooper-Thomas, H.D., Lau, R.S. and Wang, L.C. (2024) 'Reporting reliability, convergent and discriminant validity with structural equation modeling: a review and best-practice recommendations', *Asia Pacific Journal of Management*, Vol. 41, No. 2, pp.745–783.

Chin, W.W. (1998) 'The partial least squares approach to structural equation modeling', *Modern Methods for Business Research*, Psychology Press, pp.295–336. https://www.jstor.org/stable/249674

Chowdhury, S., Dey, P.K., Rodríguez-Espíndola, O., Parkes, G., Tuyet, N.T.A., Long, D.D. and Ha, T.P. (2022) 'Impact of organisational factors on the circular economy practices and sustainable performance of small and medium-sized enterprises in Vietnam', *Journal of Business Research*, Vol. 147, pp.362–378.

Cohen, S. (1988) 'Perceived stress in a probability sample of the United States', Spacapan, S. and Oskamp, S. (Eds): *The Social Psychology of Health*, Sage Publications, Inc., pp.31–67.

Dean, T.J. and McMullen, J.S. (2007) 'Toward a theory of sustainable entrepreneurship: reducing environmental degradation through entrepreneurial action', *Journal of Business Venturing*, Vol. 22, No. 1, pp.50–76.

Di Vaio, A., Hassan, R., Chhabra, M., Arrigo, E. and Palladino, R. (2022) 'Sustainable entrepreneurship impact and entrepreneurial venture life cycle: a systematic literature review', *Journal of Cleaner Production*, Vol. 378, 134469. https://doi.org/10.1016/j.jclepro.2022.134469

Díaz-López, C., Navarro-Galera, A., Zamorano, M. and Buendía-Carrillo, D. (2021) 'Identifying public policies to promote sustainable building: a proposal for governmental drivers based on stakeholder perceptions', *Sustainability*, Vol. 13, No. 14. Doi: 10.3390/su13147701.

Droege, H., Kirchherr, J., Raggi, A. and Ramos, T.B. (2023) 'Towards a circular disruption: On the pivotal role of circular economy policy entrepreneurs', *Business Strategy and the Environment*, Vol. 32, No. 3, pp.1142–1158.

Eller, F.J., Gielnik, M.M., Wimmer, H., Thölke, C., Holzapfel, S., Tegtmeier, S. and Halberstadt, J. (2020) 'Identifying business opportunities for sustainable development: longitudinal and experimental evidence contributing to the field of sustainable entrepreneurship', *Business Strategy and the Environment*, Vol. 29, No. 3, pp.1387–1403.

Emon, M.M.H. and Khan, T. (2023) 'The impact of cultural norms on sustainable entrepreneurship practices in SMEs of Bangladesh', *Indonesian Journal of Innovation and Applied Sciences*, 3, No. 3, pp.201–209.

Esteves, A.M., Genus, A., Henfrey, T., Penha-Lopes, G. and East, M. (2021) 'Sustainable entrepreneurship and the sustainable development goals: community-led initiatives, the social solidarity economy and commons ecologies', *Business Strategy and the Environment*, Vol. 30, No. 3, pp.1423–1435.

Gadenne, D.L., Kennedy, J. and McKeiver, C. (2009) 'An empirical study of environmental awareness and practices in SMEs', *Journal of Business Ethics*, Vol. 84, pp.45–63.

Gast, J., Gundolf, K. and Cesinger, B. (2017) 'Doing business in a green way: a systematic review of the ecological sustainability entrepreneurship literature and future research directions', *Journal of Cleaner Production*, Vol. 147, pp.44–56.

Gobena, A.E. and Kant, S. (2022) 'Assessing the effect of endogenous culture, local resources, eco-friendly environment and modern strategy development on entrepreneurial development', *Journal of Entrepreneurship, Management, and Innovation*, Vol. 4, No. 1, pp.118–135.

