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# Developing Tech-Enabled Skills to Drive Sustainable Youth Employment, Job Creation, and Economic Growth in Africa.

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## ABSTRACT

Africa's rapidly growing youth population presents both a challenge and an opportunity for economic growth and sustainable development. High unemployment and a mismatch between existing skills and labor market demands remain significant obstacles. This study examines how technology-driven skills can promote youth employment and job creation across the continent. Using a mixed-methods approach, it analyzes secondary data and assesses the roles of governments, educational institutions, and the private sector in fostering relevant competencies. The findings reveal that technology can open new employment pathways and boost productivity. However, barriers such as inadequate infrastructure, outdated education systems, and policy constraints limit progress. Key skills needed include digital literacy, data management, software development, and familiarity with emerging digital tools. Initiatives such as coding boot camps, innovation hubs, and youth-focused training programs have shown promising results in enhancing employability. The study recommends integrating digital skills into curricula, promoting public-private partnerships, supporting innovation centers, and developing national digital competence frameworks. Investment in ICT infrastructure and active engagement from the private sector are essential. Inclusion efforts must prioritize women, rural youth, and other vulnerable groups. Future research should evaluate the effectiveness of skills development programs and their long-term economic impact. Coordinated efforts in education, policy, and industry can build a resilient and inclusive workforce for Africa's digital economy.

**Keywords**: Tech-Enabled Skills, Youth Employment, Economic Growth, Development, Africa, Digital Economy, Public-Private Partnerships, Educational Reform.

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## 1. INTRODUCTION

Africa is experiencing a significant demographic shift, with its youth population (individuals aged 15-24) constituting approximately 33.1% of the continent's total population as of 2024 (Statistics South Africa, 2025). This burgeoning youth demographic presents both an opportunity for economic growth and a challenge in terms of employment. Despite the potential for a dynamic workforce, youth unemployment remains a critical issue. In 2024, the youth unemployment rate in Africa was estimated at 11.2% (Statista, 2024). However, this figure varies significantly across the continent. For instance, South Africa reported a youth unemployment rate of 60.2% in the third quarter of 2024 (Trading Economics, 2024), highlighting the severity of the issue in certain regions.

A significant factor contributing to youth unemployment in Africa is the mismatch between the skills possessed by young individuals and the demands of the labor market. Many educational systems in African countries have not kept pace with the rapid technological advancements and evolving industry requirements. As a result, there is a growing digital skills gap. According to the International Finance Corporation (IFC), by 2030, over 230 million jobs in Sub-Saharan Africa will require digital skills, yet a substantial portion of the youth lack access to relevant training (World Bank, 2024). This disparity leaves many young Africans ill-prepared for available job opportunities, particularly in sectors driven by technology and innovation. This paper aims to explore how developing tech-enabled skills can serve as a catalyst for sustainable youth employment, job creation, and economic growth in Africa. By examining current challenges, potential strategies, and the roles of various stakeholders, the paper seeks to provide actionable insights into bridging the skills gap and aligning youth capabilities with market needs.

## 2. LITERATURE REVIEW

### 2.1 Youth Employment Landscape in Africa: Current Statistics and Trends

Africa's youth population is burgeoning, with projections indicating that by 2050, the continent's population will reach approximately 2.5 billion, with over 600 million individuals joining the working-age demographic (World Bank, 2024). This demographic shift presents both opportunities and challenges, particularly concerning employment. In 2024, the youth unemployment rate in Sub-Saharan Africa was estimated at 8.9%, a slight decrease from 9.5% in 2019 (International Labour Organization [ILO], 2024). However, this figure does not capture the full extent of underemployment and informal employment prevalent among African youth. Notably, in South Africa, youth unemployment remains alarmingly high, with rates reaching 60.8% in the second quarter of 2024 (Statistics South Africa, 2024).

