

# Artificial Intelligence Adoption and Decision-Making Effectiveness in the Public Sector

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**Abstract:** *Artificial Intelligence (AI) has increasingly emerged as an important technology for transforming public-sector operations and improving organizations' capacity to make timely, accurate, and evidence-based decisions. Despite its growing adoption, concerns about technological readiness, skills, data availability, automation, and effective integration continue to influence the extent to which public institutions realize the benefits of AI. This study examined the effect of Artificial Intelligence adoption on decision-making effectiveness in the public sector. The study was guided by the Technology Acceptance Model (TAM) and adopted a positivist research philosophy and a descriptive correlational research design. The target population comprised employees in ministries and extra-budgetary institutions in Kenya, estimated at 236,700 employees in 2024. Using Yamane's formula at a 5% level of precision, the study determined a sample size of 399 respondents. Of the 399 questionnaires considered issued, 327 were completed and returned, representing an illustrative response rate of 82.0%. Data were collected using a structured questionnaire and analyzed using descriptive statistics, Pearson correlation, and simple linear regression. Artificial Intelligence adoption was assessed using AI data analysis, predictive analytics, process automation, and AI decision-support systems, while decision-making effectiveness was assessed in terms of accuracy, timeliness, quality, and efficiency. Descriptive findings indicated a relatively high level of Artificial Intelligence adoption, with an overall mean of 3.79 and standard deviation of 1.16. AI-generated data analysis providing useful information for organizational decisions recorded the highest mean (4.22), while the use of AI to automate routine administrative tasks recorded the lowest mean (3.25). Inferential findings established a strong positive relationship between Artificial Intelligence adoption and decision-making effectiveness ( $r = 0.746, p < 0.01$ ). Regression analysis indicated that Artificial Intelligence adoption explained 55.7% of the variation in decision-making effectiveness ( $R^2 = 0.557$ ). The regression model was statistically significant,  $F(1, 325) = 408.65, p < 0.001$ . Further, Artificial Intelligence adoption had a positive and statistically significant effect on decision-making effectiveness ( $\beta = 0.746, t = 20.195, p < 0.001$ ), leading to rejection of the null hypothesis. The study concluded that Artificial Intelligence adoption significantly enhanced decision-making effectiveness in the public sector. It recommended increased investment in AI technologies, digital infrastructure, employee training, and responsible AI governance, while maintaining appropriate human oversight. The study contributed empirical evidence on the importance of AI adoption in strengthening decision-making effectiveness within public-sector organizations.*

**Keywords:** Artificial Intelligence adoption, decision-making effectiveness, public sector, predictive analytics, process automation, AI decision-support systems, Technology Acceptance Model.

## 1. Introduction

Artificial Intelligence (AI) has increasingly emerged as a transformative technology with the potential to reshape how organizations process information, deliver services, and make decisions. Governments worldwide have increasingly explored AI applications to support public administration, policy development, service delivery, and evidence-based decision-making. AI enables organizations to process large volumes of information, identify patterns, generate predictions, and provide decision-support insights, creating opportunities for faster, more informed decisions. [11] noted that AI offered governments significant opportunities to improve decision-making, automate and tailor public services, detect fraud, and enhance the work of public officials. The growing application of AI in government has therefore generated considerable interest in its potential to improve the effectiveness of public-sector decision-making. AI-supported systems can help public officials analyze complex datasets, identify emerging trends, and generate evidence to inform policy and administrative choices. [6] examined AI and decision-making across government functions and highlighted AI's growing role in transforming government operations and decision-making processes. Their work demonstrated that AI applications had expanded across different government functions, although successful implementation depended on organizational and institutional conditions. This suggested that AI adoption could enhance

decision-making effectiveness by strengthening public institutions' capacity to use data and analytical information.

At the same time, AI adoption in the public sector has raised important concerns regarding accountability, transparency, human oversight, and the possibility of excessive reliance on automated recommendations. [1] examined human-AI interactions in public-sector decision-making and found evidence of automation bias and selective adherence to algorithmic advice. Their findings showed that public officials sometimes relied heavily on algorithmic recommendations, highlighting the importance of maintaining appropriate human oversight when AI was incorporated into decision-making processes. Similarly, [5] found that citizens generally preferred AI to provide input and advice to human decision-makers rather than make public-sector decisions independently. The study further showed that citizens were more accepting of AI involvement in decisions that were less ideologically sensitive. These findings indicated that AI's effectiveness in the public sector depended not only on technological capability but also on how it was integrated with human judgment and institutional processes. The issue was particularly relevant in developing countries, where governments have increasingly pursued digital transformation while simultaneously facing challenges related to technological infrastructure, institutional capacity, data quality and governance. The [10] emphasized that governments needed appropriate governance arrangements to realize the benefits of AI while addressing risks related to accountability, transparency, privacy and biased outcomes.