Gu, W. and Wang, J. (2022) 'Research on index construction of sustainable entrepreneurship and its impact on economic growth', *Journal of Business Research*, Vol. 142, pp.266–276.

Gu, W. and Zheng, X. (2021) 'An empirical study on the impact of sustainable entrepreneurship: based on the environmental Kuznets model', *Journal of Business Research*, Vol. 123, pp.613–624.

Hair, J. and Alamer, A. (2022) 'Partial least squares structural equation modeling (PLS-SEM) in second language and education research: guidelines using an applied example', *Research Methods in Applied Linguistics*, Vol. 1, No. 3. Doi: 10.1016/j.rmal.2022.100027.

Hair, J.F. (2021) 'Reflections on SEM: an introspective, idiosyncratic journey to composite-based structural equation modeling', *Database: Advances in Information Systems*, Vol. 52, pp.101–113.

Hair, J.F., Howard, M.C. and Nitzl, C. (2020) 'Assessing measurement model quality in PLS-SEM using confirmatory composite analysis', *Journal of Business Research*, Vol. 109, pp.101–110.

Hariram, N.P., Mekha, K.B., Suganthan, V. and Sudhakar, K. (2023) 'Sustainalism: an integrated socio-economic-environmental model to address sustainable development and sustainability', *Sustainability*, Vol. 15, No. 13. Doi: 10.3390/su151310682.

He, J., Nazari, M., Zhang, Y. and Cai, N. (2020) 'Opportunity-based entrepreneurship and environmental quality of sustainable development: a resource and institutional perspective', *Journal of Cleaner Production*, Vol. 256. Doi: 10.1016/j.jclepro.2020.120390.

Henseler, J., Ringle, C.M. and Sarstedt, M. (2015) 'A new criterion for assessing discriminant validity in variance-based structural equation modeling', *Journal of the Academy of Marketing Science*, Vol. 43, No. 1, pp.115–135. https://doi.org/10.1007/s11747-014-0403-8

Hummels, H. and Argyrou, A. (2021) 'Planetary demands: redefining sustainable development and sustainable entrepreneurship', *Journal of Cleaner Production*, Vol. 278. Doi: 10.1016/j.jclepro.2020.123804.

Ibn-Mohammed, T., Mustapha, K.B., Godsell, J., Adamu, Z., Babatunde, K.A., Akintade, D.D. and Koh, S.C.L. (2021) 'A critical analysis of the impacts of Covid-19 on the global economy and ecosystems and opportunities for circular economy strategies', *Resources, Conservation and Recycling*, Vol. 164. Doi: 10.1016/j.resconrec.2020.105169.

Jebb, A.T., Ng, V. and Tay, L. (2021) 'A review of key Likert scale development advances: 1995–2019', *Frontiers in Psychology*, Vol. 12, 637547. https://doi.org/10.3389/fpsyg.2021.637547

Johnson, M.P. and Schaltegger, S. (2020) 'Entrepreneurship for sustainable development: a review and multilevel causal mechanism framework', *Entrepreneurship Theory and Practice*, Vol. 44, No. 6, pp.1141–1173.

Joshi, A., Kale, S., Chandel, S. and Pal, D.K. (2015) 'Likert scale: explored and explained', *British Journal of Applied Science & Technology*, Vol. 7, No. 4, 396. https://doi.org/10.9734/BJAST/2015/14975

Kalnins, A. and Praitis Hill, K. (2023) 'The VIF score: what is it good for? Absolutely nothing', *Organisational Research Methods*. Doi: 10.1177/10944281231216381.

Kantis, H.D., Federico, J.S. and García, S.I. (2020) 'Entrepreneurship policy and systemic conditions: evidence-based implications and recommendations for emerging countries', *Socio-Economic Planning Sciences*, Vol. 72. Doi: 10.1016/j.seps.2020.100872.