The disparity between the number of young people entering the labor market and the availability of formal employment opportunities is widening. Each year, approximately 10 to 12 million young Africans enter the workforce, yet only about 3 million formal jobs are created annually (World Bank, 2024). This imbalance has led to a significant portion of the youth engaging in informal, low-wage, and insecure employment. Moreover, a substantial number of young people are not in employment, education, or training (NEET), with estimates indicating that 21.2% of African youth fell into this category in 2024 (African Union, 2024).

### 2.2 The Role of Technology in Employment and Economic Growth: Global and African Perspectives

Globally, technological advancements have been pivotal in driving economic growth and transforming labor markets. The Fourth Industrial Revolution (4IR) introduces technologies such as artificial intelligence (AI), machine learning, and automation, which have the potential to enhance productivity and create new industries. However, the adoption and impact of these technologies vary across regions.

In the African context, technology presents a dual-edged sword. On one hand, it offers opportunities to leapfrog traditional development stages, as evidenced by the widespread adoption of mobile banking services like M-Pesa in Kenya, which has significantly increased financial inclusion (UN Africa Renewal, 2024). On the other hand, there are concerns about the "AI divide," where unequal access to technology could exacerbate existing inequalities (Financial Times, 2024). The integration of technology into various sectors can potentially address some of the employment challenges faced by African youth. For instance, the renewable energy sector is emerging as a significant employer. Investments in green technologies are projected to create approximately 4 million jobs in Africa by 2030, particularly in renewable energy industries (AfriPol, 2024). Similarly, the digital economy offers avenues for employment through online platforms, e-commerce, and digital services. However, the realization of these opportunities is contingent upon addressing infrastructural deficits, enhancing digital literacy, and implementing supportive policies.

### 2.3 Case Studies: Successful Tech-Driven Employment Initiatives in Africa and Beyond

1) **Meltwater Entrepreneurial School of Technology (MEST), Ghana:** Established in 2008, MEST provides training, investment, and mentoring for aspiring technology entrepreneurs in Africa. The program offers a one-year intensive training in software development, business fundamentals, and entrepreneurship. Graduates have gone on to establish over 80 tech startups, contributing to job creation and innovation in the region (MEST, n.d.).
2) **Ingressive for Good (I4G), Nigeria:** Founded in 2020, I4G aims to equip young Africans with tech skills, resources, and opportunities. Collaborating with partners like Coursera and DataCamp, I4G has trained over 132,000 students in coding and digital skills. This initiative not only enhances employability but also fosters entrepreneurship among African youth (Ingressive for Good, n.d.).
3) **Digital Opportunity Trust (DOT), Pan-Africa:** DOT focuses on empowering youth through technology, entrepreneurship, and leadership training. Since its inception in 2001, DOT has trained over 3 million young people across 25 countries, with a significant emphasis on women. The organization's approach involves training local youth, who in turn mentor their peers, creating a ripple effect in community development (Digital Opportunity Trust, n.d.).
4) **Project Relate by Google, Ghana:** Project Relate is an AI-enabled application developed by Google to assist individuals with non-standard speech. In Ghana, the app has been piloted to help users communicate more effectively, thereby enhancing their employment prospects and social interactions. This initiative exemplifies how technology can be tailored to address specific local challenges (Financial Times, 2024).
5) **Africa AI Accelerator Program:** This program aims to support AI-based startups in Africa by providing mentorship, resources, and funding. The initiative focuses on capacity building and fostering innovation, enabling startups to scale their

solutions and create employment opportunities. Participants have reported improved business models and increased investment, contributing to the growth of the AI ecosystem in Africa (Research ICT Africa, 2021).

## 2.4 Theoretical Framework

### 2.4.1 Human Capital Theory and Innovation-Driven Development Models

**Human Capital Theory** posits that investments in education and skills development enhance an individual's productivity and, by extension, contribute to economic growth. In the African context, equipping youth with tech-enabled skills can increase their employability and entrepreneurial capabilities, thereby addressing unemployment challenges. However, the effectiveness of this approach depends on the relevance of the skills imparted and the capacity of the economy to absorb skilled labor.

