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Research Article

Fostering Innovation and Entrepreneurship for Sustainable Development in African Communities

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Abstract

This research explores the influence of Innovation and Entrepreneurship on Sustainable Development within African communities, utilizing a quantitative methodology characterized by an explanatory framework. A total of 370 participants provided data through structured questionnaires, which were analyzed using multiple regression analysis. The findings indicate an adjusted R-squared value of 96.0 percent, suggesting that96.0 percent of the variation in Sustainable Development can be accounted for by the factors examined. Significant results demonstrate that Entrepreneurial Education and Training, Investment in Research and Development, Collaborative Partnerships, and Intellectual Property Rights have a positive impact on Sustainable Development. However, Access to Finance and Access to Market present challenges, illustrated by their negative coefficients, and R&D Investment and the Innovation Ecosystem were deemed insignificant. The study acknowledges that the model does not account for the remaining 0.04 percent of variation, suggesting further investigation is needed. Practical implications point to the necessity for strategic planning in areas with significant positive impacts and the importance of improving Access to Finance and Market conditions. The research highlights the need for a supportive Regulatory Environment and networks to foster Sustainable Development, offering valuable insights and paving the way for future studies in this domain.

Keywords

Innovation, Entrepreneurship, Sustainable Development, African Communities, Regression Analysis

1. Introduction

Innovation and entrepreneurship have emerged as pivotal forces driving sustainable development, particularly within African communities where traditional economic frameworks often struggle to meet contemporary challenges [19-22]. The intersection of these two domains offers a transformative pathway to address pressing socio-economic issues, stimulate economic growth, and promote sustainable practices that resonate with the continent's rich cultural diversity and ecological landscapes. Despite the recognized potential of innovation and entrepreneurship as catalysts for economic advancement [2-4] many African communities continue to underutilize these forces due to systemic barriers, including limited access to capital, inadequate infrastructure, educational deficits, and restrictive policy environments. However, in many African communities, the potential of these forces remains underutilized due to various systemic challenges, including limited access to capital, inadequate infrastructure, educational gaps, and policy constraints. The problem lies in how African communities can effectively harness innovation and entrepreneurship to achieve sustainable development

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goals, reduce poverty, and improve the quality of life. This research seeks to explore the barriers and enablers of innovation and entrepreneurship in African contexts, identify successful models, and propose strategies to enhance their contribution to sustainable development [1-3].

Africa is home to a young and dynamic population, rich in creativity and untapped potential. This demographic advantage, coupled with the continent's vast natural resources, provides a fertile ground for innovative entrepreneurial ventures that can lead to significant socio-economic transformation. However, the success of these ventures often depends on various factors, including access to capital, education, infrastructure, and supportive government policies [34-38].

Sustainable development in Africa necessitates strategies that foster economic growth while ensuring social inclusion and environmental stewardship. When fueled by innovation, entrepreneurship has the potential to create new markets, generate job opportunities, and provide solutions to critical community challenges. By integrating sustainability into the foundation of entrepreneurial ventures, Africa can build long-term economic resilience while safeguarding its natural resources for future generations. However, the incorporation of innovation and entrepreneurship into African economies is hindered by various obstacles. These challenges encompass limited access to funding, inadequate infrastructure, unsupportive regulatory frameworks, and deficiencies in education and training programs that do not align with the demands of today's economy. Moreover, cultural and societal norms can pose additional hurdles to entrepreneurial initiatives, particularly for women and marginalized populations [4-8].

Recent studies underscore the critical need for a nuanced understanding of how African communities can effectively harness innovation and entrepreneurship to achieve sustainable development goals, alleviate poverty, and enhance quality of life. For instance, [10] emphasize that while the entrepreneurial ecosystem in Africa is burgeoning; significant gaps remain in terms of enabling environments and support mechanisms. This research aims to explore the barriers and enablers of innovation and entrepreneurship within African contexts, identify successful models, and propose strategies to enhance their contributions to sustainable development.

