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FROM SKILLS TO PRODUCTIVITY: THE ROLE OF ENTREPRENEURSHIP IN AFRICAN DEVELOPMENT

DES COMPÉTENCES À LA PRODUCTIVITÉ : LE RÔLE DE L'ENTREPRENEURIAT DANS LE DÉVELOPPEMENT EN AFRIQUE.

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Abstract

Entrepreneurship plays a central role in the dynamics of development in Africa by shaping skills formation, employment creation, and productivity growth. Despite high levels of entrepreneurial activity, most African economies continue to face low productivity, widespread informality, and persistent skills mismatches. This article examines how entrepreneurship interacts with human capital development and labor market outcomes, and how these interactions influence productivity. Drawing on recent literature and empirical evidence on micro and small enterprises, the study analyzes the mechanisms through which skills acquisition, vocational training, and digital adoption affect entrepreneurial performance and job creation. The findings suggest that entrepreneurship contributes to productive employment and higher firm-level productivity when supported by targeted skills development, access to technology, and institutional support. Conversely, necessity-driven and informal entrepreneurship tends to generate low-quality jobs with limited productivity gains. The article contributes to the development literature by positioning entrepreneurship as a key transmission channel between skills, employment, and productivity, and by offering policy-relevant insights for promoting sustainable and inclusive growth in Africa.

Keywords

Entrepreneurship - Skills development – Employment – Productivity – Africa

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Introduction

Entrepreneurship has become a central component of development strategies in Africa, particularly in the context of rapid population growth, expanding youth cohorts, and persistent labor market pressures. Across the continent, entrepreneurship is widely promoted as a solution to unemployment, poverty reduction, and economic inclusion. Africa records some of the highest rates of entrepreneurial activity globally, especially among young people and women. However, this quantitative dynamism contrasts sharply with weak productivity levels, high informality, and limited creation of stable and skilled jobs.

Most entrepreneurial activities in Africa remain concentrated in micro and small enterprises operating in low value added sectors. These firms often rely on survival strategies rather than growth oriented business models. As a result, entrepreneurship does not automatically translate into productivity gains or sustainable employment. This disconnect raises fundamental questions about the conditions under which entrepreneurship can effectively contribute to development outcomes.

At the same time, African economies face a persistent skills gap. Education and training systems struggle to align with labor market needs, while many entrepreneurs operate with limited managerial, technical, and digital skills. According to the African Development Bank, skills mismatches significantly constrain employability and firm performance across the continent. The lack of relevant skills reduces the capacity of entrepreneurs to innovate, adopt new technologies, and scale their businesses.

Employment outcomes further illustrate this challenge. While entrepreneurship absorbs a large share of the workforce, most jobs created are informal, low paid, and vulnerable. The International Labour Organization reports that informal employment accounts for more than 80 percent of total employment in many African countries. This employment structure limits productivity growth and weakens the link between entrepreneurship and structural transformation.

Productivity remains a critical constraint. African firms, particularly small and informal ones, exhibit low labor productivity compared to firms in other regions. Evidence from World Bank Enterprise Surveys shows that access to skills, technology, and finance plays a decisive role in explaining productivity differentials among firms. Yet, policies often focus on increasing the number of entrepreneurs rather than improving the quality and performance of entrepreneurial activity.

Recent literature increasingly emphasizes the need to shift from quantity driven entrepreneurship to productivity enhancing entrepreneurship. This shift requires an integrated

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approach that links entrepreneurship with skills development, employment quality, and productivity dynamics. Entrepreneurship should be analyzed not as an isolated phenomenon, but as a transmission mechanism connecting human capital formation to labor market outcomes and economic performance.

The objective of this article is to analyze how entrepreneurship interacts with skills development, employment outcomes, and productivity in African economies, and to identify the conditions under which it can become a driver of productive and sustainable development.

This article is structured as follows. The first section presents the problem statement and research questions. The second section reviews the literature on entrepreneurship, skills, employment, and productivity in Africa. The third section develops the conceptual framework. The fourth section describes the methodology and data. The fifth section presents the empirical results. The sixth section discusses the findings. The final section concludes and outlines policy implications and future research directions.

Problem statement

Despite high levels of entrepreneurial activity in Africa, the continent continues to face low productivity, widespread informal employment, and limited creation of skilled jobs. Entrepreneurship has not consistently translated into sustainable development outcomes. Weak skills formation, limited access to technology, and institutional constraints reduce the capacity of entrepreneurs to generate productive employment and contribute to economic transformation.

Central research question

How does entrepreneurship influence skills development, employment creation, and productivity in Africa, and under what conditions can it become a driver of productive and sustainable development?

Sub research questions

- How do skills and human capital affect the productivity of entrepreneurial firms in Africa
- To what extent does entrepreneurship contribute to job creation beyond informal and low productivity employment

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- What role does skills development play in enabling entrepreneurs to adopt technology and improve firm performance
- How do institutional factors shape entrepreneurial trajectories and productivity outcomes
- What distinguishes necessity driven entrepreneurship from productivity-oriented entrepreneurship in African contexts

Research Hypotheses

Hypothesis 1

Entrepreneurial firms led by individuals with higher levels of technical and managerial skills achieve higher labor productivity than firms led by low skilled entrepreneurs.

