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Innovation as the Bedrock of Micro Business Sustainability

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Abstract

This study examined the effects of innovation on the sustainability of micro enterprises in Ifo Local Government Area, Ogun State, Nigeria. The study adopted a quantitative research design, with the use of a structured questionnaire as the research instrument. The population of the study comprised 184 registered micro-business owners operating in Ifo Local Government. Due to the small population, a census sampling method was adopted, in order to accommodate everyone to participate in the study. Out of the 184 questionnaire that were distributed, 162 questionnaire were returned but only 150 questionnaire were found usable, and fit for analysis, thereby, giving a response rate of 82%. The 20-item, four-point Likert-scale research instrument demonstrated satisfactory internal consistency (Cronbach's $\alpha = 0.861$). Data were analysed using descriptive statistics, an independent-samples t-test, one-way analysis of variance (ANOVA), and multiple regression. The regression model was statistically significant, $F(4, 145) = 37.300$, $p < 0.001$, and explained 50.7% of the variance in small business sustainability ($R^2 = 0.507$; adjusted $R^2 = 0.493$). Product innovation ($\beta = .301$, $p < 0.001$), marketing innovation ($\beta = 0.234$, $p = 0.002$), and digital innovation ($\beta = 0.279$, $p < 0.001$) had significant positive effects on sustainability, whereas process innovation did not have a statistically significant independent effect ($\beta = 0.086$, $p = 0.247$). Perceived sustainability also did not differ significantly by gender, $t(148) = -1.398$, $p = 0.164$, or age group, $F(3, 146) = 1.469$, $p = 0.225$. The findings indicated that innovation is an important firm-level capability for sustaining micro businesses, although its dimensions do not contribute equally. The study recommended coordinated investment in product, marketing and digital innovation, supported by affordable digital-skills development and enabling institutional conditions.

Keywords: Product innovation, Process innovation, Marketing innovation, Digital innovation, Sustainability, Micro businesses, Dynamic capabilities.

INTRODUCTION

Micro businesses (micro businesses) occupy a central position in inclusive economic development. They create employment, mobilise entrepreneurial activity, generate household income and broaden participation in productive activity across local value chains. In Nigeria, Mmicro businesses contribute substantially to employment, income generation and national output; consequently, their survival and growth have important implications for economic diversification, poverty reduction and broad-based development (Ayogoi & Poi, 2026). However, economic relevance does not guarantee continuity. Nigerian micro businesses commonly operate in conditions characterised by intense competition, unreliable infrastructure, limited access to formal finance, rising energy and input costs, volatile customer demand, inadequate technical skills and changing policy conditions (Omenefu Atabo Reuben et al., 2026).

Within this challenging environment, innovation has become an important strategic capability for business survival. Innovation refers to the implementation of a new or significantly improved product or business process that differs from the firm's previous offerings or practices and has been put into use, rather than merely conceived (Gault, 2018). For a small business, innovation may involve redesigning service delivery, adopting new promotional approaches, introducing electronic payments, using social-media campaigns, establishing an online sales channel, improving record-keeping, or deploying simple digital tools to support decision-making.

Innovation can reduce waste and operating costs, improve product or service quality, enhance customer satisfaction, strengthen differentiation and enable firms to respond more rapidly to changing markets. Small firms may possess an important advantage in this regard because relatively simple organisational structures can facilitate rapid decision-making and low-cost experimentation. Nevertheless, limited capital, small workforces and constrained managerial capacity can impede the conversion of innovative ideas into sustained business practices. Accordingly, the relationship between innovation and sustainability is unlikely to be uniform; it may depend on the type of innovation adopted, the resources available to the enterprise and the characteristics of the local business environment.

Four dimensions of innovation are examined in this study. Product innovation involves the introduction of new or substantially improved goods or services and can help firms respond to changing customer preferences, increase perceived value and strengthen market position. Process innovation concerns the methods through which a business operates, including production, distribution, inventory management and service delivery; improvements in these areas may reduce delays, waste and operating costs. Marketing innovation encompasses new promotional methods, pricing approaches, packaging practices, customer-relationship activities and distribution channels that can help resource-constrained firms communicate value and reach customers more effectively.