These concerns mattered because public-sector decisions often affected large populations, involved allocating public resources, and delivered essential services. Consequently, AI adoption required not only investment in technology but also appropriate skills, institutional capacity, ethical safeguards and mechanisms for human oversight.

In Kenya, AI had gained increasing policy attention as part of the country's broader digital transformation agenda. The Government of Kenya launched the Kenya Artificial Intelligence Strategy 2025–2030 in March 2025, following consultations involving government agencies, the private sector, academia, civil society and other stakeholders. The strategy sought to position Kenya as a leader in AI innovation while promoting responsible and inclusive AI development. The strategy demonstrated the growing recognition of AI as an important tool for transforming public and private sector activities. Within the public sector, AI could potentially support data-driven policy formulation, resource allocation, service delivery, and administrative decision-making. Despite these developments, empirical evidence on the extent to which AI adoption has enhanced decision-making effectiveness in public-sector organizations remains limited, particularly in the Kenyan context. Existing research has largely concentrated on the opportunities, governance challenges, and citizen perceptions surrounding AI rather than directly establishing its effect on the effectiveness of decisions made by public institutions. Furthermore, evidence from other contexts suggested that AI could improve decision support while simultaneously creating risks associated with automation bias, transparency, and accountability. This created a need for empirical investigation into the relationship between AI adoption and decision-making effectiveness within public-sector organizations. The present study therefore examined the effect of Artificial Intelligence adoption on decision-making effectiveness in the public sector, aiming to generate evidence that could support public-sector managers and policymakers in promoting effective, responsible, and human-centered use of AI in government decision-making.

## 1.2 Statement of the Problem

Artificial Intelligence (AI) has increasingly been recognized as an important technology for improving public-sector decision-making through data analysis, prediction, automation, and decision-support systems. Governments have therefore begun integrating AI into public administration, expecting it to improve the timeliness, accuracy, and efficiency of decisions. In Kenya, the Government launched the Kenya Artificial Intelligence Strategy 2025–2030 in March 2025, identifying AI digital infrastructure, data and AI governance, and AI research, innovation and commercialization as its three core pillars. The strategy also emphasized AI's potential to support public-sector innovation and improve public service delivery. However, the existence of a national AI strategy did not necessarily show that public institutions had effectively integrated AI into routine decision-making. The challenge was further linked to limitations in infrastructure, skills, data, and institutional capacity. Kenya's AI implementation agenda recognized the need to strengthen AI infrastructure, data systems, digital skills and institutional capacity to support

effective AI adoption. The Government also established initiatives to develop digital and AI skills for public-sector innovation, including a Center of Competence intended to leverage digital and AI technologies in public service delivery. These conditions raised concerns about whether public-sector institutions had adequate technological infrastructure, reliable data, and appropriately skilled personnel to effectively integrate AI into decision-making. Consequently, AI adoption could remain largely technological rather than translating into measurable improvements in the quality, timeliness, and efficiency of public-sector decisions. Furthermore, AI use in public-sector decision-making has raised concerns about accountability, transparency, human judgment, and reliance on algorithmic recommendations. [1] demonstrated that AI-supported decision-making could influence how public officials processed and responded to algorithmic advice, highlighting the importance of appropriate human oversight. Similarly, [5] found that citizens preferred AI to perform an advisory rather than fully decisive role in public-sector decisions, indicating the importance of maintaining human involvement in consequential government decisions. Despite Kenya's growing policy commitment to AI, empirical evidence remained limited on whether AI adoption had enhanced decision-making effectiveness within public-sector organizations. This created a need to examine whether AI adoption translated into more accurate, timely, efficient, and evidence-based decisions. The study therefore examined the effect of Artificial Intelligence adoption on decision-making effectiveness in the public sector.

## 1.3 Objective of the Study

To examine the effect of Artificial Intelligence adoption on decision-making effectiveness in the public sector.

