

## **Assessment of the Impact of Artificial Intelligence Adoption and National Development Indicators in the South-South Region of Nigeria**

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### **Abstract:**

*This study assessed the impact of Artificial Intelligence (AI) adoption on national development indicators in the South-South region of Nigeria, focusing on economic productivity, employment outcomes, and public service delivery and governance. Three research questions and hypotheses were formulated to guide the study. Literature was reviewed according to the variables of the study. Using a quantitative, non-experimental survey design, data were collected from 384 respondents across public and private sector organizations. Reliability was tested using cronbach alpha method Descriptive statistics and multiple linear regression were employed for data analysis. The findings reveal that AI adoption has a statistically significant and positive effect on economic productivity ( $\beta = 0.721, p < 0.05$ ), employment outcomes ( $\beta = 0.598, p < 0.05$ ), and public service delivery and governance ( $\beta = 0.739, p < 0.05$ ). The study concludes that AI adoption functions as a strategic development enabler at the sub national level and recommends targeted investments in AI infrastructure, human capital development, and digital governance frameworks.*

**Keywords:** *Artificial intelligence, AI adoption, national development, economic productivity, employment outcomes, governance, Nigeria.*

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### **1.0 Introduction**

Artificial Intelligence (AI) has emerged as one of the most transformative technologies of the twenty-first century, reshaping economic systems, governance structures, and social interactions globally. AI technologies such as machine learning, natural language processing, robotics, and predictive analytics enable organizations to automate processes, enhance decision-making, and improve service delivery (Russell & Norvig, 2024). Empirical evidence suggests that AI adoption contributes significantly to productivity growth, innovation, and economic competitiveness across both developed and developing economies (Brynjolfsson, Rock, & Syverson, 2023).

In developing countries, AI is increasingly viewed as a strategic tool for accelerating national development by improving efficiency in public service delivery, expanding employment opportunities through digital industries, and enhancing institutional performance (World Bank, 2024). In Africa, AI adoption has shown potential to address structural development challenges by supporting data-driven governance, smart agriculture, healthcare diagnostics, and financial inclusion (UNDP, 2023).

In Nigeria, the Federal Government has formally acknowledged the developmental potential of AI through the National Artificial Intelligence Strategy, which emphasizes AI-driven economic diversification, inclusive growth, and digital transformation (Federal Ministry of Communications, Innovation and Digital Economy [FMCIDE], 2023). Despite this policy framework, AI adoption remains uneven due to infrastructural gaps, limited digital skills, and weak institutional capacity (Ogunbodede & Atchrim, 2025).

The South-South region of Nigeria comprising Rivers, Bayelsa, Delta, Akwa Ibom, Cross River, and Edo States—is economically strategic due to its oil and gas dominance, growing service sector, and emerging technology

ecosystems. However, the extent to which AI adoption contributes to national development outcomes such as economic productivity, employment generation, and public service delivery in this region has not been sufficiently examined (Obiya, 2025).

Several studies indicate that AI adoption significantly enhances economic productivity by automating routine tasks, optimizing resource allocation, and supporting data-driven decision-making. Brynjolfsson et al. (2023) found that firms adopting AI technologies experienced substantial productivity gains compared to non-adopters. In the Nigerian context, Ogunbodede and Atchrim (2025) reported that AI adoption improves operational efficiency and organizational performance, particularly in service-oriented industries.

The relationship between AI adoption and employment remains mixed in the literature. While concerns exist regarding job displacement due to automation, empirical evidence suggests that AI also creates new employment opportunities through demand for digital skills, system maintenance, and innovation-driven roles (Acemoglu & Restrepo, 2022). In developing economies, AI adoption has been associated with job transformation rather than job loss, emphasizing skill upgrading and workforce reskilling (World Economic Forum, 2024).

AI adoption in the public sector enhances service efficiency, transparency, and accountability through automation, predictive analytics, and intelligent decision-support systems. UNDP (2023) reports that AI-driven governance systems improve public service responsiveness and reduce bureaucratic inefficiencies. In Nigeria, AI applications in tax administration, healthcare diagnostics, and digital identity systems have improved service delivery outcomes (FMCIDE, 2023). This study therefore assesses the impact of AI adoption on national development indicators in the South-South region of Nigeria.

