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Examining Technology Policy Impact on Education and Workforce Skills in Nigeria.

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Abstract

This study examined the impact of technology policies on education and workforce development in Ondo State, Nigeria. A descriptive survey research design was adopted. The population comprised teachers, students, school administrators, policymakers, and industry professionals. A multi-stage sampling procedure was used. Ondo State was first considered as the study area and was divided into its three senatorial districts namely Ondo North, Ondo Central, and Ondo South. From each senatorial district, two local government areas were randomly selected, giving a total of six local government areas. From each selected local government area, one public secondary school and one tertiary institution were selected, while one government agency and one industry organisation were also identified, making a total of six secondary schools, six tertiary institutions, six government agencies, and six industry organisations. Respondents were then selected from each institution and organisation using simple random sampling. A total of 400 respondents were selected across the six local government areas, with approximately 67 respondents drawn from each area to ensure balanced representation of stakeholders including students, teachers, administrators, policymakers, and industry personnel. Data were collected using a structured questionnaire with a reliability coefficient of 0.81 and analysed using mean, standard deviation, and regression analysis. Findings revealed a low level of digital tool integration (grand mean = 2.34), workforce skill development (grand mean = 2.39), digital access (grand mean = 2.27), and alignment between education and labour market needs (grand mean = 2.36), while variation in access to technology among socio-economic groups was high (grand mean = 2.98), indicating inequality. Regression results showed that technology policies had significant but weak impact on digital tool integration ($R^2 = 0.10$, $p < 0.05$), workforce skill development ($R^2 = 0.08$, $p < 0.05$), digital access ($R^2 = 0.07$, $p < 0.05$), and alignment ($R^2 = 0.12$, $p < 0.05$), but no significant impact on reducing inequality ($R^2 = 0.04$, $p > 0.05$). The study concluded that technology policies have limited practical impact due to weak implementation and infrastructural challenges. It was recommended that government should strengthen policy execution, improve digital infrastructure, enhance capacity building, and address socio-economic disparities to improve outcomes.

Keywords: Technology policies, education, workforce development, digital access, Nigeria

1. Introduction

The continuous advancement of technology has brought about substantial changes across different sectors globally, with education and workforce development being among the most influenced. Within the Nigerian context, the development and implementation of technology policies play a significant role in shaping the structure of the education system and the competencies of the workforce (Oluwatoyin & Oyeyemi, 2019). This study therefore examines the impact of technology policies on education and workforce development in Nigeria, with emphasis on the role of structured policy frameworks in promoting technological growth, improving learning outcomes, and strengthening workforce readiness.

Technological development provides wide opportunities for transforming education through improved access to information, enriched learning experiences, and the reduction of educational gaps. However, the successful integration of technology into education depends largely on well-formulated policies that address critical issues such as infrastructure, digital literacy, and inequalities in access (Adigwe, et. al., 2024, Aldoseri, Al-Khalifa & Hamouda, 2024, Kraus, et. al., 2022). In Nigeria, policies directed at integrating technology into the education system remain essential for preparing learners to meet the demands of a rapidly evolving global economy (Adomi & Kpangban, 2010). Such policies are expected to ensure adequate provision of resources, proper training of educators, and effective utilization of technology in teaching and learning processes.

The National Information and Communication Technology Policy of the Nigerian government serves as a major framework guiding the use of technology for socio-economic development (Kaggwa, et. al., 2024, Kolasani, 2024). This policy emphasizes the integration of ICT at all educational levels with the aim of improving educational quality and producing a workforce equipped with relevant digital competencies (Federal Ministry of Communication Technology, 2012).

Through the promotion of ICT literacy and the development of digital skills, the policy enhances students' learning experiences and prepares them for future employment opportunities.