**Innovation-Driven Development Models** emphasize the role of technological innovation in driving economic development. These models advocate for creating ecosystems that support research and development, entrepreneurship, and the commercialization of new technologies. For African countries, adopting such models necessitates investments in infrastructure, education, and policy reforms to create an enabling environment for innovation.

## 3. METHODOLOGY

This study aims to investigate how tech-enabled skills can drive sustainable youth employment, job creation, and economic growth in Africa. To achieve this, a comprehensive research methodology has been designed, encompassing research design, data collection methods, sampling techniques, and data analysis tools. A **mixed-methods** approach have been employed, integrating both quantitative and qualitative research designs. This combination allows for a robust analysis by capturing numerical data and exploring deeper insights into stakeholders' experiences and perceptions. The quantitative component involves the analysis of existing datasets on youth employment and skills in Africa, while the qualitative component included interviews and focus groups to gather nuanced perspectives.

## 3.1 Data Collection Methods

**Secondary Data Analysis**: The study utilized existing datasets to assess the current state of youth employment and the skills gap in Africa. One pertinent dataset is the "Youth Jobs, Skill and Educational Mismatches in Africa," which examines the incidence of skill and educational mismatches among employed youth across ten African countries between 2012 and 2015 (Adékola et al., 2018). This dataset provides valuable insights into the alignment between youth skills and labor market demands.

A **stratified random sampling** method has been employed to ensure representation across different demographics and regions.

- **Youth**: Participants aged 15-35 were stratified based on factors such as education level, urban or rural residence, and employment status.
- **Employers**: A diverse range of industries was considered, focusing on sectors with high potential for tech-driven growth. Companies were selected based on size, industry, and geographic location.

- **Policymakers and Educators**: Individuals involved in policy formulation and educational program development related to technology and employment were purposively sampled to provide expert insights.

This stratification ensures that the sample accurately reflects the diverse contexts within Africa, allowing for more generalization and relevant findings.

### 3.2 Data Analysis Tools

- **Statistical Methods**: Quantitative data from surveys were analyzed using statistical software to perform descriptive and inferential statistics. Techniques such as regression analysis was used to identify relationships between tech-enabled skills and employment outcomes.
- **Thematic Analysis**: Qualitative data from interviews and focus groups were transcribed and analyzed thematically. This process involves coding the data to identify recurring themes and patterns related to tech-enabled skill development and its impact on youth employment.
- **Data Visualization**: Findings were presented using data visualization tools to create charts, graphs, and maps that effectively communicate the results.

### Analysis of the "Youth Jobs, Skill and Educational Mismatches in Africa" Dataset

The "Youth Jobs, Skill and Educational Mismatches in Africa" dataset, compiled by Morsy and Mukasa (2019), offers a comprehensive examination of skill and educational mismatches among African youth. Utilizing data from the School-to-Work Transition Surveys (SWTS) conducted by the International Labour Organization (ILO) between 2012 and 2015 across ten African countries—Benin, Congo, Egypt, Liberia, Madagascar, Malawi, Tanzania, Togo, Uganda, and Zambia—the dataset encompasses responses from 64,310 youth aged 15–29, with 32,437 identified as employed.

### Prevalence of Skill and Educational Mismatches:

- **Overskilled**: 17.5% of employed youth reported possessing skills exceeding job requirements.
- **Underskilled**: 28.9% felt their skills were insufficient for their roles.
- **Overeducated**: 8.3% had higher educational qualifications than necessary for their positions.
- **Undereducated**: A significant 56.9% lacked the formal education typically required for their jobs.

### Impact on Wages:

- **Wage Penalty**: Both overskilled and overeducated youth experienced lower wages compared to well-matched peers.
- **Wage Premium**: Underskilled and undereducated individuals often earned higher wages, potentially due to compensating differentials or labor market dynamics.

### Job Satisfaction and On-the-Job Search:

Mismatched youth, particularly those overskilled or overeducated, reported reduced job satisfaction. This dissatisfaction correlated with an increased likelihood of seeking alternative employment opportunities.