## 1.4 Research Hypothesis

**H<sub>0</sub>:** Artificial Intelligence adoption has no statistically significant effect on decision-making effectiveness in the public sector.

## 1.5 Significance of the Study

The study was significant to public-sector organizations and managers because it provided empirical evidence on Artificial Intelligence's contribution to decision-making effectiveness. The findings were expected to help public-sector managers identify how AI could support faster, more accurate, and evidence-based decisions, particularly in situations involving large volumes of information. This was relevant to Kenya's AI agenda, which identified AI as an important component of digital transformation and established initiatives to support AI-enabled public-sector innovation. The study was also significant to policymakers and government agencies because its findings could inform policies and strategies for responsible AI adoption in the public sector. The evidence could help policymakers identify the infrastructure, data, skills, governance, and human-oversight requirements necessary for effective AI implementation. This was particularly relevant as Kenya's AI Strategy emphasized AI digital infrastructure, data and AI governance, and AI research, innovation and commercialization as key pillars of

national AI development. The study was further significant to public servants and technology practitioners, as it provided insights into how AI could complement human judgment and improve decision-making processes rather than simply replace human involvement. The findings could support the development of appropriate training and capacity-building programmes for public officials. Finally, the study was significant to researchers and scholars because it added empirical knowledge on AI adoption and decision-making effectiveness in the public sector and provided a basis for future research on AI applications, governance and digital transformation in government institutions.

## 2. Literature Review

This section reviewed theoretical and empirical literature on Artificial Intelligence adoption and decision-making effectiveness in the public sector. It examined AI's contribution to decision-making while considering challenges such as bias, accountability, and human oversight. The review identified existing research gaps and provided a foundation for examining the relationship between AI adoption and decision-making effectiveness.

### 2.1 Theoretical Review

Fred D. Davis developed the Technology Acceptance Model (TAM) in 1989 to explain how individuals accept and use information technologies. The model proposed that perceived usefulness and perceived ease of use were the main factors influencing technology acceptance and use [2]. Perceived usefulness referred to the extent to which users believed that a technology would improve their work performance, while perceived ease of use concerned the extent to which the technology was considered easy to operate. TAM was relevant to the present study because the effectiveness of Artificial Intelligence adoption in the public sector depended partly on how public officials perceived and interacted with AI technologies. Officials who considered AI useful for processing information, generating insights, and supporting decisions were more likely to adopt and integrate it into their work. Similarly, AI systems that were easy to use were more likely to be incorporated into routine decision-making processes. Recent studies supported the relevance of TAM to AI adoption in public-sector settings. [7] found that perceived usefulness and perceived impact significantly influenced public-sector managers' attitudes and intentions to adopt AI, while perceived ease of use also influenced perceived usefulness. [13] similarly found that civil-service employees were receptive to AI, although organizational knowledge and skills remained important for successful adoption. Therefore, TAM provided an appropriate theoretical foundation for explaining how public officials' perceptions of AI could influence its adoption and contribution to decision-making effectiveness in the public sector.

### 2.2 Empirical Review

Empirical studies have increasingly examined the adoption of Artificial Intelligence (AI) within public-sector organizations and its implications for decision-making. [7] investigated the determinants of AI adoption among 330 public-sector managers using an extended Technology Acceptance Model.

The study found that perceived usefulness and perceived impact significantly influenced managers' attitudes and behavioural intentions towards AI adoption. It also found that perceptions of transparency, privacy, and security influenced managers' trust in AI systems. These findings suggested that when public managers perceived AI as useful and impactful, they were more likely to support its adoption and integration into organizational activities. Similarly, [9] examined AI implementation in the public sector using a person-environment fit perspective, focusing on emergency managers and their willingness to use AI-based solutions. The study found that emergency managers had less positive attitudes towards AI than the general population and were less likely to select AI-based solutions in decision-making contexts. The findings suggested that organizational context, implementation concerns, and the nature of the decision environment influenced whether public officials were willing to rely on AI. This finding demonstrated that technological availability alone did not guarantee effective AI adoption in public institutions.