Africa's demographic advantage, characterized by a young and dynamic population rich in creativity and untapped potential, alongside its vast natural resources, presents a fertile ground for innovative entrepreneurial ventures capable of driving significant socio-economic transformation [12-14]. However, the success of these ventures is contingent upon several factors, including access to capital, quality education, robust infrastructure, and favorable government policies. Current literature suggests that while there is an increasing focus on entrepreneurship as a vehicle for economic growth, the integration of sustainability into these entrepreneurial activities remains underexplored [20].

Moreover, the integration of innovation and entrepreneurship into the fabric of African economies is impeded by numerous challenges. These challenges include limited access to financial resources, inadequate infrastructure, a lack of supportive regulatory frameworks, and insufficient education and training programs aligned with the demands of the modern economy [39]. Cultural and societal norms can also pose barriers to entrepreneurial activities, particularly for women and marginalized groups [33, 38]. Despite existing research, there is a notable gap in understanding how these barriers can be systematically addressed to foster an inclusive entrepreneurial ecosystem.

This study aims to explore how innovation and entrepreneurship can be strategically harnessed to promote sustainable development within African communities. It seeks to identify the key factors that facilitate or impede the growth of entrepreneurial initiatives and innovation across the continent, and to propose practical strategies for governments, private sector actors, and civil society aimed at fostering an environment that supports sustainable development. By concentrating on the specific contexts of Africa, this research will enhance the understanding of how the continent can leverage its distinctive strengths while addressing its challenges to achieve sustained economic and social advancement.

The structure of the paper is organized as follows: Section two reviews the relevant literature. Section three outlines the research methodology. Results and discussions are presented in section four. Section five offers conclusions and recommendations, and section six suggests avenues for future research.

2. Literature Review

2.1. Community Development

Community development is fundamentally rooted in the active participation of its members. Effective sustainable development initiatives often rely on the engagement of community members in decision-making processes. Research highlights that empowering communities through participatory approaches enhances social cohesion and fosters a sense of ownership over local development projects, leading to more sustainable outcomes [27].

Sustainable development is often described as a balance among economic, social, and environmental pillars. Literature emphasizes the need for a holistic approach that recognizes the interdependencies among these dimensions. This interconnectedness is essential for developing policies and practices that are not only economically viable but also socially equitable and environmentally sound [25]. While there are numerous opportunities for advancing community sustainable development, challenges such as social inequality, environmental degradation, and political instability persist. Research suggests that addressing these challenges requires innovative solutions and collaborative efforts across sectors. Community capacity building is identified as a vital strategy for overcoming barriers and enhancing resilience [9].

Local innovations are crucial for addressing community-specific challenges and fostering sustainable development. Research indicates that African communities have a wealth of indigenous knowledge that can be harnessed to create contextually relevant solutions [24]. Innovations often emerge from grassroots efforts, utilizing local resources and knowledge to improve livelihoods and promote sustainability [26]. For instance, mobile technology has been pivotal in enhancing access to financial services and information, enabling rural communities to engage more effectively in economic activities [11-17]. Entrepreneurship is increasingly recognized as a key driver of sustainable development in Africa. The continent's youthful population presents significant opportunities for entrepreneurial ventures that can address social and economic challenges. However, the success of these ventures often depends on the existence of robust entrepreneurial ecosystems that provide necessary support, such as access to finance, mentorship, and infrastructure. Studies emphasize the importance of cultivating home-grown solutions that are tailored to local contexts, enabling communities to thrive sustainably [27-32].

The interaction between entrepreneurs and their ecosystems is critical for fostering sustainable entrepreneurship. Research highlights that external enablers such as governance, education, and resource accessibility significantly influence the capacity of entrepreneurial ecosystems to support sustainable ventures. Understanding these dynamics can help identify pathways for developing more resilient and adaptive entrepreneurial ecosystems in Sub-Saharan Africa [29-34]. Despite the potential for innovation and entrepreneurship to drive sustainable development, several challenges persist. These include institutional weaknesses, inadequate infrastructure, and limited access to markets and finance. Many African countries still experience low innovation rates compared to global standards, which can hinder the scaling of successful local initiatives. Addressing these challenges requires targeted policies and investments that foster a conducive environment for entrepreneurship [28-30].