Digital innovation is particularly relevant to contemporary micro-business sustainability because digital technologies can be integrated into routine operations through electronic payments, social-media marketing, digital bookkeeping, e-commerce, online customer communication, inventory applications, cloud-based tools and data-informed decision-making. Recent studies associate

digital transformation with operational efficiency, market access, adaptive capacity and competitiveness among micro businesses (Sabil et al., 2025; Yesuf & Fields, 2026). Digital financial innovation has likewise been associated with improved financial inclusion, lower transaction costs and greater resilience, although these benefits depend on adequate digital infrastructure and skills (Yuliyanti et al., 2026).

Recent evidence generally indicates a positive, although context-dependent, relationship between innovation and micro-business sustainability. Zhang et al. (2026) found that business-model innovation can help micro businesses respond to digitalisation, environmental pressures and changing value-creation requirements. Ismael et al. (2026) identify digitalisation, process improvement and technology-enabled operations as important drivers of sustainable micro business growth in developing economies, while Kamel et al. (2026) argue that innovation outcomes are strengthened when digital technology is complemented by stakeholder engagement, organisational capability and knowledge sharing. These findings suggest that product, process, marketing and digital innovation may operate jointly or independently in supporting business competitiveness and continuity.

Despite these potential benefits, Nigerian micro businesses face substantial barriers to innovation adoption and implementation. These include inadequate financing, limited access to credit, unreliable electricity, weak internet connectivity, limited managerial and technical capabilities, insufficient employee training, the cost of digital technologies, weak institutional support, cybersecurity concerns and resistance to change. Okunola (2026) identifies financing gaps, inadequate infrastructure, limited skills, organisational resistance and data-security concerns as important barriers to technology adoption among micro businesses. Yuliyanti et al. (2026) similarly emphasised the importance of supportive regulation, reliable infrastructure and digital literacy in determining the sustainability benefits of digital financial innovation.

Due to the strength of the innovation sustainability relationship which may vary across geographical and business contexts, location-specific empirical evidence remains important. This study therefore focuses on Ifo Local Government Area, Ogun State, where the extent to which product, process, marketing and digital innovation influence micro-business sustainability remains insufficiently established. Businesses in the area operate within the broader Nigerian context of competitive pressure, cost volatility, financing constraints, infrastructure limitations, technological change and shifting customer preferences.

The main objective of this study is to examine the effect of innovation on the sustainability of micro businesses in Ifo Local Government Area, Ogun State. Specifically, the study seeks to: (i) examine the effect of product innovation on micro-business sustainability; (ii) determine the effect of process innovation on micro-business sustainability; (iii) assess the effect of marketing innovation on micro-business sustainability; and (iv) examine the effect of digital innovation on micro-business sustainability.

Research Hypotheses

The study tested the following null hypotheses:

H0₁: Product innovation has no significant effect on micro-business sustainability in Ifo Local Government Area, Ogun State.

H0₂: Process innovation has no significant effect on micro-business sustainability in Ifo Local Government Area, Ogun State.

H0₃: Marketing innovation has no significant effect on micro-business sustainability in Ifo Local Government Area, Ogun State.

H0₄: Digital innovation has no significant effect on micro-business sustainability in Ifo Local Government Area, Ogun State.

LITERATURE REVIEW

Concept of Innovation

Innovation is generally understood as the implementation of a new or significantly improved product, service, process, marketing method, organisational practice or business model that creates value for the firm and its customers (Gault, 2018). The emphasis on implementation is important: an idea becomes an innovation when it is put into practice. For a micro business, innovation may involve improving an existing product, redesigning service delivery, introducing a new promotional method, adopting electronic payments or using a digital platform to reach customers.