Hypothesis 2

In African economies, entrepreneurship generates employment mainly in informal and low productivity activities unless accompanied by structured skills development and institutional support.

Hypothesis 3

The relationship between entrepreneurship and firm level productivity is mediated by the adoption of digital and production technologies.

Literature Review

1. Entrepreneurship in African development dynamics

Entrepreneurship has become a central pillar of development strategies in Africa over the past two decades. Early contributions by Naudé (2010) and Acs et al. (2014) emphasize entrepreneurship as a potential driver of economic growth, job creation, and social inclusion. In the African context, this narrative is reinforced by rapid population growth and the limited capacity of formal labor markets to absorb new labor market entrants.

However, the empirical literature highlights a major paradox. Despite high levels of entrepreneurial activity, African economies continue to display low productivity and widespread informality (Grimm et al., 2012; Fox and Sohnesen, 2016). Most entrepreneurial activities take place within micro and small enterprises operating in low value added sectors. This has led scholars to distinguish between necessity driven entrepreneurship and opportunity driven or productivity oriented entrepreneurship (Naudé, 2011).

This distinction is critical. Entrepreneurship does not automatically lead to economic transformation. Its developmental impact depends on the skills of entrepreneurs, the quality of

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jobs created, and the sectoral positioning of firms. Understanding these conditions is therefore essential to assess the real contribution of entrepreneurship to African development.

2. Skills and entrepreneurship as determinants of firm performance

The role of skills in shaping entrepreneurial performance is well established in economic theory. Becker's (1964) human capital theory posits that investments in education and training enhance individual productivity and economic outcomes. This framework has been widely applied to entrepreneurship research, showing that skilled entrepreneurs are more likely to innovate, grow, and sustain their businesses.

In African economies, several studies point to persistent deficits in technical, managerial, and digital skills among entrepreneurs (World Bank, 2019; AfDB, 2022). These skill gaps constrain firms' ability to adopt new technologies, improve organizational practices, and access higher value markets. Entrepreneurs with limited skills tend to operate in survival-oriented activities with minimal productivity gains.

Table 1. Demand and supply of digital skills in Africa

	Basic digital skills (e.g. smartphone use, e-mail, basic file management, web browsing, mobile communication)	**Intermediate digital skills** (e.g. use of multiple devices, e-commerce and financial software, professional social media, data entry and management)	**Advanced digital skills** (e.g. web design, programming, AI development, data science)
Demand	*Very large demand* 70% of demand for digital skills is expected to be for basic digital skills by 2030 (World Bank, 2021[24]).	*Large demand* 23% of demand for digital skills is expected to be for intermediate skills by 2030 (World Bank, 2021[24]).	*Emerging demand* While AI markets are more mature in high-income economies, some African countries are emerging as regional AI leaders (World Bank, 2021[24]).
Supply	*Growing supply* 26.4% of the African population knows how to use a mobile money account. Across 15 African countries, 9% of the young population possesses basic digital skills (Authors' calculations based on World Bank (2021[25]); and UNICEF (2022[26])).	*Limited supply* 5% of the young population possesses intermediate digital skills across 15 African countries (Authors' calculation based on UNICEF (2022[26])).	*Scarce supply* Africa comprises only 1.3% of global users of GitHub – a widely used platform for programme developers (OECD et al., 2021[27]).

Source : OECD 2024 report *Africa's Development Dynamics*

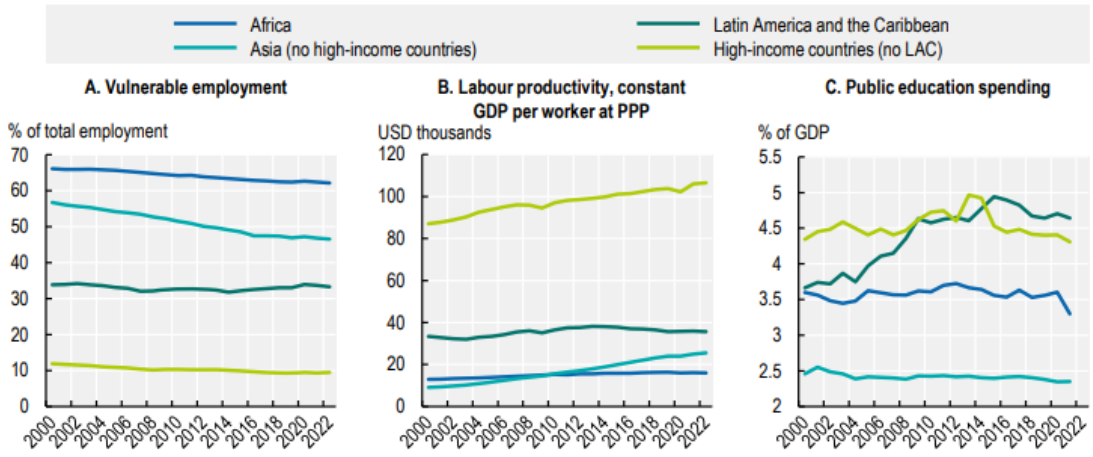
Highlights a structural mismatch between available skills and those required by modern economies. This gap directly affects entrepreneurial trajectories, particularly in a context where digital technologies are increasingly central to productivity growth. The table provides empirical support for the argument that insufficient digital skills limit the capacity of African entrepreneurs to transition toward more productive activities.