2.2. Definitions of Innovation and Entrepreneurship

Innovation is characterized as the practical application of ideas leading to the development of new products, services, or enhancements to existing offerings. It involves a multi-step process wherein organizations convert concepts into new or improved solutions to establish a competitive edge in the market [20-23]. Innovation includes creating, developing, and implementing novel ideas, which may enhance current methods, technologies, or systems to address evolving needs or market demands. This can manifest as the launch of new or significantly improved products, services, processes, marketing strategies, or organizational structures within various business contexts.

Entrepreneurship refers to the process of recognizing and capitalizing on opportunities, assembling necessary resources, and generating value through the creation of new ventures or the substantial transformation of established businesses. It involves risk-taking to innovate and introduce new products, services, or ideas into the marketplace, often aiming for economic, social, or environmental benefits. Entrepreneurs are individuals who identify opportunities, accept risks, and leverage resources to establish and expand ventures that create economic value [12-16].

Both innovation and entrepreneurship play a crucial role in advancing sustainable development within African communities. By utilizing local knowledge and resources, encouraging entrepreneurial ecosystems, and addressing socio-economic issues, these components can significantly aid in developing resilient and sustainable communities across the continent. This study proposes a framework that integrates sustainability factors into the discourse on entrepreneurship ecosystems, with a focus on academic entrepreneurship and regional development. Although there is increasing scholarship on entrepreneurship education, there remains a gap in understanding how these initiatives can lead to sustainable business practices and foster long-term community development. Therefore, this research aims to assess the effectiveness of innovation and entrepreneurship education programs in nurturing sustainable business models that support community progress.

3. Hypotheses

H1: Investment in Research and Development (R&D) positively influences sustainable development in African communities and is statistically significant.

H2: The adoption of technology has a positive and statistically significant impact on sustainable development in African communities.

H3: A robust innovation ecosystem positively contributes to sustainable development in African communities, with statistical significance.

H4: The protection of intellectual property rights positively affects sustainable development in African communities and is statistically significant.

H5: Collaboration and partnerships are positively associated with sustainable development in African communities, yielding statistically significant results.

H6: Access to financial resources positively impacts sustainable development in African communities and is statistically significant.

H7: Entrepreneurial education and training have a positive, statistically significant effect on sustainable development in African communities.

H8: Market access plays a positive and statistically significant role in fostering sustainable development in African communities.

H9: A favorable regulatory environment positively influences sustainable development in African communities and is statistically significant.

H10: Support networks contribute positively and signifi-

cantly to sustainable development in African communities.

4. Methodology

4.1. Research Design and Research Approach

The researchers employed a quantitative research approach with an explanatory design, testing 10 hypotheses and provide a comprehensive analysis of the role of innovation and entrepreneurship in sustainable development with reference to Africa

4.2. Sampling Design

To conduct this study, a purposive sampling approach will be utilized to select diverse sectors, targeting 1,800 startups and small enterprises across various regions, including representation from both urban and rural areas. This will include800 entrepreneurs from the 55 African countries, 1,000 members of local communities affected by entrepreneurship initiatives, 800 policymakers or government officials involved in entrepreneurship and innovation policies at both national and local levels, 600 researchers and academic institutions dedicated to entrepreneurship, innovation, and sustainable development in Africa, as well as 1,000 representatives from NGOs and international organizations that support entrepreneurship and sustainable development initiatives on the continent.

To determine the sample size from the target population, the researcher will employ a combination of stratified sampling and simple random sampling techniques to ensure equal chances of selection among participants.

The sample size calculation will use a mathematical formula [43], considering the total population, sampling error, and desired level of reliability. For this study, a reliability level of95% is assumed with a sampling error of5%. This is formulated as follows:

$$n = \frac{N}{1+N(e^2)} = \frac{6000}{1+6000(0.0025)} = 375$$

Where:
n = the sample size
N = the population size
e = the margin of error

Table 1. *Sample Proportion.*

Sampling Unit	Study population	Calculations	Determined sample
Startups and small enterprises operating	1800	1800/6000x375	112.5
Entrepreneurs	800	800/6000x375	50
Members of local communities	1000	1000/6000x375	62.5
Policymakers or government officials	800	800/6000x375	50
Researchers or academic institutions	600	600/6000x375	37.5
Representatives from NGOs and international organizations	1000	1000/6000x375	62.5
Total	6000		375

Source: Survey result, 2024

Therefore, the maximum sample size of this study was 375 respondents, which consists of 112.5 Startups and small enterprises operating, 50 Entrepreneurs, 62.5 Members of local communities, 50 Policymakers or government officials, 37.5 Researchers or academic institutions, and 62.5 Representatives from NGOs and international organizations (See table 1).