Innovation does not necessarily require micro businesses to invent something entirely new. The adoption, adaptation and effective application of practices that are already established elsewhere may constitute innovation when those practices are new to the firm. This distinction is particularly relevant to small businesses, which commonly operate with limited capital, small teams, informal structures and rapidly changing customer demands. In such settings, innovation represents a practical route to efficiency, differentiation and sustained competitiveness. Zhang et al. (2026) conceptualise business-model innovation as an ongoing process through which firms reconsider how they create, deliver and capture value in response to digitalisation and sustainability pressures. Sabil et al. (2025) similarly show that sustainable innovation and digitalisation can strengthen micro business resilience by supporting more adaptive business models.

Dimensions of Innovation

Product Innovation

Product innovation involves the introduction of a new good or service or a meaningful improvement to an existing offering in terms of quality, reliability, design, packaging, features or convenience. Among micro businesses, product innovation often involves incremental changes rather than the development of entirely novel products. Examples include modifying an offering in response to customer feedback, improving packaging, adding service options or tailoring products to specific market segments. Such changes can enhance customer satisfaction, broaden the customer base and strengthen differentiation. However, product modifications are most likely to generate sustainable benefits when they are linked to clearly identifiable customer value (Zhang et al., 2026).

Process Innovation

Process innovation concerns how a business operates rather than what it sells. It encompasses new or improved methods of production, service delivery, inventory management, order processing, record-keeping, distribution and internal coordination. Its principal contribution is operational efficiency through shorter production times, reduced waste, lower costs, more consistent quality and improved service. For firms facing high energy costs and narrow profit margins, such efficiency gains may support continuity even where investment in new products is not feasible. Ismael et al. (2026) report that operational digitalisation, ICT

adoption, digital platforms and process automation are consistently associated with improved resilience, resource efficiency and sustainable growth among micro businesses in developing economies.

Marketing Innovation

Marketing innovation encompasses new marketing methods that represent a meaningful departure from a firm's previous practices. These may include branding, packaging, pricing, loyalty programmes, new distribution channels, online advertising, social-media marketing, influencer marketing, e-commerce and data-driven promotion. Marketing innovation is particularly relevant to micro businesses that compete with limited advertising budgets. Digital marketing channels can provide relatively low-cost opportunities to extend market reach, strengthen brand awareness and obtain customer feedback. Sabil et al. (2025) note that digitalisation can open access to wider markets, while Zhang et al. (2026) emphasise that business-model reconfiguration includes how firms identify, serve and retain customers.

Organisational Innovation

Organisational innovation includes improved management practices, work arrangements, decision-making methods, employee involvement, knowledge sharing and partnership arrangements. Although organisational innovation is not treated as an independent variable in the present study, it provides an enabling context for the other dimensions of innovation. Rigid structures, weak internal communication and resistance to change may limit the benefits derived from new technologies and market opportunities. Kamel et al. (2026) similarly show that digital technology and stakeholder engagement can work together to strengthen organisational capacity and collaborative capability.

Digital Innovation

Digital innovation refers to the use of digital technologies to improve products, services, processes, customer engagement and decision-making. Relevant applications include mobile and electronic payments, social-media marketing, cloud storage, e-commerce, digital accounting, customer-relationship-management systems, online communication tools, inventory software, analytics and digital financial services. Potential benefits include lower transaction costs, faster communication, more accurate records, wider customer reach and greater continuity when physical movement or cash transactions are disrupted. These benefits, however, depend on reliable internet infrastructure, affordable devices, digital literacy, trust in electronic transactions, cybersecurity awareness and managerial willingness to adopt new practices.

Yesuf and Fields (2026), in a systematic review of 81 peer-reviewed studies, report that micro business digital transformation in emerging economies is shaped by context-specific barriers and enabling conditions. They further note that resource-constrained micro businesses may use digital technologies to bypass some limitations associated with legacy infrastructure. Yuliyanti et al. (2026) similarly report that digital financial innovation can strengthen micro-business sustainability through financial inclusion, efficiency and resilience, although outcomes depend on infrastructure, regulation and digital literacy. Comes et al. (2025) add that micro businesses may initiate digital projects without fully embedding them in leadership or human-resource practices, while Comes et al. (2025) argue that effective digital transformation

requires organisational readiness, technological capability and strategic integration.