Persistence of Mismatches:

- Skill and educational mismatches exhibited persistence over time.
- Skill-mismatched youth were more likely to transition to better-matched jobs compared to their education-mismatched counterparts.

### Analytical Approach

The study employed a probit-selection multinomial logit model to estimate the likelihood of youth being mismatched in the labor market, accounting for sample selection bias and unobserved heterogeneity. Additionally, an instrumental variable two-stage least squares (IV-2SLS) approach was utilized to assess the impact of mismatches on wages, job satisfaction, and job search behaviors.

## 4. FINDINGS AND DISCUSSION

### 4.1 Key Findings

The analysis of the "Youth Jobs, Skill and Educational Mismatches in Africa" dataset provides a nuanced understanding of the current landscape of youth employment, tech-enabled skill gaps, job creation opportunities, and the challenges hindering the adoption of technology-driven skills in Africa. This section discusses the key findings, the impact of tech-enabled skills on job creation, and the barriers to realizing the full potential of technology in addressing youth unemployment. The study revealed significant skill and educational mismatches among African youth, with critical implications for employment and economic growth. The analysis highlighted the following:

a) **Prevalence of Skill Mismatches**: Approximately **17.5%** of employed youth are **overskilled**, while **28.9%** are **underskilled** for their roles. The **high rate of undereducation (56.9%)** among youth indicates a misalignment between formal education and job requirements (Morsy & Mukasa, 2019).
b) **Wage Disparities**: Youth with mismatched skills experience wage penalties, especially those who are overskilled or overeducated. Conversely, underskilled and undereducated youth often earn higher wages, possibly due to the scarcity of qualified labor in specific sectors.
c) **Job Satisfaction and Turnover Intentions**: Skill-mismatched individuals reported lower job satisfaction and were more likely to search for new employment opportunities, suggesting instability in the labor market.
d) **Skill Mismatches and Persistence**: Skill mismatches show a degree of persistence, with skill-mismatched youth having a better chance of transitioning to suitable roles than those with educational mismatches (Morsy & Mukasa, 2019).

### 4.2 Tech-Enabled Skill Gaps: Insights into In-Demand Skills

The evolving job market increasingly demands **digital and tech-enabled skills**, yet the dataset highlights a substantial gap in these competencies among African youth. Key insights include:

a) **Demand for Digital Literacy and Technical Skills**: **Data analysis, software development, digital marketing, and cybersecurity** are among the most in-demand skills (World Economic Forum, 2023). **Emerging technologies** such as **artificial intelligence (AI)**, **blockchain**, and **Internet of Things (IoT)** are creating new job roles, but qualified candidates are scarce.
b) **Entrepreneurial and Soft Skills**: Beyond technical abilities, **critical thinking**, **problem-solving**, and **entrepreneurial skills** are increasingly valued (African Development Bank, 2024). The dataset suggests that youth with a blend of technical and soft skills have better employment outcomes.

c) **Regional Disparities in Skill Acquisition**: Youth in **urban areas** tend to have greater access to tech training and resources than those in **rural regions**, exacerbating inequalities (Morsy & Mukasa, 2019).

### 4.3 Impact on Job Creation: How Tech Skills Translate to New Opportunities

Tech-enabled skills have the potential to drive job creation in several ways:

- **Enabling Digital Transformation**: Companies adopting **digital solutions** require a workforce skilled in **IT support**, **software development**, and **digital content creation**. Industries such as **finance (fintech)**, **agriculture (agritech)**, and **healthcare (healthtech)** are particularly poised for tech-driven job growth.
- **Facilitating Entrepreneurship**: Many African youths are leveraging digital platforms to create **micro-enterprises**, particularly in the **gig economy** and **e-commerce** (International Labour Organization, 2024). Tech skills empower youth to establish **startups**, offering services that bridge local needs with global markets.
- **Enhancing Employability**: Tech-enabled skills align with the **future of work**, improving youth employability in both **formal** and **informal sectors**. Training in **digital literacy** and **advanced technologies** equips youth for **remote work** and **freelance opportunities**.