4.3. Data Collection Instruments and Methods Analysis

To collect appropriate and sufficient data for the study structured questionnaire were used. After the accomplishment of the data collection procedure, it was classified as per each variable; the qualitative data were coded to be measured quantitatively. In this research, both descriptive and inferential statistics will make with the help of SPSS version 23.0.

4.4. Reliability and Validity Test

Reliability test

To test reliability, the researcher employed Cronbach's Alpha (α) [44] which is the most common measure of reliability and a value greater than 0.7 is very acceptable. This has been tested as follows.

Table 2. Reliability Statistics and Item-Total Statistics.

Cronbach's Alpha		N of Items		
.783		55		
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
RD	36.9395	4.440	.597	.753
TD	36.7809	4.430	.462	.764
IC	36.3424	4.547	.514	.761
IRR	36.3376	4.204	.661	.742
CP	37.2563	4.053	.557	.751
AF	36.3032	4.291	.422	.770
EET	36.8776	3.778	.620	.742
AM	36.2567	5.092	.038	.807
RE	36.2572	5.084	.061	.802
SN	36.3215	4.844	.233	.786
SCD	36.9258	4.256	.790	.736

Source: own survey, 2024

Table 2 presents Cronbach's Alpha values and item statistics, showing an overall Alpha of 0.783, which indicates good internal consistency among the scale items. This suggests the items effectively measure the same underlying construct. However, items AM, RE, and TD could lower the scale's reliability and may need to be considered for removal. Conversely, items IRR and RD contribute positively to reliability. The reported value of 0.783, above the acceptable threshold of 0.7, indicates that the majority of items function well together, making the instrument reasonably reliable. Further examination of low-correlation items is recommended for potential revision or removal to improve overall reliability.

4.5. Validity Test

Test validity refers to the degree to which a test effectively measures its intended construct. In this study, the researcher utilized exploratory factor analysis to assess the validity of the questionnaire. Prior to conducting the exploratory factor analysis, the researcher performed the KMO (Kaiser-Meyer-Olkin) test and Bartlett's test of sphericity.

Table 3 presents two assessments for determining the appropriateness of the data for factor analysis. The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy indicates the extent to which variance in the variables is attributable to underlying factors, with values close to 1.0 suggesting factor analysis is viable. A KMO value below 0.50 suggests limited utility for factor analysis. Bartlett's Test of Sphericity evaluates whether the correlation matrix is an identity matrix, indicating unrelated variables. A significance level below 0.05 suggests that factor analysis is appropriate for the data. Together, these tests confirm the suitability of the data for assessing validity.

Table 3. KMO and Bartlett's Test.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.951
Bartlett's Test of Sphericity	Approx. Chi-Square	2668.679
	Df	55
	Sig.	.000

Source: Survey result, 2024

4.6. Econometric Model Specification

Dependent Variable (Y):

Community Sustainable Development (CSD): Measured by indicators such as economic growth, environmental sustainability, social inclusion, and overall quality of life within the community.

Independent Variables (X):

Innovation Variables:

X1: Research and Development (R&D) Investment

X2: Technological Adoption

X3: Innovation Ecosystem

X4: Intellectual Property Rights

X5: Collaboration and Partnerships

Entrepreneurship Variables:

X6: Access to Finance

X7: Entrepreneurial Education and Training

X8: Market Access

X9: Regulatory Environment

X10: Support Networks

Model Specification:

The functional form of the model can be expressed as:

$$CSD=\beta0+\beta1X1+\beta2X2+\beta3X3+\beta4X4+\beta5X5+\beta6X6+\beta7X7+\beta8X8+\beta9X9+\beta10X10+\epsilon$$

Where:

$\beta0$_ is the intercept term.