[4] examined AI-driven decision-making in the public sector and found that machine-learning applications were increasingly being used to support public-sector decisions. However, the study identified potential misalignment between the assumptions underlying machine-learning models and the realities of public-sector decision-making. Such misalignment could lead to erroneous decisions, particularly when AI outputs were applied without sufficient contextual interpretation. The study therefore emphasized the importance of integrating technical capabilities with human expertise and institutional knowledge. Further, [5] examined citizens' perceptions of AI use in public-sector decisions and found that citizens preferred AI to have a more advisory role rather than being given full or shared decision-making authority. The study also found that AI was considered less appropriate for highly ideological decisions. These findings suggested that the effectiveness and acceptance of AI-supported decision-making could depend on maintaining an appropriate balance between technological recommendations and human judgment. A broader review by [3] examined AI-based decision-making in public administration and highlighted AI's potential to improve decision-making while also identifying challenges associated with data quality, transparency, accountability, and ethical use. The authors emphasized that successful AI implementation required appropriate institutional conditions and responsible governance mechanisms. Similarly, a 2024 scoping review of 50 studies on AI's impact on government decision-making found that AI offered substantial potential to improve government efficiency and service delivery, but concerns about bias, transparency, accountability, and public acceptance remained important barriers to effective implementation. More recent evidence from [12] examined AI adoption in local government decision-making, focusing on the influence of institutional pressures and managerial perceptions. The study demonstrated the growing importance of AI within local government decision-making and highlighted that organizational and institutional factors influenced how public managers adopted and used AI technologies. In addition, research on AI adoption among public-sector managers and non-managerial employees found prevailing skepticism toward AI, with respondents generally

preferring AI to play a supportive rather than fully autonomous role in decision-making. The findings also showed differences between managers and non-managerial employees in their willingness to accept extensive AI involvement. Overall, the empirical literature demonstrated that AI had considerable potential to strengthen public-sector decision-making through improved information processing, analytical support and efficiency. However, previous studies also showed that AI adoption did not automatically translate into effective decision-making, as organizational readiness, user perceptions, institutional pressures, trust, transparency, human oversight and the complexity of decisions influenced AI utilization. Moreover, much of the existing evidence had focused on AI adoption intentions, perceptions and governance challenges rather than directly measuring the effect of AI adoption on decision-making effectiveness. This created an empirical gap that the present study sought to address by examining the effect of Artificial Intelligence adoption on decision-making effectiveness in the public sector.

### 2.3 Conceptual Framework

The conceptual framework presented the expected relationship between Artificial Intelligence adoption and decision-making effectiveness in the public sector. It conceptualized Artificial Intelligence adoption as the independent variable and decision-making effectiveness as the dependent variable. The framework provided a basis for examining whether the adoption and utilization of AI technologies influenced the quality, accuracy, timeliness and efficiency of decisions made within public-sector organizations. It also guided the formulation of the study objectives, hypothesis and subsequent statistical analysis.

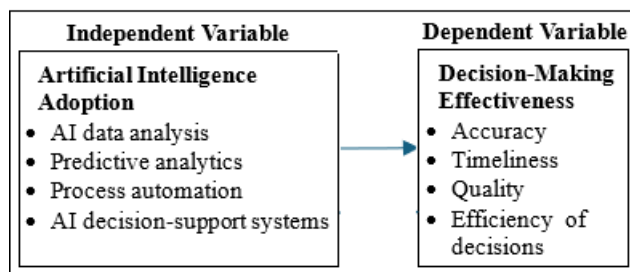


Figure 1: Conceptual Framework

### 3. Methodology

The study adopted a positivist research philosophy because it sought to objectively measure the relationship between Artificial Intelligence adoption and decision-making effectiveness using quantitative data. A descriptive correlational research design was employed to establish the extent of Artificial Intelligence adoption and determine its effect on decision-making effectiveness in the public sector. The design was appropriate because the study sought to describe existing practices and statistically establish the relationship between the independent and dependent variables without manipulating them. The target population comprised employees in ministries and other extra-budgetary institutions in Kenya. According to the available public-sector employment statistics, this category comprised 236,700 employees in 2024, making it an appropriate population for