### 4.4 Challenges: Barriers to Developing and Adopting Tech-Enabled Skills

Despite the potential of tech-enabled skills, several **barriers** hinder their development and adoption:

- **Infrastructure Deficits**: Limited access to **reliable internet**, **electricity**, and **digital devices** remains a significant obstacle, particularly in **rural and underserved areas** (Morsy & Mukasa, 2019).
- **Educational Gaps**: Many educational institutions in Africa lack **up-to-date curricula** that incorporate **digital literacy** and **emerging technologies**. The focus on **theoretical knowledge** rather than **practical skill development** leaves graduates unprepared for the **technology-driven job market** (African Development Bank, 2024).
- **Policy and Governance Issues**: Insufficient **government policies** to promote **digital skills training** and **entrepreneurial support**. **Regulatory barriers** can stifle **innovation** and **startup growth**, limiting opportunities for **youth-led enterprises** (World Bank, 2023).
- **Socioeconomic Constraints**: **Poverty** and **financial instability** restrict many youths from accessing **training programs** or **higher education**. **Gender disparities** also affect **women's participation** in **tech-related fields**, leading to an **underutilization of the potential workforce**.

### 4.5 Addressing the Gaps

To effectively leverage tech-enabled skills for employment and economic growth, a coordinated approach involving multiple stakeholders is essential. This approach should encompass government initiatives, educational reforms, private sector engagement, and community-based strategies to create a robust ecosystem for skill development and job creation.

a) **Government Initiatives:** Governments play a pivotal role in creating an enabling environment for digital transformation. Key actions include implementing policies that promote digital education and infrastructure development. By investing in high-speed internet access, particularly in rural and underserved areas, governments can ensure equitable access to digital resources and learning platforms. Additionally, supporting entrepreneurship through grants, micro-financing, and regulatory incentives can boost

tech-driven startups and foster innovation. Establishing national frameworks for digital skills development will also encourage lifelong learning and adaptability to evolving market needs.

b) **Educational Reforms:** Educational institutions must update curricula to integrate practical digital skills training across all levels of education. This involves incorporating courses on digital literacy, coding, data analytics, artificial intelligence, and emerging technologies. To enhance employability, schools and universities should establish partnerships with industries to offer internship opportunities, hands-on training, and real-world project experiences. By aligning academic programs with market demands, educational institutions can better prepare students for technology-driven careers.

c) **Private Sector Engagement:** The private sector, especially technology companies, can significantly contribute by offering youth training programs, mentorship, and job placements. Businesses can collaborate with educational institutions to design tailored training modules that address specific skill gaps in the labor market. Through public-private partnerships, companies can support apprenticeship programs and create pathways for young professionals to transition smoothly into the workforce. Additionally, organizations that invest in training and development initiatives should be incentivized through tax breaks and regulatory support.

d) **Community-Based Approaches:** Local organizations and community groups are crucial in reaching grassroots levels, particularly in rural and remote areas. These groups can facilitate digital skills training by organizing workshops, bootcamps, and peer-learning sessions. Community-based programs can focus on empowering marginalized populations, including women, rural youth, and individuals with disabilities, ensuring that digital transformation is inclusive and leaves no one behind. By leveraging community networks, these initiatives can build trust, enhance participation, and drive sustainable impact at the local level.