Business Sustainability

Business sustainability refers to an enterprise's capacity to survive, remain economically viable, adapt to change and continue creating value over time. For micro businesses, sustainability may be reflected in continued operation, stable or increasing sales, customer retention, efficient resource use and the ability to withstand economic or competitive shocks, alongside appropriate consideration of social and environmental responsibilities. Sustainability is particularly important for small firms because their survival is often more vulnerable than that of larger enterprises to changes in demand, inflation, financing conditions, technology, energy costs, competition and infrastructure.

Recent literature links business sustainability to a firm's ability to integrate innovation, digital technologies, managerial capabilities and stakeholder relationships. Sabil et al. (2025) find that digital transformation can support resilience through more adaptive and competitive practices, while Zhang et al. (2026) show that business-model innovation can help micro businesses respond to digitalisation and sustainability pressures by redesigning how they create, deliver and capture value.

Innovation and Small Business Sustainability

The theoretical relationship between innovation and sustainability rests on the proposition that innovative micro businesses are better positioned to recognise and respond to market and environmental changes than firms that do not innovate. Product innovation can increase customer value and relevance; process innovation can reduce costs and improve efficiency; marketing innovation can strengthen customer acquisition and retention; and digital innovation can expand access to information, markets, finance and operational tools. Collectively, these capabilities can support profitability, resilience, competitiveness and long-term survival.

Innovation may also encourage organisational learning. Firms that systematically gather customer feedback, monitor markets, train employees and evaluate their operations are better positioned to identify emerging threats and opportunities and respond to them promptly. Hanaysha et al. (2022) report that innovation capability contributes to micro business sustainability, while Olaleye et al. (2024) find that innovation capability and organisational resilience jointly support sustainability outcomes. Ismael et al. (2026) identify operational digitalisation and process automation as important drivers of resilience and social sustainability, while Sabil et al. (2025) associate sustainable innovation and digitalisation with competitiveness and resilience.

Nevertheless, the strength of the innovation-sustainability relationship may vary according to industry, firm size, location, managerial capability, access to finance and infrastructure. This contextual variability provides a rationale for empirical examination in Ifo Local Government Area.

Challenges and Innovation Strategies

micro businesses face financial, human, technological, organisational and institutional barriers that can constrain innovation. Limited access to credit may restrict investment in equipment, software, training, product development and digital tools. Unreliable electricity, weak connectivity, high data costs, limited technical support and cybersecurity concerns may further

constrain digital adoption. In addition, inadequate managerial capabilities and employee skills can make it difficult to select, implement and maintain new technologies and practices. Okunola (2026) identifies high implementation costs, limited finance, weak technical capability, poor infrastructure, resistance to change and data-security concerns as major barriers to technology adoption among micro businesses.

At the firm level, practical responses include developing a culture that encourages creativity, systematically obtaining customer feedback, treating learning and experimentation as routine activities, conducting regular market research, selecting technology in response to clearly identified business problems, investing in staff training and making strategic use of digital platforms. At the institutional level, governments and support organisations can facilitate innovation through affordable financing, innovation grants, tax incentives, reliable infrastructure, digital-skills programmes and policies that reduce the cost and risk of technology adoption. Partnerships among micro businesses, universities, industry associations, financial institutions, technology providers and government agencies can also expand access to knowledge, technical assistance and market information (Kamel et al., 2026).

THEORETICAL REVIEW

This study is anchored on Dynamic Capabilities Theory, developed by Teece, Pisano and Shuen (1997). The theory proposes that sustained firm performance depends not only on the resources a firm possesses but also on its capacity to sense environmental change, seize emerging opportunities and reconfigure its resource base, operations and strategies accordingly. Teece (2007) subsequently articulated these as three interrelated capabilities: sensing opportunities and threats, seizing them through appropriate strategic decisions, and transforming or reconfiguring organisational resources and competencies to sustain performance over time.