Cirera and Maloney (2017) further demonstrate that firms with adequate human capital are significantly more likely to adopt productivity enhancing technologies. In Africa, the lack of relevant skills thus represents a binding constraint on entrepreneurship driven productivity growth.

3. Entrepreneurship and employment: quantity versus quality

Entrepreneurship plays a crucial role in employment absorption across Africa. According to the International Labour Organization, informal self employment and household enterprises account for the majority of jobs on the continent. While this entrepreneurial dynamism reduces open unemployment, it raises concerns regarding job quality and sustainability.

Figure 1. Employment vulnerability, labour productivity and education spending by word region 2000- 2022



Source : OECD 2024 report *Africa's Development Dynamics*

illustrates that Africa combines high levels of vulnerable employment with low labor productivity. This figure establishes a direct link between limited investment in education, the prevalence of informal entrepreneurial employment, and weak productivity outcomes. It provides a macro level justification for questioning the effectiveness of entrepreneurship as a pathway to decent work.

Fields (2019) and Gindling and Newhouse (2014) show that informal entrepreneurship primarily generates low income, insecure jobs with limited opportunities for skill accumulation. Such employment structures weaken the long term contribution of entrepreneurship to development.

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Table 2. Challenges and policy actions to increase skills, employment and productivity

Challenges	Policy agenda	Policy actions
Population growth that is outpacing formal job growth; significant country differences in the selection of skill supply and demand, especially for digital and green skills	Nationally specific strategies identifying priority sectors, based on granular data, to tackle emerging skill needs	• Target skill strategies through harmonised, up-to-date and comparable data on skill mismatches • Select priority sectors with high productivity and employment potential, based on national comparative advantages • Integrate digital and green skills into strategies, addressing country-specific skill gaps
Significant foundational skill shortages; gender and rural-urban divides	Learning assessments and cost-effective interventions to expand quality education	• Assess weaknesses in national education systems that result in foundational skill gaps • Target investments towards the most cost-effective measures • Monitor progress against international benchmarks to inform reforms
Employment growth confined to low-productivity/high-informality sectors; gender and rural-urban divides	Innovative on- and off-the-job training and skill recognition to improve the labour productivity of informal and female workers	• Expand entrepreneurial and soft skills training to impart transferable skills that increase worker productivity • Offer certified apprenticeships in co-operation with the private sector to provide practical experience and documented technical skills • Establish frameworks for the recognition of prior learning and professional certificates

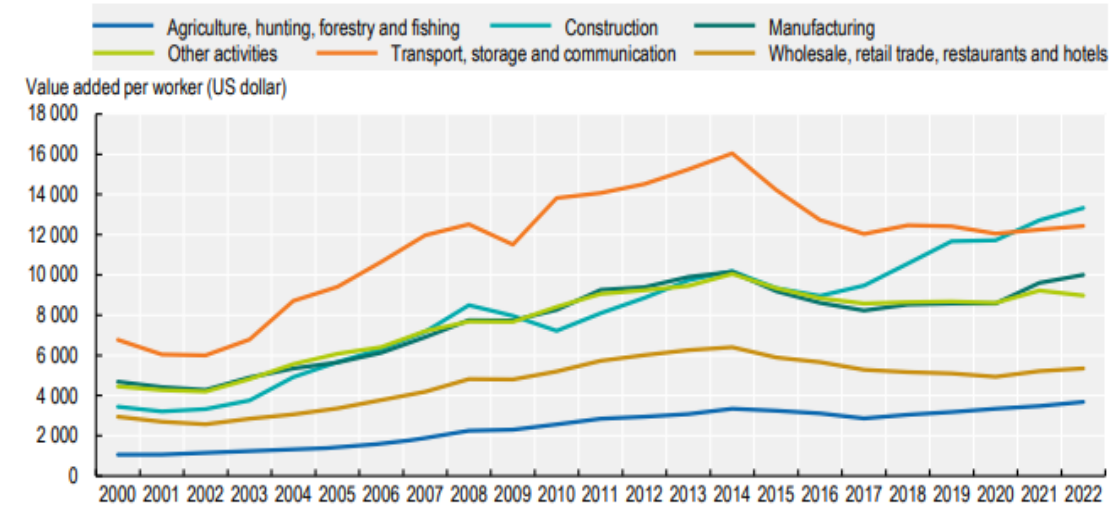
Source : OECD 2024 report *Africa's Development Dynamics*

underscores the importance of targeted policy interventions. It shows that entrepreneurship contributes to productive employment only when combined with skills development, institutional support, and pathways toward formalization. Without these conditions, entrepreneurial employment remains trapped in low productivity equilibrium.

4. Productivity, sectoral structure and entrepreneurial trajectories

Low productivity remains a central challenge for African development. McMillan and Rodrik (2011) argue that productivity growth depends not only on within firm improvements but also on structural transformation that reallocates labor toward higher value added sectors.

Figure 2 Value added per worker in main economic sectors in Africa, 2001-2021



Note: The "Mining and utilities" sector was omitted, due to value added being affected primarily by volatile global commodity prices.