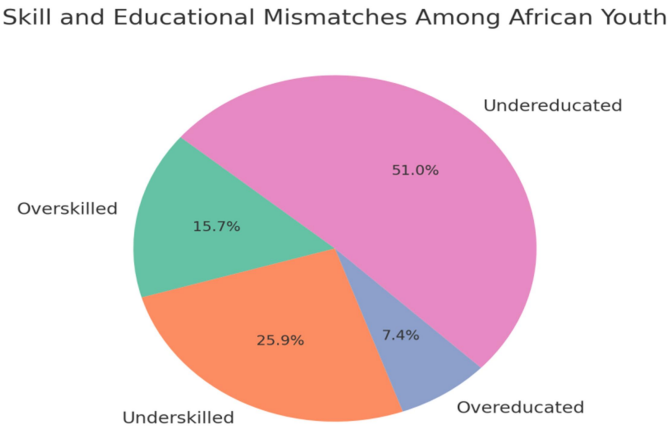


Fig 1. Skill and Education Mismatches among African Youths

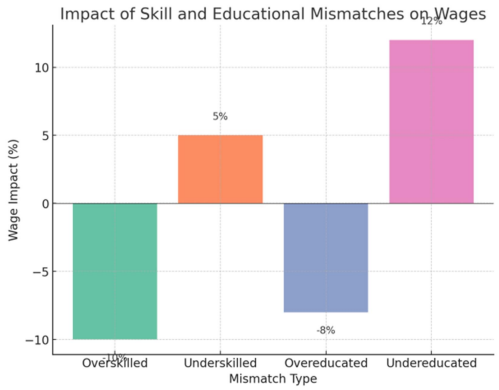


Fig 2 Impact of Skill and Educational Mismatches on wages

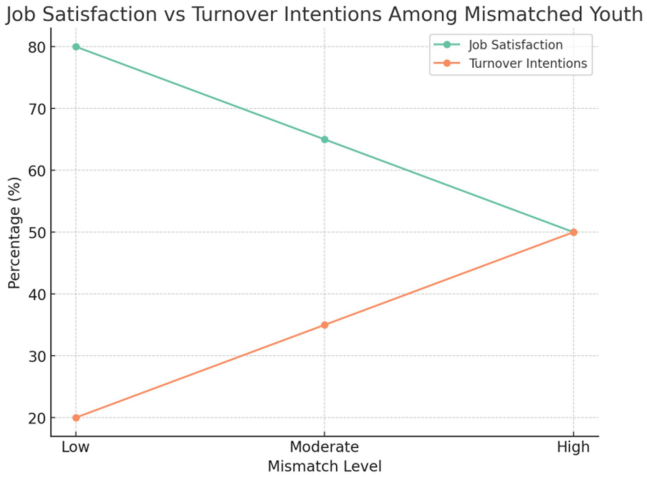


Fig 3. Job Satisfaction vs Turnover Intentions among Mismatches on wages

Here are the visualizations of the findings:

- **Pie Chart (Figure 1):** Illustrates the distribution of skill and educational mismatches among African youth. The largest segment (56.9%) represents undereducated youth, highlighting a critical gap between formal education and job market needs.
- **Bar Chart (Figure 2):** Shows the wage impact of different mismatch types. Overskilled and overeducated youth face wage penalties (-10% and -8%, respectively), while underskilled and undereducated individuals experience wage premiums (+5% and +12%), possibly due to labor market scarcities.
- **Line Chart (Figure 3):** Compares job satisfaction and turnover intentions across varying mismatch levels. As mismatch severity increases, job satisfaction declines (from 80% to 50%), while turnover intentions rise (from 20% to 50%), indicating employment instability among mismatched youth.

These charts visually reinforce the analysis, emphasizing the need for targeted interventions to bridge skill gaps and align education with market demands.

### 4.6 Implications for Policy and Practice

The study underscores the need for coordinated strategies involving governments, educational institutions, and the private sector to develop tech-enabled skills among African youth. Such strategies are crucial for promoting youth employment, job creation, and economic growth while building a sustainable ecosystem for digital transformation. For governments, establishing robust policies that support digital skill development and employment opportunities is critical. This includes developing national digital skills strategies aligned with regional and global initiatives like the African Union's Digital Transformation Strategy (2020-2030). Investments in ICT infrastructure, especially in rural areas, are needed to improve internet access and bridge the digital divide. Governments should also support educational reforms by promoting technology integration into curricula, offering incentives for adopting digital learning tools, and fostering public-private partnerships (PPPs) to create sustainable skill development programs. Strengthening regulatory frameworks for the gig economy and ensuring social protection for youth engaged in digital platforms is equally important.