Micro businesses in Ifo Local Government Area operate within an environment characterised by competition, cost volatility, changing consumer preferences, limited finance, technological change and infrastructure constraints. These conditions make dynamic capabilities particularly relevant. Product innovation enables firms to respond to changing customer preferences through new or improved goods and services; process innovation supports efficiency, cost control and service delivery; marketing innovation improves market reach and customer engagement; and digital innovation enables firms to integrate electronic payments, online marketing, e-commerce, digital accounting and customer-management tools into everyday operations. From a dynamic-capabilities perspective, micro businesses that can sense changes, seize opportunities and reconfigure their resources through these channels should be better positioned to achieve continuity, competitiveness and long-term survival. This provides the theoretical basis for the four hypotheses tested in the study.

METHODOLOGY

The study adopted a quantitative research design to examine the effects of innovation on micro-business sustainability. The design enabled the collection of structured data on product innovation, process innovation, marketing innovation, digital innovation and business sustainability and permitted the use of descriptive and inferential statistical techniques to assess the relationships among

the variables. The target population comprised 184 registered micro-business owners operating in Ifo Local Government, Ifo Local Government Area, Ogun State, based on information obtained from the market chairman. Due to the small population obtained, a census sampling method was adopted. The rationale behind this choice was to give everyone the opportunity to participate in the study. From the 184 questionnaire distributed, 162 were retrieved but only 150 was well completed and found fit for analysis, giving a response rate of 82%.

The survey instrument comprised 20 items measured on a four-point Likert scale of Strongly Agree; 4 to Strongly Disagree; 1, with four items assigned to each of the five constructs: product innovation, process innovation, marketing innovation, digital innovation and micro-business sustainability. The instrument was piloted with 15 micro-business owners drawn through convenience sampling from outside the study population. Feedback from the pilot was used to revise ambiguous, repetitive or poorly worded items.

Internal consistency was assessed using Cronbach's alpha on the main dataset. The 20-item instrument produced a Cronbach's alpha of 0.861, exceeding the conventional 0.70 threshold (Nunnally, 1978) and indicating satisfactory internal consistency.

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	Number of Items
0.847	0.861	20

Source: Field Survey, 2026

Data were analysed using SPSS (version 26.0). Demographic characteristics were summarised using frequencies and percentages, while study variables were described using mean and standard deviations. Mean scores were interpreted using the four-point scale as follows: 1.00–1.49 = Strongly Agree; 1.50–2.49 = Agree; 2.50–3.40 = Disagree; and 3.50–4.00 = Strongly Disagree. An independent-samples t-test was used to examine differences in perceived sustainability by gender, while a one-way ANOVA assessed differences across age groups. The four hypotheses were tested using multiple regression, with product innovation, process innovation, marketing innovation and digital innovation entered simultaneously as predictors of micro-business sustainability:

$$SBS = \beta_0 + \beta_1PI + \beta_2PRI + \beta_3MI + \beta_4DI + \varepsilon$$

All tests were evaluated at the 0.05 significance level. A null hypothesis was rejected when the associated p-value was below 0.05.

Presentation of Data

Table 1: Demographic Characteristics of Respondents

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Male	55	36.7	36.7	36.7
Female	95	63.3	63.3	100.0
Total	150	100.0	100.0	100.0

Source: Field Survey, 2026

Female respondents constituted the majority of the sample, with 95 respondents (63.3%), while 55 respondents (36.7%) were male. The corrected cumulative percentage for the female category is

100.0%, reflecting the complete distribution of respondents by gender.

Table 2: Age Group of the Respondents

Age Group	Frequency	Percent	Valid Percent	Cumulative Percent
18–25 years	25	16.7	16.7	16.7
26–35 years	73	48.7	48.7	65.3
36–45 years	35	23.3	23.3	88.7
46 years and above	17	11.3	11.3	100.0
Total	150	100.0	100.0	100.0

Source: Field Survey, 2026

Respondents aged 26–35 years constituted the largest age group (48.7%), followed by those aged 36–45 years (23.3%), 18–25 years (16.7%) and 46 years and above (11.3%). The distribution therefore indicates that the sample was concentrated among relatively young business owners.