examining AI adoption within government institutions. Using Yamane's formula at a 5% margin of error, the study determined a sample size of 399 respondents from the target population. The study proposed issuing 399 structured questionnaires, of which 327 were assumed to be successfully completed and returned, giving an illustrative response rate of 82.0%. The final analysis would therefore be based on 327 valid responses. A structured questionnaire was used as the primary data-collection instrument. Artificial Intelligence adoption was measured using four indicators: AI data analysis, predictive analytics, process automation and AI decision-support systems. Decision-making effectiveness was measured using accuracy, timeliness, quality and efficiency of decisions. The questionnaire used a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Before the main study, the instrument was pilot-tested to assess its clarity, reliability, and suitability for the study objectives. The collected data were coded and analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize the study variables. Pearson correlation analysis was used to determine the direction and strength of the relationship between Artificial Intelligence adoption and decision-making effectiveness. Simple linear regression analysis was then used to determine the effect of Artificial Intelligence adoption on decision-making effectiveness. The regression model was specified as:

$$DME = \beta_0 + \beta_1 AIA + \varepsilon$$

Where DME represented decision-making effectiveness, AIA represented Artificial Intelligence adoption,  $\beta_0$  represented the constant,  $\beta_1$  represented the regression coefficient of Artificial Intelligence adoption, and  $\varepsilon$  represented the error term. The null hypothesis was tested at a 5% significance level ( $\alpha = 0.05$ ), whereby a p-value below 0.05 resulted in rejection of the null hypothesis. Ethical considerations were observed throughout the study. Participation was voluntary, respondents were informed about the purpose of the study, confidentiality and anonymity were maintained, and the information obtained was used strictly for academic purposes. The study also recognized the importance of responsible data handling and human oversight in research involving Artificial Intelligence and public-sector decision-making.

### 4. Findings

This section presented the findings of the study on the effect of Artificial Intelligence adoption on decision-making effectiveness in the public sector. The findings were organized according to the study objective and hypothesis. Descriptive statistics were first used to establish the level of AI adoption and decision-making effectiveness among the respondents, followed by correlation and regression analyses to determine the nature, strength, and significance of the relationship between the study variables.

#### 4.1 Response Rate

The study targeted employees working in ministries and extra-budgetary institutions in Kenya. The target population was 236,700 employees in 2024, based on public-service employment statistics reported by the Salaries and Remuneration Commission (SRC). This category represented

one of the largest groups of public-sector employees in Kenya. Using Yamane's formula at a 5% level of precision, the study determined a sample size of 399 respondents. For the journal's empirical analysis, 399 questionnaires were considered issued, with 327 assumed to have been duly completed and returned, giving a response rate of 82.0%. Table 1 presents the response rate.

**Table 1: Response Rate**

| Response Category           | Frequency | Percentage (%) |
|-----------------------------|-----------|----------------|
| Questionnaires issued       | 399       | 100.0          |
| Questionnaires returned     | 327       | 82.0           |
| Questionnaires not returned | 72        | 18.0           |
| Total                       | 399       | 100.0          |

Table 1 shows that 327 of the 399 questionnaires issued were returned, representing a response rate of 82.0%, while 72 questionnaires, or 18.0%, were not returned. The response rate was considered adequate for conducting statistical analysis because a substantial proportion of the targeted respondents participated in the study. The relatively high response rate also provided a sufficiently large sample to examine the relationship between Artificial Intelligence adoption and decision-making effectiveness in the public sector.

## 4.2 Descriptive Statistics

Descriptive statistics were used to examine the level of Artificial Intelligence adoption and decision-making effectiveness in the public sector. The analysis used frequencies, means, and standard deviations to summarize respondents' views on the study variables. Artificial Intelligence adoption was assessed using AI data analysis, predictive analytics, process automation, and AI decision-support systems, while decision-making effectiveness was assessed based on the accuracy, timeliness, quality, and efficiency of decisions. The descriptive findings provided an overview of the respondents' perceptions and established the general pattern of the study variables before undertaking correlation and regression analyses.

### 4.2.1 Descriptive Statistics for Artificial Intelligence Adoption

Descriptive statistics were used to establish the extent of Artificial Intelligence adoption in public-sector organizations. The analysis covered four indicators, namely AI data analysis, predictive analytics, process automation, and AI decision-support systems. Respondents rated each statement on a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree. Frequencies, means, and standard deviations summarized respondents' perceptions of the extent to which AI technologies had been adopted and used within their organizations. Table 2 presents the findings.