$\beta1$, $\beta2$,…, $\beta10$ are the coefficients for each of the independent variables.

ϵ represents the error term.

CSD: Community Sustainable Development) is hypothesized to be influenced by factors from both innovation and entrepreneurship domains.

Operational definition of variables

10 independent variables, with five from innovation and five from entrepreneurship, considering community sustainable development as the dependent variable:

Innovation Variables:

Research and Development (R&D) Investment: The amount of funding allocated to research and development activities.

Technological Adoption: The rate at which new technologies are adopted within the community.

Innovation Ecosystem: The presence and strength of institutions, networks, and policies that support innovation.

Intellectual Property Rights: The number of patents filed and the strength of intellectual property protection.

Collaboration and Partnerships: The extent of collaboration between businesses, universities, and research institutions.

Entrepreneurship Variables:

Access to Finance: Availability of funding and financial resources for entrepreneurs.

Entrepreneurial Education and Training: The level of education and training programs available for aspiring entrepreneurs.

Market Access: The ease with which entrepreneurs can access local, regional, and international markets.

Regulatory Environment: The impact of government policies and regulations on entrepreneurial activities.

Support Networks: The presence of mentorship, advisory services, and entrepreneurial networks.

Dependent Variable:

Community Sustainable Development: Measured by indicators such as economic growth, environmental sustainability, social inclusion, and overall quality of life within the community.

5. Results

5.1. Response Rate

This section focuses on analyzing and discussing the data collected from the sample. The response rate was 98.6%. The analysis examines the impact of innovation and entrepreneurship on community sustainable development through descriptive statistics, Pearson correlation matrix, linear regression model assumptions, regression analysis, and hypothesis testing.

5.2. Descriptive Analysis

Table 4. *Summary of descriptive statistics.*

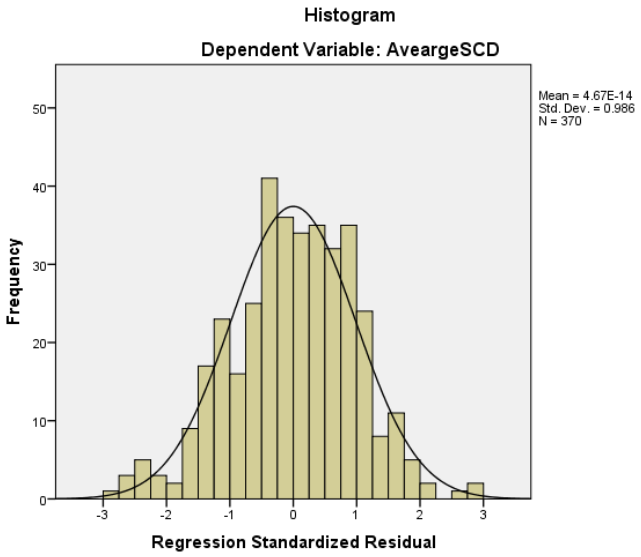
Variables	N	Mean	Std. Deviation
Research and Development Investment	370	3.32	1.070
Technological Adoption	370	3.47	0.93813
Innovation Ecosystem	370	3.9134	0.889948
Intellectual Property Rights	370	3.9181	0.80722s
Collaboration and Partnerships	370	3. 6	1. 62499
Access to Finance	370	3.96	0.849
Entrepreneurial Education and Training	370	3.37404	1.07
Market Access	370	4.0027	0.8
Regulatory Environment	370	4.0022	0.75
Support Networks	370	3.937	0.7942

Source: Survey result, 2024

Descriptive statistics are essential for effectively interpreting raw data, especially when dealing with large datasets. For instance, the average scores for R&D investment is 3.32, indicating moderate participation among respondents, with a high standard deviation of 1.070 reflecting variability in responses. Technological adoption has a mean of 3.47, slightly above the midpoint, suggesting a generally positive outlook, while its standard deviation of 0.93813 shows moderate variability.