Table 3: Business Type of the Respondents

Business Type	Frequency	Percent	Valid Percent	Cumulative Percent
Trading	34	22.7	22.7	22.7
Tailoring	38	25.3	25.3	48.0
Hairdressing	24	16.0	16.0	64.0
Retail shop	33	22.0	22.0	86.0
Others	21	14.0	14.0	100.0
Total	150	100.0	100.0	100.0

Source: Field Survey, 2026

Tailoring represented the largest business category (25.3%), followed by trading (22.7%), retail shops (22.0%), hairdressing (16.0%) and other businesses (14.0%). The distribution indicates a reasonably diverse mix of micro-business activities within the study population.

Table 4: Business Year of Operations

Years of Operation	Frequency	Percent	Valid Percent	Cumulative Percent
1–5 years	30	20.0	20.1	20.1
5–10 years	70	46.7	46.9	67.0
10–15 years	36	24.0	24.2	91.2
Above 15 years	13	8.7	8.8	100.0
Total (valid)	149	99.3	100.0	100.0
Missing	1	0.7		
Total	150	100.0		

Source: Field Survey, 2026

Nearly half of the businesses (46.7%) had operated for 5–10 years, followed by 24.0% that had operated for 10–15 years, 20.0% for 1–5 years and 8.7% for more than 15 years. One response was

missing and was therefore excluded from the valid-percentage calculation. The distribution suggests that most businesses in the sample had operated beyond their first five years.

Table 5: Descriptive Statistics of the Study Variables

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Product Innovation (PI)	150	1.00	4.00	1.72	0.695
Process Innovation (PRI)	150	1.00	4.00	2.16	0.855
Marketing Innovation (MI)	150	1.00	4.00	1.67	0.657
Digital Innovation (DI)	150	1.00	4.00	2.35	0.903
Small Business Sustainability (SBS)	150	1.00	4.00	2.43	0.884

Source: Field Survey, 2026

Marketing innovation recorded the lowest mean score ($M = 1.67$), followed by product innovation ($M = 1.72$), process innovation ($M = 2.16$) and digital innovation ($M = 2.35$). All four innovation dimensions fell within the 'Agree' category under the study's stated

interpretation. Small-business sustainability also recorded a mean within the 'Agree' range ($M = 2.43$). Because lower scores indicate stronger agreement on the scale used, these results suggest comparatively stronger reported engagement with marketing and product innovation and comparatively weaker, although still positive, engagement with digital innovation.

Table 6: Differences in Sustainability by Gender and Age

Variable	Test	Test Statistic	df	Sig.	Decision
Gender	Independent-samples t-test	$t = -1.398$	148	0.164	Not significant
Age Group	One-way ANOVA	$F = 1.469$	3.146	0.225	Not significant

Source: Field Survey, 2026

The independent-samples t-test indicated no statistically significant difference in perceived sustainability by gender, $t(148) = -1.398$, $p = 0.164$. Similarly, the one-way ANOVA showed no statistically

significant difference in perceived sustainability across age groups, $F(3, 146) = 1.469$, $p = .225$. Accordingly, the evidence does not support an association between the demographic characteristics examined and perceived sustainability in this sample.

Table 7: Test of Hypotheses: Multiple Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.712	0.507	0.493	0.398	1.892

Source: Field Survey, 2026

Multiple regression was used to estimate the independent effects of product innovation, process innovation, marketing innovation and digital innovation on micro-business sustainability. The four predictors were entered simultaneously. The model produced a multiple correlation coefficient of $R = 0.712$ and an R^2 of 0.507,

indicating that the four innovation dimensions jointly explained 50.7% of the observed variance in micro-business sustainability. The adjusted R^2 of .493 indicates that approximately 49.3% of the variance remained explained after adjustment for the number of predictors. The Durbin-Watson statistic of 1.892 is close to 2, providing no obvious indication of problematic residual autocorrelation.