Khanra, S., Kaur, P., Joseph, R.P., Malik, A. and Dhir, A. (2022) 'A resource-based view of green innovation as a strategic firm resource: present status and future directions', *Business Strategy and the Environment*, Vol. 31, No. 4, pp.1395–1413.

Lüdeke-Freund, F. (2020) 'Sustainable entrepreneurship, innovation, and business models: integrative framework and propositions for future research', *Business Strategy and the Environment*, Vol. 29, No. 2, pp.665–681.

Martin, X. and Cuypers, I.R. (2024) 'Heterogeneous adaptability: learning, cash resources, and the fine-grained adjustment of misaligned governance', *Strategic Management Journal*, Vol. 45, No. 1, pp.168–201.

Mathur, S. and Tandon, N. (2016) 'Green entrepreneurship: the emerging paradigm for sustainable growth and development in India – a study of the Millennials', *Indian Journal of Science and Technology*, Vol. 9, No. 45, pp.1–11.

Memon, M.A., Ramayah, T., Cheah, J.H., Ting, H., Chuah, F. and Cham, T.H. (2021) 'PLS-SEM statistical programs: a review', *Journal of Applied Structural Equation Modeling*, Vol. 5, No. 1, pp.1–14.

Musona, J., Puumalainen, K., Sjögrén, H. and Vuorio, A. (2021) 'Sustainable entrepreneurship at the bottom of the pyramid: an identity-based perspective', *Sustainability*, Vol. 13, No. 2. Doi: 10.3390/su13020812.

Nguyen, P.N.D. and Nguyen, H.H. (2024) 'Examining the role of family in shaping digital entrepreneurial intentions in emerging markets', *Sage Open*, Vol. 14, No. 1. Doi: 10.1177/21582440241239493.

Ogbolu, G. and Adelaja, A.A. (2022) 'Exploring the benefits of technology adoption on business performance among unregistered SMEs: insights from Nigeria', *Asian Journal of Economics, Business and Accounting*, Vol. 22, No. 21, pp.182–188.

Ogbolu, G. and Hague, S. (2025) 'Bending the rules of the game: dark entrepreneurship in the capitalist system', in Oyewunmi, A., Owens, G. and Adeola, O. (Eds): *The Dark Side of Leadership: A Cross-Cultural Compendium*, Productivity Press, pp.133–143.

Patashnik, E. (2003) 'After the public interest prevails: the political sustainability of policy reform', *Governance*, Vol. 16, No. 2, pp.203–234.

Polas, M.R.H., Kabir, A.I., Sohel-Uz-Zaman, A.S.M., Karim, R. and Tabash, M.I. (2022) 'Blockchain technology as a game changer for green innovation: green entrepreneurship as a roadmap to green economic sustainability in Peru', *Journal of Open Innovation: Technology, Market and Complexity*, Vol. 8, No. 2. Doi: 10.3390/joitmc8020062.

Pulka, B.M., Ramli, A. and Mohamad, A. (2021) 'Entrepreneurial competencies, entrepreneurial orientation, entrepreneurial network, government business support and SMEs performance: the moderating role of the external environment', *Journal of Small Business and Enterprise Development*, Vol. 28, No. 4, pp.586–618.

Purwanto, A. and Sudargini, Y. (2021) 'Partial least squares structural squation modeling (PLS-SEM) analysis for social and management research: a literature review', *Journal of Industrial Engineering and Management Research*, Vol. 2, No. 4, pp.114–123.

Ramayah, T.J.F.H., Cheah, J., Chuah, F., Ting, H. and Memon, M.A. (2018) 'Partial least squares structural equation modeling (PLS-SEM) using smart PLS3.0', *An Updated Guide and Practical Guide to Statistical Analysis*, pp.967–978.

Sadiq, M., Nonthapot, S., Mohamad, S., Chee Keong, O., Ehsanullah, S. and Iqbal, N. (2022) 'Does green finance matter for sustainable entrepreneurship and environmental corporate social responsibility during Covid-19?', *China Finance Review International*, Vol. 12, No. 2, pp.317–333.