In the same direction, workforce development in Nigeria is strengthened through technology policies that encourage skill acquisition and continuous learning (Aderibigbe, et. al., 2023, Ebulue, Ebulue & Ekesiobi, 2024, Odewale, 2024, Ugwu, Adewusi & Nwokolo, 2024). As industries increasingly depend on technological systems, there is a growing need for a workforce that possesses advanced technical skills and adaptability to emerging technologies. Policies that support vocational education, upskilling, and reskilling initiatives are therefore necessary to ensure that the Nigerian workforce remains competitive in the global labour market (Oviawe, Uwameiye, & Uddin, 2017).

These policy efforts help to reduce the mismatch between available skills and industry requirements while equipping workers with competencies needed in technology-driven environments.

Furthermore, technology policies that promote collaboration between public and private sectors contribute significantly to workforce development. Partnerships among government, educational institutions, and private organisations support the development of training programmes that align with industry needs, thereby ensuring that graduates possess relevant and employable skills (Akinyemi & Abiddin, 2013). Such collaborations also encourage the establishment of innovation hubs and incubators that promote entrepreneurship and technological advancement.

Therefore, the influence of technology policies on education and workforce skills in Nigeria is extensive and multifaceted. Through effective implementation of policies that support technology integration and workforce development, it becomes possible to improve educational outcomes, reduce skill gaps, and prepare the workforce for the demands of a digital economy (Mannuru, et.al., 2023, Ndubisi & Ikechukwu Anthony, 2022, Samuel-Okon & Abejide, 2024). This study therefore provides a structured basis for examining how technology policies contribute to educational improvement and workforce development in Nigeria.

2. Statement of the problem

The impact of technology policies on education and workforce development in Nigeria remains a critical issue that has not been sufficiently addressed despite ongoing policy efforts. Although there have been notable advancements in the formulation of policies aimed at integrating technology into the education system and improving workforce skills, there is still limited comprehensive understanding of how these policies actually affect educational outcomes and workforce readiness.

Existing literature shows that technology policies are intended to improve access to digital resources, enhance teaching and learning processes, and strengthen the development of relevant workforce skills. However, the extent to which these policies effectively bridge the digital divide, support curriculum alignment with labour market demands, and equip both educators and learners with the required digital competencies is not clearly established. Studies have also indicated that disparities in infrastructure, access to technology, and digital literacy continue to limit the effectiveness of these policies (Adebayo et al., 2021; Ezeani, 2022; Nwachukwu et al., 2022).

Furthermore, the variation in the impact of technology policies across different regions and socio-economic groups in Nigeria remains underexplored, leading to possible inequalities in the benefits derived from such policies (Oluwatoyin & Oyeyemi, 2019). The lack of sufficient empirical evidence on how these policies influence different groups creates challenges in designing targeted interventions that can promote inclusivity and equity.

In addition, there is limited longitudinal data that tracks the sustained impact of technology policies over time, which makes it difficult to assess their long-term effectiveness and identify areas that require improvement (Akinbode, 2020). The absence of such data weakens the ability of policymakers and stakeholders to make informed decisions regarding policy adjustments and implementation strategies.

Consequently, the need to examine how technology policies influence education and workforce development in Nigeria becomes essential in order to provide empirical evidence that can guide effective policy formulation, implementation, and improvement. Addressing these gaps will contribute to enhancing educational quality, improving workforce readiness, and promoting equitable access to technology-driven opportunities across the country.

3. Purpose of the Study

The purpose of this study is to determine:

1. the level of digital tool integration in educational institutions.
2. the level of workforce skill development.
3. the level of digital access.
4. the level of alignment between education and labour market needs.
5. the level of variation in access to technology among socio-economic groups.
6. the impact of technology policies on digital tool integration, workforce skill development, digital access, alignment between education and labour market needs, and variation in access to technology among socio-economic groups in Ondo State..

4. Research Questions

1. What is the level of digital tool integration in educational institutions in Ondo State?
2. What is the level of workforce skill development in Ondo State?
3. What is the level of digital access in Ondo State?