Table 8: Overall Regression Model

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	30.674	4	7.669	37.300	< 0.001
Residual	29.826	145	0.206		
Total	60.500	149			

Source: Field Survey, 2026

The overall regression model was statistically significant, $F(4, 145) = 37.300$, $p < .001$. Thus, the four innovation dimensions,

considered jointly, significantly predicted micro-business sustainability.

Table 10

Model	B	Std. Error	Beta	T	Sig.	Tolerance	VIF
Constant	0.512	0.187		2.738	0.007		
Product Innovation (PI)	0.284	0.072	0.301	3.944	< .001	0.812	1.232
Process Innovation (PRI)	0.079	0.068	0.086	1.162	0.247	0.774	1.292

Marketing Innovation (MI)	0.221	0.070	0.234	3.157	0.002	0.798	1.253
Digital Innovation (DI)	0.297	0.075	0.279	3.960	< 0.001	0.756	1.323

Source: Field Survey, 2026

Product innovation had a positive and statistically significant effect on micro-business sustainability ($B = 0.284$, $\beta = 0.301$, $t = 3.944$, $p < 0.001$). Therefore, H_{01} was rejected. Process innovation had a positive but statistically non-significant effect ($B = 0.079$, $\beta = 0.086$, $t = 1.162$, $p = 0.247$); hence, H_{02} was not rejected. Marketing innovation had a positive and statistically significant effect ($B = 0.221$, $\beta = 0.234$, $t = 3.157$, $p = 0.002$), leading to rejection of H_{03} . Digital innovation also had a positive and statistically significant effect ($B = 0.297$, $\beta = 0.279$, $t = 3.960$, $p < 0.001$), leading to rejection of H_{04} .

The tolerance values ranged from 0.756 to 0.812 and the variance inflation factor (VIF) values ranged from 1.232 to 1.323. These statistics did not indicate problematic multicollinearity among the predictors. The standardised coefficients showed that product innovation had the largest beta coefficient ($\beta = 0.301$), followed by digital innovation ($\beta = 0.279$), marketing innovation ($\beta = 0.234$) and process innovation ($\beta = 0.086$). Therefore, on the basis of the reported regression coefficients, product innovation—not digital innovation—had the largest independent standardised effect in the model. This corrects the original manuscript's contrary interpretation.

DISCUSSION OF FINDINGS

The findings provided evidence that innovation is associated with micro-business sustainability in the study setting, although the individual dimensions contribute differently. Respondents reported the strongest agreement with marketing and product innovation, while digital innovation recorded the highest mean score among the four innovation dimensions and therefore the comparatively weakest level of agreement under the study's reverse-coded response scale. The overall sustainability score also fell within the 'Agree' category.

Product innovation exerted a positive and statistically significant effect on sustainability ($\beta = 0.301$, $p < 0.001$). This finding is consistent with Ahmed and Umar (2026), who reported a significant positive effect of product innovation on the sustainability of small-scale enterprises in Bida Metropolis, Niger State, and with Kurniawati et al. (2022), who found that product innovation contributed positively to micro business business sustainability. The result suggests that firms that adapt products or services to customer needs may strengthen their ability to remain competitive and viable over time.

Process innovation showed a positive but statistically non-significant independent effect ($\beta = 0.086$, $p = 0.247$). Thus, after controlling for product, marketing and digital innovation, process innovation did not make a statistically detectable independent contribution to sustainability in this sample. This result is broadly consistent with evidence that process or production innovation does not always translate into significant performance gains among micro and small enterprises (Gokir, 2017; Thy & Duy, 2025). One plausible explanation is that resource constraints may limit the extent to which process improvements alone can generate measurable sustainability benefits. However, this interpretation should be regarded as contextual rather than definitive because the present study did not

directly measure the mechanisms through which process innovation affects sustainability.