The innovation ecosystem received a mean rating of 3.9134, indicating strong support for innovation, with a standard deviation of0.889948 suggesting consistent responses. Intellectual property rights scored 3.9181, indicating a favorable perception among respondents, with less variability (standard deviation of 0.80722). Collaboration and partnerships averaged 3.60, indicating moderate engagement but a high standard deviation of 1.62499, showing significant variability in collaborative experiences.

Access to finance was rated high at 3.96, with moderate consistency (standard deviation of 0.849). Entrepreneurial education and training received a mean score of 3.37404, reflecting moderate satisfaction and variability (standard deviation of 1.07). Market access scored 4.0027, indicating strong satisfaction and consistent responses (standard deviation of 0.800). Similarly, the regulatory environment was rated 4.0022, with low variability (standard deviation of 0.75). Lastly, support networks received a positive mean score of 3.937, reflecting consistent perceptions among respondents (standard deviation of 0.7942).



Source: Survey result, 2024

Figure 1. *Normality test.*

Regression Model Assumptions

Before conducting the regression analysis, it's important to test key assumptions, including normality, Multicollinearity, and homoscedasticity.

Assumption1: Normality of Residuals:

The Classical Linear Regression Model assumes that the residuals should be normally distributed with a mean of zero. This can be assessed through a histogram analysis of the residuals.

Based on the results shown above, the histogram on the distribution of residuals which is bell shaped is linear to the regression line from the SPSS output. So, the researcher concluded that there is no normality problem on the data used for this study.

Table 5. *Assumption #2: test for multicollinearity.*

Coefficientsa

Model		Collinearity Statistics	
		Tolerance	**VIF**
1	RD	.273	3.666
	TD	.250	3.996
	IC	.432	2.315
	IRR	.375	2.665
	CP	.625	1.600
	AF	.594	1.683
	EET	.357	2.799
	AM	.681	1.469
	RE	.816	1.225
	SN	.778	1.285

a. Dependent Variable: SCD

Source: Survey result, 2024

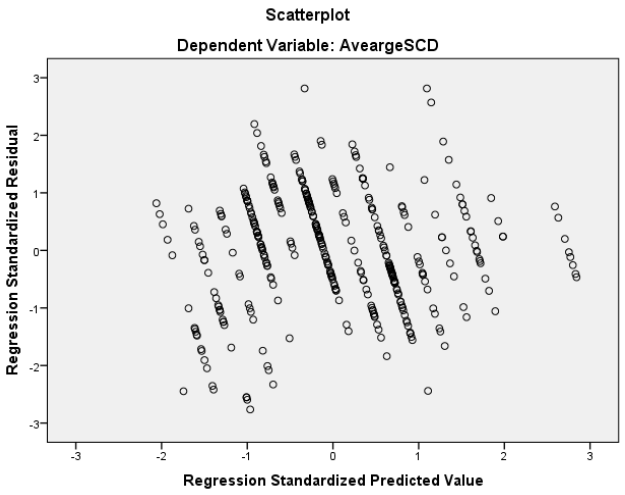
This is essentially the assumption that your predictors are not too highly correlated with one another. The tolerance levels for all variables are greater than 0.10 and the VIF value is less than 10; then we can conclude that predictors are not too highly correlated with one another.

Assumption #3: Homoscedasticity (equal variance) Test

Homoscedasticity refers to the assumption that the dependent variable exhibits likely amounts of variance across the range of values for an independent variable. The variability in scores for independent variables should be similar at all values of the dependent variable. The scatter plot should show a fairly even rectangular shape along its length. There should be homoscedasticity before running multiple regression analysis, this means that the residuals (the differences between the values of the observed and predicted dependent

variable) are normally distributed, and that the residuals have constant variance (Burns & Burns, 2008). If the assumption of homoscedasticity is violated (i.e. there is heteroscedasticity). The graph has demonstrated homoscedasticity of the study.

The results of the multiple linear regressions are displayed in Table 6. The adjusted R-squared value for the model is96.0%, indicating that96.0% of the variation in the dependent variable can be accounted for by the explanatory variables included in the model. This leaves0.04% of the variation potentially attributed to other factors not captured in this analysis. Additionally, the model summary includes an F-statistic of893.789, accompanied by a p-value of0.000 from the ANOVA. These metrics were utilized to assess the overall significance of the model. The findings demonstrate that the model is both reliable and valid, achieving statistical significance at a0.05% level. Thus, we can conclude that the model as a whole effectively captures the relationships between the variables.