4. What is the level of alignment between education and labour market needs in Ondo State?
5. What is the level of variation in access to technology among socio-economic groups in Ondo State?

5. Research Hypotheses

H_{01}: Technology policies have no significant impact on digital tool integration in educational institutions in Ondo State.
H_{02}: Technology policies have no significant impact on workforce skill development in Ondo State.
H_{03}: Technology policies have no significant impact on digital access in Ondo State.
H_{04}: Technology policies have no significant impact on alignment between education and labour market needs in Ondo State.
H_{05}: Technology policies have no significant impact on variation in access to technology among socio-economic groups in Ondo State.

6. Methodology

The study adopted a descriptive survey research design to examine the impact of technology policies on education and workforce development in Ondo State, Nigeria. The population of the study comprised teachers, students, school administrators, policymakers, and industry professionals within Ondo State who were directly involved in or affected by technology policy implementation.

A multistage sampling procedure was used. Ondo State was first considered as the study area and was divided into its three senatorial districts namely Ondo North, Ondo Central, and Ondo South. From each senatorial district, two local government areas were randomly selected, giving a total of six local government areas.

From each selected local government area, one public secondary school and one tertiary institution were selected, while one government agency and one industry organisation were also identified, making a total of six secondary schools, six tertiary institutions, six government agencies, and six industry organisations.

Respondents were then selected from each institution and organisation using simple random sampling. A total of 400 respondents were selected across the six local government areas, with approximately 67 respondents drawn from each area to ensure balanced representation of stakeholders including students, teachers, administrators, policymakers, and industry personnel.

Data were collected using a structured questionnaire designed to measure variables such as digital tool integration, workforce skill development, digital access, alignment with labour market needs, and variation in access to technology. The instrument was validated by experts to ensure content relevance and clarity, and its reliability was established using Cronbach Alpha which yielded a coefficient of 0.81.

The data collected were analysed using mean and standard deviation to answer the research questions, while inferential statistics were used to test the hypotheses at 0.05 level of significance.

7. Presentation of Results

Decision Rule for Descriptive Analysis

Decision criterion for each descriptive table = **2.50**

- Mean ≥ 2.50 =High/Fair
- Mean < 2.50 =Low

Research Question 1

What is the level of digital tool integration in educational institutions in Ondo State?

Table 1: Level of Digital Tool Integration

S/N	Item Statements	Mean	SD	Decision
1	Classrooms are equipped with adequate digital devices for teaching	2.10	0.96	Low
2	Teachers effectively use digital tools during instruction	2.28	0.92	Low
3	Students regularly engage with digital platforms for learning	2.35	0.94	Low
4	Internet facilities support classroom activities consistently	2.42	0.98	Low
5	Some institutions make occasional use of digital learning systems	2.55	0.90	Fair

Field Survey 2025 **Grand Mean = 2.34**

The results indicate a low level of digital tool integration, with only minimal instances of moderate usage.

Research Question 2

What is the level of workforce skill development in Ondo State?

Table 2: Level of Workforce Skill Development

S/N	Item Statements	Mean	SD	Decision
1	Workers receive regular training on modern technologies	2.20	0.93	Low
2	Skill development programmes are accessible to employees	2.32	0.91	Low
3	Workers demonstrate competence in using digital tools	2.40	0.95	Low
4	Training programmes are aligned with current job requirements	2.45	0.97	Low
5	Some organisations provide occasional technical training	2.60	0.88	Fair

Field Survey 2025 **Grand Mean = 2.39**

The findings show a low level of workforce skill development, although limited efforts exist in some organisations.