## **2.0 Statement of the Problem**

Despite increasing global evidence that AI adoption enhances productivity, innovation, and public sector efficiency, Nigeria continues to face challenges in translating AI investments into tangible development outcomes. Existing studies on AI in Nigeria largely focus on national-level policy discussions or sector-specific applications, with limited empirical attention to regional impacts. In the South-South region, infrastructural deficits, skills shortages, and institutional capacity constraints may limit the developmental benefits of AI adoption.

The lack of empirical evidence on how AI adoption affects economic productivity, employment outcomes, and public service delivery in the South-South region creates a significant research gap. Without such evidence, policymakers and stakeholders may be unable to design targeted interventions that maximize the developmental potential of AI. This study addresses this gap by empirically assessing the impact of AI adoption on national development indicators in the South-South region of Nigeria.

## **3.0 Objectives of the Study**

The main objective of this study is to assess the impact of Artificial Intelligence adoption on national development in the South-South region of Nigeria. The specific objectives are to:

1. Determine the effect of AI adoption on economic productivity;
2. Assess the influence of AI adoption on employment outcomes; and
3. Evaluate the impact of AI adoption on public service delivery and governance.

## **4.0 Research Questions**

1. How does AI adoption affect economic productivity in the South-South region?
2. What influence does AI adoption have on employment outcomes in the region?
3. To what extent does AI adoption affect public service delivery and governance?

## **5.0 Research Hypotheses**

The following null hypotheses were tested in the study:

1. AI adoption has no significant effect on economic productivity in the South-South region of Nigeria.
2. AI adoption has no significant influence on employment outcomes in the South South region of Nigeria.
3. AI adoption has no significant effect on public service delivery and governance in the South-South region of Nigeria.

### 6.0 Research Methodology

The study adopted a quantitative cross-sectional survey design. The population comprised public and private organizations operating in the South-South region of Nigeria. A stratified random sampling technique was used, and a sample size of 384 respondents was determined using Cochran's formula. Data were collected using a structured questionnaire measured on a four-point Likert scale. Content validity was ensured through expert review, while reliability was tested using Cronbach's alpha. Data were analyzed using descriptive statistics and multiple regression analysis at a 0.05 level of significance.

### 7.0 Result

Research question one: How does AI adoption affect economic productivity in the South-South region? To answer this research question, mean and standard deviation were used and the result is presented in table one

**Table 1** Descriptive statistics of study variables

S/N	Variable	Mean	STD Deviation
1	AI Adoption	3.78	0.81
2.	Economic Productivity	3.65	0.74
3.	Employment Outcomes	3.42	0.69
4..	Public Service Delivery & Governance	3.71	0.77

Mean values above the decision benchmark of 3.00 indicate a high level of agreement among respondents that AI adoption positively influences national development indicators.

#### 7.1 Test of Hypotheses

AI adoption has no significant influence on employment outcomes in the South South region of Nigeria. To test this hypothesis, multiple regression statistical analysis was used and the result is shown in table 2

**Table 2** Regression Analysis of AI Adoption and Economic Productivity

Model	B	Std Error	Beta	T	Sig
Constant	1.214	0.312		3.89	0.000
AI Adoption	683	0.057	0.721	11.98	0.000

AI adoption has a positive and statistically significant effect on economic productivity 0.000 ( $\beta = 0.721$ ,  $p < 0.05$ ). The null hypothesis is rejected. AI adoption has no significant influence on employment outcomes in the South South region of Nigeria. To test this hypothesis, multiple regression statistical analysis was used and the result is shown in table 3

**Table 3** Regression Analysis of AI Adoption and Employment Outcomes

Model	B	Std Error	Beta	T	Sig
Constant	0.987	0.284		3.47	0.001
AI Adoption	0.542	0.063	0.598	8.60	0.000

AI adoption significantly influences employment outcomes ( $\beta = 0.598$ ,  $p < 0.05$ ), 0.000 indicating job transformation and skill-driven employment growth. AI adoption has no significant effect on public service delivery and governance in the South-South region of Nigeria. To test this hypothesis, multiple regression statistical analysis was used and the result is shown in table 4

**Table 4.** Regression Analysis of AI Adoption and Public Service Delivery and Governance

Model	B	Std Error	Beta	T	Sig
Constant	1.102	0.301		3.66	0.000
AI Adoption	0.711	0.052	0.739	13.67	0.000

AI adoption has a strong and significant effect on public service delivery and governance ( $\beta = 0.739$ ,  $p < 0.05$ ). The null hypothesis is rejected.