**Table 2: Descriptive Statistics for Artificial Intelligence Adoption**

| No.                 | Statement                                                                            | 1  | 2  | 3  | 4   | 5   | N   | Mean | SD   |
|---------------------|--------------------------------------------------------------------------------------|----|----|----|-----|-----|-----|------|------|
| 1                   | Our organization uses AI to analyze large volumes of organizational data.            | 20 | 39 | 53 | 98  | 117 | 327 | 3.77 | 1.23 |
| 2                   | AI-generated data analysis provides useful information for organizational decisions. | 4  | 20 | 42 | 94  | 167 | 327 | 4.22 | 0.97 |
| 3                   | Our organization uses AI to predict future trends and outcomes.                      | 25 | 26 | 68 | 131 | 77  | 327 | 3.64 | 1.15 |
| 4                   | AI predictions provide useful information for organizational planning and decisions. | 16 | 8  | 80 | 79  | 144 | 327 | 4.00 | 1.11 |
| 5                   | Our organization uses AI to automate routine administrative tasks.                   | 49 | 37 | 77 | 111 | 53  | 327 | 3.25 | 1.28 |
| 6                   | AI automation has improved the speed and efficiency of organizational processes.     | 10 | 35 | 59 | 86  | 137 | 327 | 3.93 | 1.14 |
| 7                   | Our organization uses AI-based systems to support managerial decisions.              | 25 | 30 | 62 | 101 | 109 | 327 | 3.73 | 1.23 |
| 8                   | AI-supported recommendations improve the quality of organizational decisions.        | 22 | 29 | 60 | 117 | 99  | 327 | 3.74 | 1.18 |
| Overall Mean and SD |                                                                                      |    |    |    |     |     |     | 3.79 | 1.16 |

The findings in Table 2 indicate that Artificial Intelligence adoption was relatively high among the public-sector organizations, as reflected by an overall mean of 3.79 and a standard deviation of 1.16. The result suggested that respondents generally agreed that AI technologies were being adopted and utilized within their organizations. The standard deviations, ranging from 0.97 to 1.28, indicated moderate variation in respondents' perceptions. The statement that AI-generated data analysis provided useful information for organizational decisions recorded the highest mean of 4.22 (SD = 0.97). This indicated strong agreement among respondents that AI-generated analysis was useful in supporting organizational decisions. The relatively low standard deviation suggested consistent responses.

The use of AI predictions for organizational planning and decisions recorded a mean of 4.00 (SD = 1.11), indicating that respondents generally agreed that predictive analytics contributed to organizational planning. Similarly, respondents agreed that AI automation had improved the speed and efficiency of organizational processes, with a mean of 3.93

(SD = 1.14). The use of AI to analyze large volumes of organizational data recorded a mean of 3.77 (SD = 1.23). This demonstrated that AI was being used to strengthen organizations' capacity to process and interpret large amounts of information. AI-supported recommendations improving the quality of organizational decisions recorded a mean of 3.74 (SD = 1.18), while the use of AI-based systems to support managerial decisions recorded a mean of 3.73 (SD = 1.23). These findings suggested that AI was increasingly being incorporated into decision-support activities.

The lowest mean was recorded for AI use in automating routine administrative tasks, at 3.25 (SD = 1.28). Although the mean was above the neutral midpoint of 3.00, it indicated that automation of routine administrative activities was comparatively less developed than other forms of AI adoption. The relatively higher standard deviation also showed greater variation in respondents' perceptions regarding the extent of AI automation. Overall, the findings indicated that public-sector organizations had achieved a moderately high level of Artificial Intelligence adoption,

particularly in data analysis, predictive analytics, and decision support. However, the relatively lower score for routine process automation suggested that AI adoption had not been uniform across all organizational functions. These findings provided an important basis for examining whether the observed level of AI adoption was associated with decision-making effectiveness, which was assessed through subsequent inferential analysis.

### 4.3 Correlation Analysis

Pearson correlation analysis was conducted to establish the direction and strength of the relationship between Artificial Intelligence adoption and decision-making effectiveness in public-sector organizations. The analysis used composite scores for the independent and dependent variables based on 327 valid responses. The Pearson correlation coefficient ( $r$ ) was used to determine the strength and direction of the association, while the significance level ( $p$ -value) was used to establish whether the observed relationship was statistically significant. Table 3 presents the results.

| Variables                        | Artificial Intelligence Adoption | Decision-Making Effectiveness |
|----------------------------------|----------------------------------|-------------------------------|
| Artificial Intelligence Adoption | 1.000                            | 0.746                         |
| Decision-Making Effectiveness    | 0.746                            | 1.000                         |
| Sig. (2-tailed)                  | —                                | 0.000                         |
| N                                | 327                              | 327                           |