Serdar, C.C., Cihan, M., Yücel, D. and Serdar, M.A. (2021) 'Sample size, power and effect size revisited: simplified and practical approaches in pre-clinical, clinical and laboratory studies', *Biochemia Medica*, Vol. 31, No. 1, pp.27–53.

Shamsudin, A.S., Adelaja, A.A. and Minai, M.S. (2018) 'Conceptualising the effect of entrepreneurial education and industrial interface mix in enhancing the entrepreneurial intention amongst graduates', *Journal of Entrepreneurship Education*, Vol. 21, No. 3, pp.1–9.

Shibin, K.T., Dubey, R., Gunasekaran, A., Hazen, B., Roubaud, D., Gupta, S. and Foropon, C. (2020) 'Examining sustainable supply chain management of SMEs using resource based view and institutional theory', *Annals of Operations Research*, Vol. 290, pp.301–326.

Thomas, L. and Krebs, C.J. (1997) 'A review of statistical power analysis software', *Bulletin of the Ecological Society of America*, Vol. 78, No. 2, pp.126–138.

Weidinger, C. (2014) *Sustainable Entrepreneurship Business Success through Sustainability*, Springer.

Yang, M. (2020) 'Resilience and meaning-making amid the Covid-19 epidemic in China', *Journal of Humanistic Psychology*, Vol. 60, No. 5, pp.662–671.

Ye, Q., Zhou, R., Anwar, M.A., Siddiquei, A.N. and Asmi, F. (2020) 'Entrepreneurs and environmental sustainability in the digital era: regional and institutional perspectives', *International Journal of Environmental Research and Public Health*, Vol. 17, No. 4. Doi: 10.3390/ijerph17041355.

Yu, Y., Junjan, V., Yazan, D.M. and Iacob, M.E. (2022) 'A systematic literature review on Circular Economy implementation in the construction industry: a policy-making perspective', *Resources, Conservation and Recycling*, Vol. 183. Doi: 10.1016/j.resconrec.2022.106359.

Zahra, S.A. (2021) 'The resource-based view, resourcefulness, and resource management in startup firms: a proposed research agenda', *Journal of Management*, Vol. 47, No. 7, pp.1841–1860.

Zhang, Z., Yu, J. and Tian, J. (2023) 'Community participation, social capital cultivation and sustainable community renewal: a case study from Xi'an's Southern Suburbs, China', *Journal of the Knowledge Economy*, pp.1–34.

Zhao, D., Jiang, J. and Yin, Z. (2020) 'Can entrepreneurship bring happiness? Evidence from China', *Economic Modelling*, Vol. 91, pp.679–686. https://doi.org/10.1016/j.econmod.2019.12.009

Appendix A: Measurement instrument items and construct mapping

All items were measured using a 5-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree). The table below lists each item by construct, source, status and whether it was kept or dropped after validation.

Economic and Financial Constraints (EFC)				
Item code	*Statement*	*Adapted source*	*Status*	*Kept /Dropped*
EF_1	Lack of access to capital limits my ability to grow sustainably.	Gu and Wang (2022)	Retained in final model	Kept
EF_2	Financial constraints hinder investment in green technologies.	Yang (2020); Zhao et al. (2020)	Retained in final model	Kept
EF_3	I face difficulty obtaining funds to meet environmental standards.	Dean and McMullen (2007)	Retained in final model	Kept
EF_4	High cost of compliance affects sustainability plans.	Lüdeke-Freund (2020)	Retained in final model	Kept
EF_5	The absence of financial support discourages sustainability initiatives.	Amoah et al. (2023)	Retained in final model	Kept
EF_6	Limited access to credit reduces my ability to invest in sustainable practices.	Esteves et al. (2021)	Retained in final model	Kept
EF_7	Access to financial incentives is inadequate for green entrepreneurship.	Adelaja et al. (2023)	Retained in final model	Kept
EF_8	My business cannot afford long-term investments in sustainability.	Pre-test item	Removed during validation	Dropped
Government Support (GS)				
Item code	*Statement*	*Adapted source*	*Status*	*Kept/Dropped*
GS_1	Government policies promote sustainability among SMEs.	Díaz-López et al. (2021)	Retained in final model	Kept
GS_2	I have access to tax incentives for implementing sustainable practices.	Gadenne et al. (2009)	Retained in final model	Kept
GS_3	Public awareness programs support sustainable entrepreneurship.	Amoah et al. (2023)	Retained in final model	Kept
GS_4	Regulatory support encourages my sustainable business efforts.	Patashnik (2003)	Retained in final model	Kept