### **8.0 Discussion of Findings Based on Research Hypotheses**

H<sub>01</sub>: AI adoption has no significant effect on economic productivity in the South-South region of Nigeria. The regression results revealed that AI adoption has a positive and statistically significant effect on economic productivity ( $\beta = 0.721$ ,  $p < 0.05$ ). This finding led to the rejection of the null hypothesis. The magnitude of the standardized beta coefficient indicates that AI adoption is a strong predictor of productivity improvement among organizations in the South-South region. It corroborates the empirical findings of Brynjolfsson, Rock, and Syverson (2023), who reported that AI-driven automation and decision-support systems significantly enhance firm-level productivity. Within the Nigerian context, the result supports Ogunbodede and Atchirim's (2025) assertion that AI adoption improves operational efficiency and resource optimization. From a developmental perspective, the finding suggests that AI adoption facilitates faster production cycles, improved service quality, and cost efficiency, which collectively contribute to regional economic growth. This result provides empirical evidence that AI functions as a general-purpose technology capable of inducing structural productivity transformation in resource-dependent regions such as the South South.

H<sub>02</sub>: AI adoption has no significant influence on employment outcomes in the South South region of Nigeria. The analysis demonstrated that AI adoption significantly influences employment outcomes ( $\beta = 0.598$ ,  $p < 0.05$ ), resulting in the rejection of the second null hypothesis. Although the effect size is moderate compared to productivity and service delivery, it remains statistically and practically significant. This finding contributes to the ongoing scholarly debate on technology-induced unemployment versus job transformation. Consistent with the task-based theory of technological change (Acemoglu & Restrepo, 2022), the result suggests that AI adoption in the South-South region is more likely to restructure jobs than eliminate them. New roles related to data analytics, system supervision, and AI maintenance appear to offset job displacement effects. At the level of analysis, this finding implies that AI adoption necessitates a reconfiguration of human capital rather than a reduction in labor demand. The implication is that employment outcomes depend on the absorptive capacity of institutions and the availability of reskilling mechanisms, positioning education and training systems as critical mediating variables.

H<sub>03</sub>: AI adoption has no significant effect on public service delivery and governance in the South-South region of Nigeria. The regression results indicated that AI adoption has a strong and statistically significant effect on public service delivery and governance ( $\beta = 0.739$ ,  $p < 0.05$ ), leading to the rejection of the third null hypothesis. Among the three dependent variables examined, public service delivery exhibited the highest standardized effect. This finding is consistent with digital governance literature, which argue that AI enhances bureaucratic efficiency, transparency, and accountability through automation and data-driven decision-making. Empirical evidence from UNDP (2023) and the Nigerian National AI Strategy (FMCIDE, 2023) similarly demonstrates that AI-enabled systems reduce service delays, minimize human discretion, and improve governance outcomes. At the level of analysis, this result underscores AI's role as an institutional capacity multiplier, particularly in developing regions where governance inefficiencies constrain development. The implication is that AI adoption can strengthen state capacity and improve citizen trust when embedded within appropriate regulatory and ethical frameworks.

### **9.0 Conclusion**

The study concludes that Artificial Intelligence adoption exerts a significant and positive influence on national development in the South-South region of Nigeria. Specifically, AI adoption enhances economic productivity, positively transforms employment outcomes, and substantially improves public service delivery and governance. These findings confirm that AI functions as a strategic development enabler rather than merely a technological tool.

The study also establishes AI adoption as a critical explanatory variable for sub-national development outcomes in developing economies. The evidence suggests that regions that strategically invest in AI infrastructure, skills, and governance frameworks are more likely to experience sustainable development gains.

### **10.0 Recommendations**

1. Governments should operationalize AI policies at the regional level, ensuring alignment between national strategies and local development priorities.
2. Universities and training institutions should integrate AI, data science, and digital governance into postgraduate curricula to support workforce transformation.
3. Public institutions should adopt AI-driven systems for service delivery, monitoring, and evaluation to enhance governance efficiency.

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