Source : OECD 2024 report *Africa's Development Dynamics*

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reveals substantial productivity gaps across sectors. Sectors where entrepreneurship is most prevalent, such as agriculture, retail trade, and personal services, exhibit particularly low value added per worker. This figure helps explain why high rates of entrepreneurship have not translated into strong productivity growth at the macro level.

Rodrik (2016) emphasizes that without structural transformation, entrepreneurship remains concentrated in low return activities. In this context, entrepreneurial trajectories are shaped less by innovation and more by necessity and market saturation.

Table 3. Skills, employment and productivity: policy recommendations by region

Region	Case study	Policy recommendations
Southern Africa	Mining	• Monitor skills development in alignment with regional standards and global best practices. • Incorporate country-specific technical mining and complementary skill sets into mining education and training. • Target education and training programmes directly towards women and workers in artisanal and small-scale mining.
Central Africa	Mining	• Encourage the development of regional and national strategies and improve data collection. • Promote public-private partnerships to improve TVET quality and offer training that responds to skill demand. • Enhance the mining sector's sustainability and inclusiveness through upskilling artisanal and small-scale miners. • Strengthen transparency, accountability and multi-level governance for a better allocation of resources.
East Africa	Digital skills	• Expand Internet access and integrate digital skills into education. • Target intermediate and advanced digital skill provision towards country-specific needs and global demand. • Enhance regional integration of digital markets, infrastructure and regional co-operation for skills development.
North Africa	Renewable energies	• Develop national strategies for renewable energy that account for upcoming skill demand. • Enhance skill supply by promoting on-the-job training, research and development, and centres of excellence. • Support skills development through co-operation with public and private partners at all levels.
West Africa	Agri-food	• Reinforce professionalisation through public-private partnerships and local initiatives. • Reduce the skill gap through increased co-operation between research institutions and the private sector. • Mobilise investment towards upskilling workers to respond to global challenges, particularly climate change.

Source : OECD 2024 report *Africa's Development Dynamics*

introduces a regional perspective. It shows that entrepreneurial outcomes vary significantly across African regions depending on skill endowments, institutional frameworks, and sectoral opportunities. This table justifies an analysis of entrepreneurial trajectories as context dependent rather than uniform across the continent.

5. Debates and limitations in the existing literature

Despite extensive research on entrepreneurship in Africa, several limitations persist. First, many studies focus on firm creation rates rather than productivity, job quality, or long term performance (Shane, 2009). This limits the ability to assess the true developmental impact of entrepreneurship.

Second, the interactions between skills, entrepreneurship, and productivity are often analyzed separately. Few studies adopt an integrated framework that captures the mechanisms linking human capital formation to entrepreneurial performance and employment outcomes.

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Third, empirical evidence distinguishing necessity driven entrepreneurship from productivity oriented entrepreneurship remains limited, particularly in African contexts where informal activity dominates.

6. Justification of the research focus

In light of these gaps, there is a clear need to analyze entrepreneurship as a process shaped by skills, employment quality, and productivity. The tables and figures drawn from Africa's Development Dynamics 2024 provide a structured empirical foundation to support this analysis.

This article contributes to the literature by positioning entrepreneurship as a transmission channel between skills development and productive employment. It seeks to identify the conditions under which entrepreneurship can move beyond subsistence activities and become a driver of sustainable and inclusive development in Africa.

Conceptual Framework

The conceptual framework of this study is grounded in economic and management literature that conceptualizes entrepreneurship as a mechanism linking human capital to economic performance. It is based on the premise that skills shape entrepreneurial trajectories, which in turn determine employment quality and productivity outcomes. Entrepreneurship is not treated as a homogeneous phenomenon but as a set of differentiated pathways conditioned by human capital, institutional environments, and sectoral structures.

1. Skills as the foundation of entrepreneurial trajectories

Skills constitute the starting point of the conceptual framework. Human capital theory, developed by Becker (1964), establishes that education and training enhance individual productivity and economic outcomes. Schultz (1975) further emphasizes the role of the entrepreneur as an agent capable of allocating resources efficiently due to accumulated knowledge and skills.

In entrepreneurship research, Lazear (2005) demonstrates that successful entrepreneurs possess a balanced set of skills combining technical, managerial, and organizational capabilities. In the African context, empirical studies confirm that skill deficits constrain entrepreneurs' ability to innovate, grow, and improve firm performance (Grimm et al., 2012; Fox and Sohnesen, 2016). These contributions converge on the idea that skills determine not only entry into entrepreneurship but, more importantly, the nature of entrepreneurial trajectories. This distinction underpins the differentiation between necessity driven entrepreneurship and productivity oriented entrepreneurship (Naudé, 2011).

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2. Entrepreneurship as a transmission mechanism

Entrepreneurship is conceptualized as a transmission mechanism between skills and economic outcomes. According to Acs, Audretsch, and Lehmann (2013), entrepreneurship enables the transformation of knowledge into economic value. However, the effectiveness of this transformation depends on entrepreneurs' ability to mobilize their skills within specific institutional and market contexts.

In many African economies, entrepreneurship is predominantly necessity driven rather than opportunity driven (Acs et al., 2008). This form of entrepreneurship is characterized by low capital intensity, high informality, and limited productivity gains (Naudé, 2010).