Economic and Financial Constraints (EFC)				
GS_5	Government offers support for sustainable innovation.	Dean and McMullen (2007)	Retained in final model	Kept
GS_6	Market access support from government facilitates sustainability.	Pulka et al. (2021)	Retained in final model	Kept
GS_7	Government training programs help build sustainability skills.	Dean and McMullen (2007)	Removed during item reduction	Dropped
Sustainability Awareness through Education (SAE)				
Item Code	*Statement*	*Adapted source*	*Status*	*Kept/Dropped*
SAE_1	I have received training on sustainability practices.	Mathur and Tandon (2016)	Retained in final model	Kept
SAE_2	I understand the importance of sustainability in business.	Gadenne et al. (2009)	Retained in final model	Kept
SAE_3	I know how to reduce environmental impact in operations.	Barba-Sánchez et al. (2022)	Retained in final model	Kept
SAE_4	I apply sustainable principles in decision-making.	Eller et al. (2020)	Retained in final model	Kept
SAE_5	I actively seek new knowledge about sustainable practices.	Amoah et al. (2023)	Retained in final model	Kept
SAE_6	My education has emphasised environmental and social responsibility.	Adelaja et al. (2023)	Retained in final model	Kept
SAE_7	I have formal education in environmental entrepreneurship.	New item	Removed during validation	Dropped
Technology Infrastructure (TI)				
Item code	*Statement*	*Adapted source*	*Status*	*Kept/Dropped*
TECH_1	I use digital platforms to reach sustainable markets.	Cheng et al. (2024)	Retained in final model	Kept
TECH_2	My business uses technology to reduce production waste.	Zhao et al. (2020)	Retained in final model	Kept
TECH_3	Technological tools help optimise energy use in my business.	Esteves et al. (2021)	Retained in final model	Kept
TECH_4	I adopt AI or automation to improve sustainable outcomes.	Kantis et al. (2020)	Retained in final model	Kept
TECH_5	E-commerce tools support my sustainability efforts.	Gu and Zheng (2021)	Retained in final model	Kept

Technology Infrastructure (TI)				
Item code	*Statement*	*Adapted source*	*Status*	*Kept/Dropped*
TECH_6	My business accesses green technology solutions.	Eller et al. (2020)	Retained in final model	Kept
TECH_7	Limited infrastructure restricts technology adoption. (reverse-coded)	New item	Dropped during pre-test	Dropped
Sustainable Entrepreneurship (SE)				
Item code	*Statement*	*Adapted source*	*Status*	*Kept/Dropped*
SE_1	I prioritise sustainability in all aspects of my business.	Dean and McMullen (2007)	Retained in final model	Kept
SE_2	My business model includes social and environmental goals.	Esteves et al. (2021)	Retained in final model	Kept
SE_3	I track the environmental impact of my operations.	Ibn-Mohammed et al. (2021)	Retained in final model	Kept
SE_4	I seek to balance economic goals with sustainability.	Hariram et al. (2023)	Retained in final model	Kept
SE_5	Sustainability drives innovation in my business.	Eller et al. (2020)	Retained in final model	Kept
SE_6	I see long-term sustainability as key to competitiveness.	Lüdeke-Freund (2020)	Retained in final model	Kept