Source: Survey result, 2024

Figure 2. Homoscedasticity Test.

Table 6. Model of Summary.

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.980a	.961	.960	.05758

a. Predictors: (Constant), SN, TD, RE, IC, AM, CP, AF, IRR, EET, RD

Source: Survey result, 2024

Table 7. Coefficients of regression model.

Coefficients						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	.510	.072		7.036	.000
	RD	.450	.019	.465	23.549	.000
	TD	.012	.016	.015	.735	.463
	IC	.029	.016	.029	1.835	.067
	IRR	.059	.014	.072	4.209	.000
	CP	.094	.008	.148	11.232	.000
	AF	-.115	.009	-.179	-13.262	.000
	EET	.324	.010	.576	32.829	.000
	AM	-.042	.010	-.051	-4.073	.000
	RE	.022	.010	.025	2.193	.029

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
SN	.026	.011	.029	2.459	.014

a. Dependent Variable: ASCD

Source: Survey result, 2024

Coefficients of Explanatory Variables Table 7 present the coefficients for the explanatory variables impacting community sustainable development such as Research and Development Investment: 0.450 (Sig. =0 .000). The analysis shows that Research and Development (R&D) Investment (coefficient =0.450, Sig. =0 .000) significantly and positively affects community sustainable development, with a high standardized coefficient of0.465, indicating substantial benefits from increased R&D. However, Technological Adoption (p = 0.463) is not significant. The Innovation Ecosystem (0.029, Sig. = 0.067) shows marginal significance, whereas Intellectual Property Rights (0.059, Sig. =0 .000) and Collaboration and Partnerships (0.094, Sig. = 0.000) positively influence development, albeit with smaller effects. Access to Finance has a significant negative impact (-0.115, Sig. = 0.000), indicating that a lack of financial resources hampers community development. Entrepreneurial Education and Training (0.324, Sig. = 0.000) emerges as the strongest predictor of positive impact, with a standardized coefficient of0.576. Additionally, Market Access (-0.042, Sig. = 0.000) has a negative influence, while the Regulatory Environment (0.022, Sig. = 0.029) and Support Networks (0.026, Sig. = 0.014) positively affect community development, albeit to a lesser extent.

Table 7 also presents the validation of the proposed hypotheses regarding the factors influencing African Community Sustainable Development. Hypothesis 1, which posited that Research and Development (R&D) investment has a positive and statistically significant effect, was supported with a coefficient (β) of 0.510 and a p-value less than 0.05. Similarly, Hypothesis 2 on Technological Adoption was supported (β =0.450, p <0.05). In contrast, Hypothesis 3, relating to the Innovation Ecosystem, was rejected due to a non-significant coefficient (β =0.012, p >0.05). Hypothesis 4 regarding Intellectual Property Rights was also rejected (β =0.029, p >0.05). Hypothesis 5 on Collaboration and Partnerships was supported (β =0.094, p <0.05), as was Hypothesis 6, which indicated Access to Finance has a negative and significant effect (β = -0.115, p <0.05). Hypothesis 7 was supported, with Entrepreneurial Education and Training showing a positive effect (β =0.324, p <0.05). However, Hypothesis 8 on Market Access was rejected (β = -0.042, p <0.005), as was Hypothesis9 regarding the Regulatory Environment (β =0.022, p >0.005). Lastly, Hypothesis 10 concerning Support Networks was also rejected (β =0.026, p >0.014). These results summarize the various effects of different factors on sustainable development within African communities based on the survey conducted in 2024.