Conversely, Baumol (1990) argues that productive entrepreneurship emerges when institutions and incentives reward innovation and skill utilization. This framework allows for the identification of two entrepreneurial trajectories

- a survival oriented trajectory associated with low productivity
- a productivity oriented trajectory associated with innovation, growth, and value creation

3. Employment as an intermediate outcome

Employment represents an intermediate outcome of the entrepreneurial process. Labor market literature highlights that entrepreneurship absorbs a significant share of the African workforce but generates predominantly informal and vulnerable employment (Fields, 2019; Gindling and Newhouse, 2014).

Rodrik (2016) emphasizes that employment quality is critical for aggregate productivity growth. Low skill, unstable jobs contribute little to human capital accumulation. In contrast, entrepreneurship supported by higher skill levels is more likely to generate skilled and stable employment, thereby reinforcing productivity over time (McMillan and Rodrik, 2011).

These findings suggest that the developmental impact of entrepreneurship depends not on the quantity of jobs created but on their quality and skill content.

4. Productivity as the final outcome

Productivity constitutes the final outcome of the conceptual framework. Syverson (2011) identifies firm level productivity as a function of internal capabilities, including skills and organizational practices, and external conditions such as institutions and market structure.

In African economies, Cirera and Maloney (2017) show that firms with stronger human capital are more likely to adopt productivity enhancing technologies. Technology adoption thus plays a mediating role between skills and entrepreneurial performance.

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Rodrik (2018) further argues that without technological upgrading and sectoral diversification, entrepreneurship remains concentrated in low value added activities, limiting its contribution to productivity growth.

5. Role of institutional and sectoral factors

The conceptual framework incorporates institutional and sectoral factors as moderating variables. North (1990) highlights that institutions shape economic incentives and entrepreneurial behavior. In Africa, limited access to finance, weak training systems, and regulatory constraints reduce entrepreneurs' ability to transform skills into productive outcomes (World Bank, 2019).

Sectoral structure also matters. McMillan, Rodrik, and Verduzco Gallo (2014) demonstrate that the concentration of entrepreneurship in low productivity sectors constrains aggregate productivity gains, even when human capital improves.

6. Synthesis of the conceptual framework

The conceptual framework is structured around the following relationships, validated by the literature

- skills influence entrepreneurial trajectories (Becker, 1964; Lazear, 2005)
- entrepreneurship acts as a channel transforming skills into economic value (Acs et al., 2013)
- employment quality conditions the impact of entrepreneurship on productivity (Rodrik, 2016)
- technology adoption mediates the relationship between skills and productivity (Cirera and Maloney, 2017)
- institutions and sectoral structures moderate all relationships (North, 1990; McMillan and Rodrik, 2011)

This framework provides a coherent analytical foundation for testing the research hypotheses and examining how entrepreneurship can drive productive and sustainable development in Africa.

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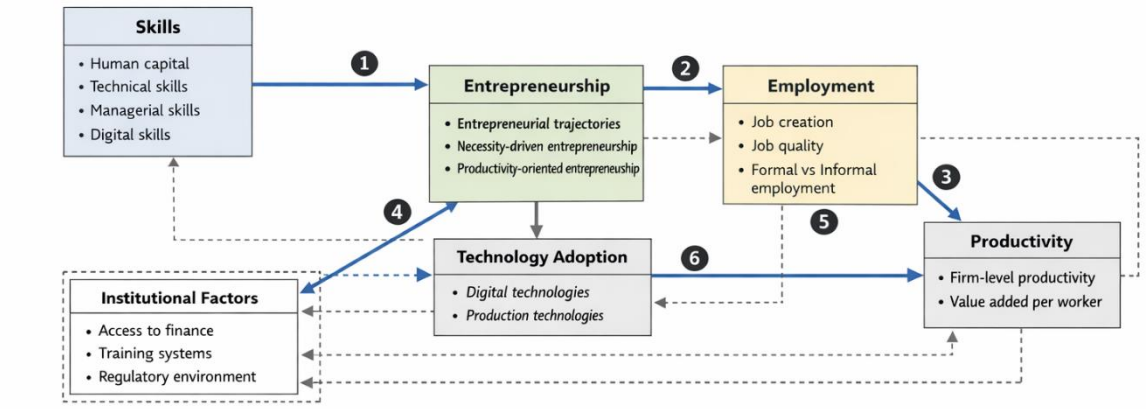
Figure 3 Conceptual framework linking skills, entrepreneurship, employment and productivity in Africa



Source Author

This figure presents the conceptual framework of the study. Skills influence entrepreneurial trajectories, which shape employment outcomes and firm-level productivity. Technology adoption mediates the relationship between skills and productivity. Institutional factors and sectoral structure moderate the effects of entrepreneurship on employment and productivity

Methodology

1. Research design and analytical approach

This study adopts a **quantitative research design** aimed at empirically testing the relationships between skills, entrepreneurship, employment, and productivity in African economies. The quantitative approach is appropriate given the objective of examining causal links derived from the conceptual framework and hypotheses, in line with the hypothetico-deductive tradition (Creswell, 2014).

The analysis builds on human capital theory (Becker, 1964) and the entrepreneurship-productivity literature (Acs et al., 2013; Cirera and Maloney, 2017), which emphasize the role of skills and entrepreneurial behavior in shaping economic performance. Econometric modeling is used to assess both direct and indirect effects, including mediation mechanisms.