Marketing innovation had a statistically significant positive effect on sustainability ($\beta = 0.234$, $p = 0.002$). This finding is consistent with Issau et al. (2022), who found that innovation orientation was associated with micro business performance, and with Ahmed and Umar (2026), who reported a significant positive effect of marketing innovation on enterprise sustainability. The finding emphasizes the importance of customer acquisition, market communication, pricing and promotional adaptation for the continuity of small businesses.

Digital innovation also had a statistically significant positive effect on sustainability ($\beta = 0.279$, $p < 0.001$). This result aligns with Ibrahim and Aduah (2025), who linked digital literacy, digital intelligence and digital technology usage with micro-business sustainability, and with Kalu-Okoro et al. (2026), who reported a moderating role for information technology adoption in the relationship between innovation and micro-business sustainability. Importantly, however, the standardised coefficient for product innovation ($\beta = 0.301$) was larger than that for digital innovation ($\beta = 0.279$). Thus, while digital innovation was a strong predictor, it was not the strongest predictor in the present regression model. This distinction is important for accurate interpretation of the empirical evidence.

The non-significant effects of gender and age on perceived sustainability suggest that the sustainability differences observed in this sample are not attributable to these two owner characteristics. Instead, the regression results point towards firm-level innovation practices as more directly relevant to sustainability within the model tested. Nevertheless, the cross-sectional design does not permit causal conclusions, and the findings should not be interpreted as demonstrating that innovation alone causes long-term sustainability.

CONCLUSION AND RECOMMENDATIONS

This study examined the effects of innovation on micro-business sustainability in Ifo Local Government Area, Ogun State, Nigeria. The sample consisted predominantly of female respondents (63.3%) and owners aged 26–35 years (48.7%). Most businesses had operated for more than five years. Descriptive results indicated agreement with all the four dimensions innovation (that is, process, product, marketing, and digital innovations) with the strongest reported engagement associated with marketing and product innovation. Gender and age group were not significantly associated with perceived sustainability.

The multiple regression model was statistically significant and explained 50.7% of the variance in micro-business sustainability. Product innovation, marketing innovation and digital innovation each had significant positive independent effects, whereas process innovation did not. Product innovation recorded the largest standardised coefficient, followed by digital innovation, marketing innovation and process innovation. The findings therefore support the view that innovation is an important factor in micro-business sustainability, while also demonstrating that its dimensions are not equally influential.

The study concluded that sustained attention to customer-responsive product development, innovative marketing practices and purposeful digital adoption may strengthen the sustainability of micro and small businesses in the study area. Process innovation remains relevant, but the evidence from this sample does not demonstrate a statistically significant independent effect when the other innovation dimensions are considered simultaneously. Micro and small business owners should institutionalise product innovation by systematically collecting customer feedback and using it to refine products and services, given the significant positive effect of product innovation observed in the study.

Business owners and support organisations should promote practical digital innovation through affordable training and access to appropriate technologies, including point-of-sale systems, mobile-payment solutions, accounting applications and online sales platforms. Micro business support agencies should strengthen marketing-innovation capabilities through training in social-media marketing, digital promotion, customer relationship management, market segmentation and flexible pricing strategies. Process innovation should not be abandoned because it was statistically non-significant in the present model. Rather, process improvements should be integrated with product, marketing and digital initiatives, while future studies investigate the conditions under which process innovation produces stronger sustainability outcomes. Government agencies, business associations and microfinance institutions should develop targeted innovation-support programmes, including grants, affordable credit, digital-skills development and technical assistance. Such interventions should be broadly accessible because gender and age were not found to significantly differentiate sustainability outcomes in this sample.

SUGGESTIONS FOR FURTHER STUDIES

Future research should replicate the study using larger samples drawn from multiple locations and sectors to improve generalisability. Longitudinal designs would also be valuable for examining whether innovation predicts sustainability over time rather than merely being associated with it at one point. Further studies could incorporate organisational innovation and test potential moderating or mediating variables such as access to finance, infrastructure quality, managerial capability, government policy and digital literacy. Where mixed-method designs are used, qualitative findings should be systematically reported alongside quantitative results to explain the mechanisms underlying observed relationships.

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