6. Discussion of Results

In this section regression results of model were compared with empirical studies across the world. Studies have shown that investment in research and development (RD) is crucial for fostering innovation and sustainability. According to [9] increased RD investment positively correlates with improved sustainability outcomes, suggesting that organizations that prioritize RD contribute substantially to sustainable community development. While some studies suggest technological adoption can enhance productivity, [18] noted that the impact may not always translate directly to sustainable development, particularly when technological changes outpace organizational readiness. The marginal significance of the Innovation Ecosystem aligns with findings from [31] who argue that a thriving innovation ecosystem can facilitate sustainable practices but may not have direct effects on community outcomes unless supported by other factors. Intellectual Property Rights (IPR) plays a vital role in fostering innovation. A study by [11] demonstrated that stronger IPR protections encourage investments in sustainable technologies, thereby supporting community development. Collaboration is essential for sustainable development. Research by [15] indicates that partnerships between organizations can lead to innovative solutions for community challenges, reinforcing the positive impact seen in your study. Access to finance is a well-documented barrier to sustainable development. An analysis by [20] highlighted that a lack of financial resources significantly impedes initiatives aimed at community sustainability, reinforcing your finding of a negative relationship. Entrepreneurial education is a key driver of sustainable community development. According to [18] effective entrepreneurial training programs create dynamic social impacts, significantly improving community development metrics. Limited market access can hinder community growth. Research by [35] indicated that poor market access negatively affects the sustainability of community projects by restricting

resource availability, resonating with your findings. A supportive regulatory environment is crucial for sustainable practices. As noted by de [40-42] regulations that promote sustainability lead to positive community outcomes, albeit sometimes to a lesser degree compared to direct investments. Support networks mitigate barriers to sustainable development. A study by [34] confirms that access to networks enhances resource availability, supporting your finding of a positive but small impact.

7. Conclusion and Recommendations

In this paper, the researcher explored the effect of Innovation & Entrepreneurship on Community Sustainable Development. By keeping objective of the study in mind, the researcher collected the primary data through a self-administrated questionnaire and analyzed it through SPSS version 23.0. A multiple regression model was employed to test the hypothesis. In this model, the variables Research and Development (R&D) Investment, Intellectual Property Rights, Collaboration and Partnerships, Access to Finance, Entrepreneurial Education and Training, Access to Market, Regulatory Environment, and Support Networks are statistically significant predictors of African Community Sustainable Development Among them, Entrepreneurial Education and Training and Research and Development (R&D) Investment have the most substantial positive impacts, while Access to Finance has the most substantial negative impact. Variables Technological Adoption and Innovation Ecosystem are not significant, meaning they do not contribute meaningfully to predicting African Community Sustainable Development in this model.

The regression analysis shows that Entrepreneurial Education and Training, Research and Development (R&D) Investment, Collaboration and Partnerships, and $_4$: Intellectual Property Rights are the most significant positive contributors to African Community Sustainable Development, while Access to Finance and Access to Market negatively impact African Community Sustainable Development. This suggests that focusing on education and training, research and development, collaboration, and investment in research can significantly improve African Community Sustainable Development outcomes, whereas administrative factors and management need careful handling to avoid negative effects.

The variables Entrepreneurial Education and Training, Research and Development (R&D) Investment, Collaboration and Partnerships, and Intellectual Property Rights have the highest positive impact on African Community Sustainable Development. Emphasize these areas in strategic planning and resource allocation. The negative coefficients for Access to Finance and Access to Market suggest these areas could be problematic. Strategies to stabilize assets and improve asset management should be prioritized. Research and Development (R&D) Investment and Innovation Ecosystem are not significant in this model. Consider revising the approach to these areas or investigate if other variables might be more impactful. Even smaller, yet significant, influences like Regulatory Environment and Support Networks should be considered in the broader strategy to enhance African Community Sustainable Development.

Abbreviations

ACSD	Community Sustainable Development
R&D	Research and Development
RDI	Research and Development Investment
ILO	International Labor Organization
TA	Technological Adoption
IE	Innovation Ecosystem
IPR	Intellectual Property Rights
CP	Collaboration and Partnerships
AF	Access to Finance
EET	Entrepreneurial Education and Training
MA	Market Access
RE	Regulatory Environment
SN	Support Networks
Sig	Significance Level

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Ethics Approval and Consent to Participate

This study did not include human participants; thus, ethics approval and consent requirements are not relevant.

Consent for Publication

Not applicable.

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Data Availability Statement

All data relevant to this study are contained within the manuscript.

Conflicts of Interest

The authors declare no conflicts of interest.

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