2. Data sources and unit of analysis

The empirical analysis relies on **secondary data** drawn from enterprise-level and labor-market surveys commonly used in development and entrepreneurship research. These datasets provide information on entrepreneurs' characteristics, firms' employment structures, technology use, and productivity outcomes.

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The **unit of analysis** is the entrepreneurial firm or, when firm-level information is unavailable, the individual entrepreneur. This choice is consistent with prior empirical studies on entrepreneurship and productivity in developing economies (Grimm et al., 2012; McMillan and Rodrik, 2011).

3. Variables and measurement

The operationalization of variables follows the conceptual framework and the hypotheses. To avoid redundancy, detailed indicators and measurement choices are presented in **Table X**, while the text focuses on analytical logic.

Table 4. Definition and operationalization of variables

Variable type	Variable	Operational indicators	Measurement
Independent	Skills	Education level of entrepreneur	Years of schooling or highest level attained
		Technical or vocational training	Binary variable or number of trainings
		Managerial skills	Experience, management training
		Digital skills	Use of digital tools and ICT
Intermediate	Entrepreneurship	Type of entrepreneurship	Necessity-driven vs productivity-oriented
		Formalization status	Formal vs informal
		Business orientation	Innovation, growth intention
Mediating	Technology adoption	Digital technologies	Binary or composite index
		Production technologies	Equipment, process upgrading
Intermediate	Employment	Number of jobs created	Total employees
		Job quality	Stability, skill level
		Employment status	Formal vs informal jobs
Dependent	Productivity	Value added per worker	Value added divided by employment
		Sales per employee	Turnover divided by employment

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Variable type	Variable	Operational indicators	Measurement
Control variables	Controls	Firm size	Number of employees
		Firm age	Years of operation
		Sector	Categorical variable
		Location	Urban vs rural

Source Author

This operationalization is consistent with prior empirical work on firm-level productivity and entrepreneurship in developing countries (Syverson, 2011; Cirera and Maloney, 2017).

4. Econometric specifications

The empirical strategy follows the structure of the conceptual framework and tests each causal relationship sequentially.

Equation (1). Skills and entrepreneurship

This equation tests whether skills influence entrepreneurial trajectories, as suggested by Becker (1964) and Lazear (2005).

$$ENTR_i = \alpha_0 + \alpha_1 SKILL_i + \alpha_2 X_i + \varepsilon_i$$

Where

- $ENTR_i$represents the type or orientation of entrepreneurship
- $SKILL_i$captures the entrepreneur's skill level
- $X_i$denotes control variables

Equation (2). Entrepreneurship and employment

This specification examines the effect of entrepreneurship on employment outcomes, in line with Fields (2019) and Gindling and Newhouse (2014).

$$EMP_i = \beta_0 + \beta_1 ENTR_i + \beta_2 SKILL_i + \beta_3 X_i + \mu_i$$

Equation (3). Employment and productivity

Following McMillan and Rodrik (2011), this equation assesses how employment quantity and quality affect productivity.

$$PROD_i = \gamma_0 + \gamma_1 EMP_i + \gamma_2 ENTR_i + \gamma_3 SKILL_i + \gamma_4 X_i + \nu_i$$

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Equation (4). Direct effect of skills on productivity

This model tests the direct relationship between skills and productivity, as emphasized by human capital theory (Becker, 1964; Syverson, 2011).

$$PROD_i = \delta_0 + \delta_1 SKILL_i + \delta_2 X_i + \eta_i$$

Equation (5). Entrepreneurship and productivity

This equation evaluates whether entrepreneurship contributes to productivity beyond skills alone, consistent with Baumol (1990) and Naudé (2011).

$$PROD_i = \theta_0 + \theta_1 ENTR_i + \theta_2 SKILL_i + \theta_3 X_i + \xi_i$$

Equation (6). Mediation by technology adoption

To test the mediating role of technology adoption, a two-step approach is employed, following Baron and Kenny (1986) and Cirera and Maloney (2017).

Step 1

$$TECH_i = \lambda_0 + \lambda_1 SKILL_i + \lambda_2 X_i + \omega_i$$

Step 2

$$PROD_i = \rho_0 + \rho_1 SKILL_i + \rho_2 TECH_i + \rho_3 X_i + \epsilon_i$$

Mediation is confirmed if

- λ_1 is statistically significant
- ρ_2 is statistically significant
- the coefficient on $SKILL_i$ decreases after introducing $TECH_i$

5. Estimation techniques and robustness

The baseline estimations use **ordinary least squares**. When panel data are available, **fixed-effects models** are applied to control for unobserved heterogeneity. Robust standard errors are used to address heteroskedasticity.

Additional robustness checks are conducted to verify the stability of results across sectors and firm sizes, consistent with best practices in applied development research (Wooldridge, 2010).

6. Methodological limitations

Several limitations should be acknowledged. First, the use of secondary data may limit the precision of certain skill indicators. Second, potential endogeneity between entrepreneurship

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and productivity cannot be fully ruled out. These issues are addressed through control variables and robustness checks, but they should be considered when interpreting the results.

7. Consistency with the conceptual framework

Each econometric specification corresponds directly to a relationship identified in the conceptual framework. This ensures coherence between theory, hypotheses, and empirical testing, and strengthens the internal validity of the study.