Educational institutions must revise curricula to include emerging technologies such as AI, data science, blockchain, and cybersecurity. Practical skills development through hands-on training and the adoption of digital learning tools, including e-learning platforms and virtual classrooms, will enhance learning outcomes. Promoting STEM education from an early age, introducing tech-focused extracurricular activities, and building educator capacity through professional development programs will also contribute to a tech-ready workforce. The private sector can bridge the gap between academic learning and market needs by engaging in training programs, offering internships, and developing certification courses. Supporting innovation hubs, incubators, and accelerators will nurture youth entrepreneurship and drive job creation. Through corporate social responsibility (CSR) initiatives, companies can contribute to digital literacy programs, provide scholarships, and support disadvantaged youth.

## 5. CONCLUSION AND RECOMMENDATIONS

This study examined the critical role of tech-enabled skills in driving youth employment, job creation, and economic growth in Africa. The analysis revealed that despite Africa's vast youth population, the region continues to face significant challenges related to unemployment, underemployment, and skills mismatches. The research highlighted that bridging the gap between current skill sets and market demands is essential to unlocking the continent's economic potential. Key findings underscored the importance of technology in creating new job opportunities, promoting entrepreneurship, and enhancing productivity across various sectors. However, barriers such as inadequate infrastructure, outdated educational curricula, and policy constraints hinder the effective adoption of tech-enabled skills.

The strategies proposed to address these challenges included educational reforms to integrate digital literacy into curricula, fostering public-private partnerships to create robust skill development programs, promoting entrepreneurship through support for tech startups, and advocating for government policies that create an enabling environment for technology-driven employment. By leveraging these strategies, stakeholders can transform Africa's labor market and create sustainable pathways to prosperity.

## 6. RECOMMENDATIONS

Addressing youth unemployment and promoting economic growth through tech-enabled skills require both short- and long-term strategies involving governments, educational institutions, and the private sector. In the short term, educational institutions should update curricula to include technology-focused courses such as digital literacy, coding, data analytics, AI, and blockchain to bridge the skills gap. Governments and private organizations need to initiate skill development programs, including bootcamps, certification courses, and targeted training initiatives that equip youth with job-ready skills. Enhancing digital infrastructure is also crucial, with a focus on improving internet access in rural and underserved areas to ensure equitable access to online learning and job opportunities.

Supporting small and medium enterprises (SMEs) through grants and micro-financing is vital for boosting job creation, particularly in tech-driven startups led by young innovators. Public-private partnerships (PPPs) can further strengthen collaboration among educational institutions, businesses, and policymakers, facilitating skill-building initiatives, internship programs, and job placement services. Long-term strategies should include developing national digital skills frameworks that promote lifelong learning and adaptability to market demands. Governments can incentivize private sector involvement in youth training programs through tax benefits and regulatory support. Investing in research and development (R&D) will help identify emerging skill needs and align training programs accordingly. Additionally, establishing innovation hubs, incubators, and accelerators will nurture youth entrepreneurship by providing mentorship, technical support, and access to funding. Aligning national employment policies with global best practices and adapting to digital economy trends will ensure strategies remain effective and responsive to market shifts.

## 7. FUTURE RESEARCH DIRECTIONS

Future research should focus on assessing the impact of tech skill development programs by evaluating job placement rates, income growth, and career progression. Conducting sectoral analyses can help identify high-growth industries such as fintech, e-commerce, AgriTech, and renewable energy, where skill development efforts could have the most significant impact. Research should also explore how tech-driven employment strategies can support marginalized groups, including women, rural youth, and individuals with disabilities, by examining barriers to entry and promoting diversity and inclusion in digital skill programs. Longitudinal studies are needed to analyze how technology adoption influences economic growth and labor market dynamics over time. Additionally, evaluating government policies and public-private partnerships will provide insights into how regulatory environments and collaborative initiatives affect job creation and support the scaling of tech-driven enterprises.

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