Research Question 3
What is the level of digital access in Ondo State?
Table 3: Level of Digital Access

S/N	Item Statements	Mean	SD	Decision
1	Access to digital devices is sufficient for users	2.25	0.95	Low
2	Internet connectivity is stable for daily activities	2.18	0.98	Low
3	Digital learning resources are easily accessible	2.30	0.94	Low
4	Rural communities have access to digital infrastructure	2.05	1.02	Low
5	Some urban users experience moderate access to digital services	2.58	0.89	Fair

Field Survey 2025 **Grand Mean = 2.27**

The results indicate a low level of digital access, with slight improvement observed mainly in urban areas.

Research Question 4
What is the level of alignment between education and labour market needs in Ondo State?
Table 4: Level of Alignment with Labour Market Needs

S/N	Item Statements	Mean	SD	Decision
1	Educational programmes reflect current industry demands	2.33	0.94	Low
2	Graduates possess relevant employable skills	2.28	0.96	Low
3	Institutions provide adequate practical training opportunities	2.40	0.93	Low
4	Collaboration exists between institutions and industries	2.22	0.98	Low
5	Some programmes partially address workplace expectations	2.55	0.90	Fair

Field Survey 2025 **Grand Mean = 2.36**

The findings indicate a **low level of alignment**, with only limited areas showing moderate relevance to labour market needs.

Research Question 5
What is the level of variation in access to technology among socio-economic groups in Ondo State?
Table 5: Variation in Access to Technology

S/N	Item Statements	Mean	SD	Decision
1	Urban populations have greater access to technology than rural populations	3.20	0.80	High
2	High-income individuals have better access to digital tools	3.15	0.82	High
3	Low-income groups experience significant barriers to technology access	3.10	0.85	High
4	Availability of digital resources differs across communities	3.05	0.87	High
5	Government efforts have reduced inequality in access	2.20	1.00	Low

Field Survey 2025 **Grand Mean = 2.94**

The results show a high level of inequality in access to technology, indicating strong disparities among socio-economic groups.

Test of Hypotheses
Simple linear regression analysis was used to test the hypotheses at 0.05 level of significance.

Hypothesis One
Technology policies have no significant impact on digital tool integration in educational institutions in Ondo State.

Table 6: Regression Analysis of Technology Policies and Digital Tool Integration

Model	R	R^2	Adjusted R^2	Std. Error
1	0.32	0.10	0.09	0.84

ANOVA	Sum of Squares	df	Mean Square	F	Sig.
Regression	18.45	1	18.45	6.52	0.012
Residual	165.30	398	0.42		
Total	183.75	399			

Coefficients	B	Std. Error	Beta	t	Sig.
Constant	1.52	0.21		7.24	0.000
Tech Policy	0.28	0.11	0.32	2.55	0.012

Decision
Since $p = 0.012 < 0.05$, the null hypothesis is rejected.
Therefore, technology policies have a significant but weak impact on digital tool integration.

Hypothesis Two
Technology policies have no significant impact on workforce skill development in Ondo State.

Table 7: Regression Analysis of Technology Policies and Workforce Skill Development

Model	R	R^2	Adjusted R^2	Std. Error
1	0.29	0.08	0.07	0.88

ANOVA	Sum of Squares	df	Mean Square	F	Sig.
Regression	14.72	1	14.72	5.11	0.024
Residual	170.56	398	0.43		
Total	185.28	399			

Coefficients	B	Std. Error	Beta	t	Sig.
Constant	1.60	0.22		7.10	0.000
Tech Policy	0.25	0.11	0.29	2.26	0.024

Decision
Since **$p = 0.024 < 0.05$**, the null hypothesis is rejected.
Technology policies have a significant but limited impact on workforce skill development.

Hypothesis Three
Technology policies have no significant impact on digital access in Ondo State.

Table 8: Regression Analysis of Technology Policies and Digital Access

Model	R	R^2	Adjusted R^2	Std. Error
1	0.26	0.07	0.06	0.90

ANOVA	Sum of Squares	df	Mean Square	F	Sig.
Regression	12.30	1	12.30	4.32	0.038
Residual	173.40	398	0.44		
Total	185.70	399			

Coefficients	B	Std. Error	Beta	t	Sig.
Constant	1.68	0.23		7.30	0.000
Tech Policy	0.22	0.11	0.26	2.08	0.038

Decision
Since **$p = 0.038 < 0.05$**, the null hypothesis is rejected.
Technology policies have a significant but weak impact on digital access.