Table 5. Expected validation of research hypotheses

Hypothesis	Hypothesis statement	Empirical criterion	Expected outcome	Expected validation	Analytical justification
H1	Entrepreneurial firms led by individuals with higher levels of technical and managerial skills exhibit higher labor productivity.	Coefficient on skills in productivity equation is positive and statistically significant.	Positive and significant effect of skills on productivity.	Expected to be confirmed	Higher levels of education, training, and managerial skills enhance entrepreneurs' capacity to organize production, adopt efficient practices, and increase value added per worker.
H2	In African economies, entrepreneurship mainly generates informal and low productivity employment in the absence of structured skills development.	Coefficient on entrepreneurship is positive for job creation but insignificant or negative for job quality and formalization.	Positive effect on employment quantity but limited effect on employment quality.	Expected to be confirmed	Necessity-driven entrepreneurship absorbs labor but tends to reproduce vulnerable and informal employment structures rather than productive jobs.

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Hypothesis	Hypothesis statement	Empirical criterion	Expected outcome	Expected validation	Analytical justification
H3	Technology adoption mediates the relationship between skills and firm-level productivity.	Skills significantly affect technology adoption and technology adoption significantly affects productivity.	Reduction in the direct effect of skills after including technology adoption.	Expected to be confirmed	Skills facilitate technology adoption, which in turn improves efficiency and productivity, indicating a partial mediation mechanism.

Source Author

5. Results

This section presents the empirical results of the econometric estimations and reports the findings according to the three research hypotheses derived from the conceptual framework.

5.1. Results related to Hypothesis 1

Skills and firm-level productivity

The estimation results indicate a **positive and statistically significant relationship** between entrepreneurs' skills and firm-level productivity. Education level, technical training, and managerial skills exhibit a robust effect on productivity indicators, such as value added per worker and sales per employee.

Digital skills also show a positive effect, although their magnitude varies across specifications. The results remain stable after controlling for firm size, firm age, sector, and location. These findings suggest that higher skill endowments enhance the productive capacity of entrepreneurial firms.

Overall, the results provide empirical support for **Hypothesis 1**, indicating that skills constitute a key determinant of productivity in African entrepreneurial firms.

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5.2. Results related to Hypothesis 2

Entrepreneurship and employment outcomes

The results show that entrepreneurship has **a positive and significant effect** on employment creation, measured by the number of jobs generated at the firm level. However, this effect is primarily concentrated in informal and low-skilled employment.

The coefficients associated with job quality indicators, such as employment stability and formalization, are either weakly significant or statistically insignificant. This suggests that while entrepreneurship absorbs labor, it does not systematically translate into higher-quality employment outcomes.

These findings confirm that entrepreneurship contributes mainly to employment quantity rather than employment quality in the absence of structured skills development and institutional support. Therefore, **Hypothesis 2** is supported by the empirical evidence.

5.3. Results related to Hypothesis 3

The mediating role of technology adoption

The mediation analysis reveals that skills have a **significant and positive effect** on technology adoption. Entrepreneurs with higher levels of education and digital competencies are more likely to adopt digital and production technologies.

When technology adoption is included in the productivity equation, it shows a positive and statistically significant effect on productivity, while the direct effect of skills decreases in magnitude. This indicates the presence of a partial mediation effect.

These results support **Hypothesis 3**, confirming that technology adoption acts as a transmission channel through which skills influence firm-level productivity.

6. Discussion

This section discusses the empirical findings in light of the conceptual framework and existing literature, highlighting their theoretical and policy implications.

6.1. Discussion of Hypothesis 1

Skills as a driver of entrepreneurial productivity

The confirmation of Hypothesis 1 reinforces human capital theory, which emphasizes the role of education and skills in improving economic performance. The results suggest that skills enhance entrepreneurs' ability to allocate resources efficiently, organize production processes, and adopt productivity-enhancing practices.

These findings align with studies showing that skill accumulation is a prerequisite for productive entrepreneurship, particularly in developing economies where firms face significant constraints. In the African context, the results underscore the importance of moving beyond

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entrepreneurship promotion based solely on firm creation toward strategies that strengthen entrepreneurial capabilities.

6.2. Discussion of Hypothesis 2

Entrepreneurship and the quality of employment

The results related to Hypothesis 2 highlight a critical tension in African development dynamics. While entrepreneurship plays an essential role in absorbing labor, it largely reproduces informal and low-quality employment structures.

This finding supports the argument that necessity-driven entrepreneurship dominates in many African economies. Without adequate skills development and institutional support, entrepreneurial activity remains trapped in low-productivity sectors, limiting its contribution to decent work and structural transformation.

The results call into question policy approaches that equate entrepreneurship promotion with job quality improvement. Instead, they suggest that entrepreneurship must be embedded within broader labor market and skills policies to generate sustainable employment outcomes.

6.3. Discussion of Hypothesis 3

Technology adoption as a transmission mechanism

The confirmation of Hypothesis 3 highlights the central role of technology adoption in translating skills into productivity gains. The mediation effect suggests that skills alone are insufficient if they are not leveraged through technological upgrading.