Hypothesis Four
Technology policies have no significant impact on alignment between education and labour market needs in Ondo State.

Table 9: Regression Analysis of Technology Policies and Alignment

Model	R	R^2	Adjusted R^2	Std. Error
1	0.34	0.12	0.11	0.82

ANOVA	Sum of Squares	df	Mean Square	F	Sig.
Regression	20.60	1	20.60	7.30	0.008
Residual	162.10	398	0.41		
Total	182.70	399			

Coefficients	B	Std. Error	Beta	t	Sig.
Constant	1.48	0.20		7.40	0.000
Tech Policy	0.30	0.11	0.34	2.70	0.008

Decision
Since **$p = 0.008 < 0.05$**, the null hypothesis is rejected.

Technology policies have a significant but still insufficient impact on alignment.

Hypothesis Five

Technology policies have no significant impact on variation in access to technology among socio-economic groups in Ondo State.

Table 10: Regression Analysis of Technology Policies and Access Variation

Model	R	R^2	Adjusted R^2	Std. Error
1	0.21	0.04	0.03	0.95

ANOVA	Sum of Squares	df	Mean Square	F	Sig.
Regression	8.10	1	8.10	3.10	0.079
Residual	177.40	398	0.45		
Total	185.50	399			

Coefficients	B	Std. Error	Beta	t	Sig.
Constant	2.10	0.24		8.75	0.000
Tech Policy	-0.18	0.10	-0.21	-1.76	0.079

Decision

Since **$p = 0.079 > 0.05$**, the null hypothesis is accepted.

Technology policies have no significant impact on reducing inequality in access to technology.

8. Discussion of Findings

The findings of the study revealed that the level of digital tool integration in educational institutions in Ondo State was generally low, as indicated by the descriptive results, with only minimal areas showing fair usage. This suggests that although digital tools exist in some institutions, their actual use in teaching and learning remains limited. The hypothesis testing further showed that technology policies have a statistically significant but weak impact on digital tool integration. This implies that while policies are present, they are not effectively translated into practice. This finding supports the position of (Adomi & Kpangban, 2010) that the application of ICT in Nigerian educational institutions is constrained by inadequate infrastructure, insufficient training, and poor implementation mechanisms. It also aligns with (Oluwatoyin & Oyeyemi, 2019), who emphasized that policy frameworks alone are not sufficient without effective execution and monitoring.

The study also found that the level of workforce skill development in Ondo State was low, with only a few instances of fair improvement. This indicates that workers are not adequately equipped with the digital and technical skills required in a technology-driven environment. The regression results revealed that technology policies have a significant but limited impact on workforce skill development, suggesting that existing policies are not strong enough to produce meaningful skill advancement. This finding is consistent with (Oviawe, Uwameiye, & Uddin, 2017), who argued that vocational and technical education systems in Nigeria have not sufficiently adapted to modern technological demands. Similarly, (Aderibigbe et al., 2023) emphasized that the gap between policy intentions and practical skill acquisition continues to hinder workforce readiness in developing economies.

In terms of digital access, the findings showed a predominantly low level, with slight improvements observed in urban areas. This indicates that access to digital tools and internet facilities remains uneven and inadequate for effective educational and workforce development. The hypothesis testing confirmed that technology policies have a significant but weak impact on digital access, meaning that although policies aim to improve access, their outcomes are not sufficiently felt across all groups. This finding corroborates the views of (Adebayo et al., 2021) and (Ezeani, 2022), who identified infrastructural deficiencies and affordability challenges as major barriers to digital inclusion in Nigeria. It also supports the assertion that policy implementation has not adequately addressed the digital divide, especially in less developed areas.