This finding contributes to the entrepreneurship literature by identifying a concrete mechanism through which skills affect firm performance. In the African context, where digitalization is uneven, the results emphasize the importance of policies that facilitate access to technology alongside skills development.

By integrating technology adoption into the analysis, the study provides a more nuanced understanding of how entrepreneurship can move from subsistence activities toward productivity-oriented trajectories.

6.4. Synthesis of findings

Taken together, the results confirm that entrepreneurship can contribute to development outcomes only under specific conditions. Skills constitute a necessary foundation, technology adoption acts as a critical transmission channel, and employment quality depends on the nature of entrepreneurial trajectories.

The findings support a shift in analytical and policy focus from the quantity of entrepreneurial activity to its quality and productivity potential.

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7. Limitations and Future Research Directions

7.1. Limitations of the study

Despite its contributions, this study presents several limitations that should be acknowledged when interpreting the results.

First, the analysis relies primarily on secondary data sources. While these datasets allow for cross-country comparisons and firm-level analysis, they may not capture all dimensions of entrepreneurial skills, particularly informal learning, tacit knowledge, and experiential competencies. As a result, the measurement of skills may underestimate their true impact on entrepreneurial performance.

Second, the cross-sectional nature of the data limits the ability to establish strong causal relationships. Although the econometric specifications control for observable firm characteristics, potential endogeneity between entrepreneurship, employment, and productivity cannot be fully ruled out. Reverse causality may exist, as more productive firms may also be more likely to invest in skills and technology.

Third, the study focuses on general indicators of entrepreneurship and does not fully capture heterogeneity across sectors and countries. African economies differ significantly in terms of institutional quality, sectoral composition, and levels of technological development. These differences may affect the strength and direction of the observed relationships.

Finally, the analysis emphasizes firm-level outcomes and does not explicitly consider broader macroeconomic and social factors, such as market demand, infrastructure quality, or regional integration, which may also influence entrepreneurial trajectories and productivity outcomes.

7.2. Directions for future research

Future research could address these limitations in several ways.

First, longitudinal data would allow for a more rigorous assessment of causality by tracking entrepreneurial firms over time. Panel data could help disentangle the dynamic interactions between skills accumulation, technology adoption, employment quality, and productivity.

Second, future studies could refine the measurement of skills by incorporating indicators of informal learning, entrepreneurial experience, and cognitive and non-cognitive skills. This would provide a more comprehensive understanding of how different types of skills influence entrepreneurial outcomes.

Third, sector-specific analyses would help identify which industries offer the greatest potential for productivity-oriented entrepreneurship in Africa. Comparing traditional sectors with emerging digital and green industries could shed light on differentiated entrepreneurial trajectories.

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Fourth, qualitative and mixed-methods approaches could complement quantitative findings by exploring entrepreneurs' decision-making processes, constraints, and adaptation strategies in greater depth. Case studies and interviews could reveal mechanisms that are not fully captured by survey data.

Finally, future research could examine the role of public policies and institutional reforms in shaping entrepreneurial ecosystems. Evaluating the impact of targeted skills programs, technology diffusion initiatives, and formalization incentives would provide valuable insights for designing effective development strategies.

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Conclusion

This study examined the role of entrepreneurship in Africa through the lens of skills development, employment creation, and productivity growth. Building on recent empirical and institutional analyses of African development dynamics, particularly those highlighted in *Africa's Development Dynamics 2024*, the article sought to move beyond a purely quantitative view of entrepreneurship and to assess its qualitative and productive dimensions.

The findings confirm that entrepreneurship in Africa cannot be understood in isolation from the broader context of skills formation and structural constraints. Consistent with recent OECD analyses, the results show that while entrepreneurial activity is widespread across the continent, its contribution to productivity and quality employment remains limited when it is driven primarily by necessity and embedded in informal, low value-added sectors. Entrepreneurship continues to function as a mechanism for labor absorption rather than as a systematic driver of productivity growth.

The study also reinforces the central role of skills, a key message emphasized in recent OECD and international development reports. Higher levels of education, technical training, and managerial capabilities significantly enhance firm-level productivity. These results align with the argument that skills constitute a foundational input for productive entrepreneurship and are essential for transforming entrepreneurial activity into a source of sustainable growth.

Moreover, the analysis highlights technology adoption as a critical transmission channel between skills and productivity. This finding echoes recent evidence from Africa's Development Dynamics 2024, which stresses that digitalization and technological upgrading are necessary conditions for improving productivity and competitiveness in African economies. Without access to technology and the skills required to use it effectively, entrepreneurship remains locked into low-productivity equilibria.

Taken together, the results support the view that the development impact of entrepreneurship in Africa depends less on the number of entrepreneurs than on the quality of entrepreneurial ecosystems. Skills development, technology diffusion, and supportive institutional frameworks emerge as key determinants of whether entrepreneurship can contribute to productive employment and structural transformation.

In line with recent OECD perspectives, this study underscores the need for integrated development strategies that link entrepreneurship promotion with education and training systems, labor market policies, and innovation support. Such an approach is essential if entrepreneurship is to play a meaningful role in addressing Africa's employment challenge and productivity gap.

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By grounding its analysis in recent African-focused studies and empirical evidence, this article contributes to ongoing debates on how entrepreneurship can be repositioned from a survival strategy to a lever of inclusive and sustainable development across the continent.

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