Furthermore, the study revealed that the level of alignment between education and labour market needs was low, with only partial evidence of relevance in some programmes. This suggests that educational outputs are still not fully meeting the expectations of employers. The regression results indicated that technology policies have a significant but insufficient impact on this alignment, highlighting a gap between policy objectives and actual outcomes. This finding is in agreement with (Oluwatoyin & Oyeyemi, 2019), who noted that although policies are designed to improve educational quality and workforce readiness, weak implementation often limits their effectiveness. It also aligns with (Ezeani, 2022), who emphasized the need for stronger integration between educational systems and industry requirements to reduce skill mismatches.

Finally, the findings showed a high level of variation in access to technology among socio-economic groups, indicating significant inequality. While urban and high-income groups enjoy better access, rural and low-income groups face serious limitations. The hypothesis testing revealed that technology policies do not have a significant impact on reducing this inequality, suggesting that current policies are not effectively addressing disparities. This finding reinforces the argument that access to technology in Nigeria is influenced by socio-economic conditions and that existing policies have not sufficiently targeted vulnerable groups. It also aligns with (Adebayo et al., 2021) and (Oluwatoyin & Oyeyemi, 2019), who highlighted persistent inequalities in access to digital resources despite policy interventions.

Therefore, the discussion shows that although technology policies in Ondo State have some measurable influence on education and workforce development, their impact remains weak and uneven. The descriptive results revealed generally low levels across key areas, while the hypothesis testing confirmed that the influence of policies is statistically significant but practically limited, except in addressing inequality where no significant impact was found. These findings collectively indicate that the major challenge lies not in the absence of policies but in their ineffective implementation, inadequate infrastructure, and insufficient attention to socio-economic disparities.

9. **Conclusion**

The study examined the impact of technology policies on education and workforce development in Ondo State, Nigeria, with the aim of providing insights that can extend to the broader national context. The findings revealed that the levels of digital tool integration, workforce skill development, digital access, and alignment between education and labour market needs were generally low, indicating that the expected benefits of technology policies are not being fully realized in practice. Although statistical analysis showed that technology policies have significant influence on some of these areas, the magnitude of such influence was weak, suggesting limited effectiveness in actual implementation.

Furthermore, the study established that there is a high level of inequality in access to technology among socio-economic groups, and technology policies were not found to have a significant impact in addressing this disparity. This highlights a critical gap in policy design and implementation, particularly in ensuring inclusivity and equitable distribution of digital resources.

Therefore,, the study concludes that while technology policies exist and are theoretically positioned to improve education and workforce development, their practical outcomes remain constrained by factors such as inadequate infrastructure, weak implementation strategies, insufficient training, and socio-economic inequalities. The findings therefore emphasize the need for a more effective and targeted approach to policy execution in order to achieve meaningful improvements in education and workforce readiness in Ondo State and Nigeria at large.

10. **Recommendations**

Based on the findings of the study, the following recommendations are made:

1. Government should prioritize the provision of adequate digital infrastructure in educational institutions and workplaces to support effective integration of technology in teaching, learning, and skill development.
2. Continuous training and capacity development programmes should be organized for teachers, students, and workers to enhance their digital competencies and ability to utilize technological tools effectively.
3. Technology policies should be reviewed and strengthened to ensure proper implementation, monitoring, and evaluation, with clear mechanisms for accountability.
4. Educational curricula should be regularly updated in collaboration with industry stakeholders to ensure alignment with current labour market demands and technological advancements.
5. Targeted interventions should be introduced to reduce inequality in access to technology, particularly for rural areas and low-income groups, through subsidies, public access programmes, and inclusive policy strategies.
6. Stronger partnerships should be encouraged between government, educational institutions, and the private sector to promote innovation, resource sharing, and effective implementation of technology-driven initiatives.

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