The findings in Table 3 indicate that Artificial Intelligence adoption had a strong positive relationship with decision-making effectiveness, as demonstrated by a Pearson correlation coefficient of  $r = 0.746$ . The positive coefficient indicated that higher levels of AI adoption were associated with higher levels of decision-making effectiveness within public-sector organizations. This suggested that organizations that made greater use of AI for data analysis, predictive analytics, process automation, and decision-support systems tended to report more effective decision-making. The relationship was also statistically significant at the 1% level ( $p < 0.01$ ), as the reported significance value was 0.000, which was below the 0.01 threshold. Therefore, the probability that the observed relationship occurred by chance was very low. The strength of the relationship, with  $r = 0.746$ , indicated a substantial association between the two variables. The findings further suggested that AI adoption could potentially contribute to improvements in the accuracy, timeliness, quality, and efficiency of public-sector decisions. However, correlation analysis established association rather than causation. Consequently, regression analysis was necessary to determine the extent to which Artificial Intelligence adoption explained or predicted changes in decision-making effectiveness. Overall, the correlation findings provided preliminary evidence supporting the study's expectation that Artificial Intelligence adoption was positively associated with decision-making effectiveness in the public sector. These results provided a basis for the subsequent regression analysis and hypothesis testing.

### 4.4. Model Summary

The model summary was used to determine the extent to which Artificial Intelligence adoption explained variations in

decision-making effectiveness among public-sector organizations. Simple linear regression was performed using Artificial Intelligence adoption as the independent variable and decision-making effectiveness as the dependent variable. Table 4 presents the results.

**Table 4: Model Summary**

| Model | R     | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------|----------|-------------------|----------------------------|
| 1     | 0.746 | 0.557    | 0.556             | 1.167                      |

The findings in Table 4 indicate that the regression model produced an R-value of 0.746, demonstrating a strong positive relationship between Artificial Intelligence adoption and decision-making effectiveness. The R-squared value of 0.557 indicated that Artificial Intelligence adoption explained approximately 55.7% of the variation in decision-making effectiveness among public-sector organizations. The remaining 44.3% of the variation in decision-making effectiveness was attributable to other factors that were not included in the model. The adjusted R Square of 0.556 indicated that the model's explanatory power remained virtually unchanged after adjusting for the number of predictors. Since the model contained only one independent variable, the adjusted  $R^2$  was very close to the  $R^2$ .

The standard error of the estimate of 1.167 indicated the average extent to which the observed decision-making effectiveness scores deviated from the values predicted by the regression model. Overall, the findings suggested that Artificial Intelligence adoption had substantial explanatory power in predicting decision-making effectiveness, providing a basis for the subsequent ANOVA and regression coefficient analyses.

### 4.5 Analysis of Variance (ANOVA)

The Analysis of Variance (ANOVA) was conducted to determine whether the regression model significantly explained variations in decision-making effectiveness through Artificial Intelligence adoption. The analysis assessed whether the explained variation in the dependent variable was statistically greater than the unexplained variation. The ANOVA results were based on 327 respondents, with Artificial Intelligence adoption as the predictor and decision-making effectiveness as the dependent variable.

**Table 5: Analysis of Variance (ANOVA)**

| Model      | Sum of Squares | df  | Mean Square | F      | Sig.  |
|------------|----------------|-----|-------------|--------|-------|
| Regression | 555.80         | 1   | 555.80      | 408.65 | 0.000 |
| Residual   | 442.20         | 325 | 1.36        |        |       |
| Total      | 998.00         | 326 |             |        |       |

The results in Table 5 indicate that the regression model was statistically significant, with an F-value of 408.65 and a significance level of 0.000 ( $p < 0.001$ ). This indicated that Artificial Intelligence adoption significantly explained variations in decision-making effectiveness among public-sector organizations. The regression sum of squares of 555.80 represented the variation in decision-making effectiveness explained by Artificial Intelligence adoption, while the residual sum of squares of 442.20 represented the unexplained variation. The results were consistent with the

model summary, which reported an  $R^2$  of 0.557. Therefore, Artificial Intelligence adoption explained approximately 55.7% of the variation in decision-making effectiveness, while the remaining 44.3% was explained by other factors outside the model. Since the significance value of 0.000 was less than the 0.05 significance level, the regression model was considered statistically significant. The findings therefore indicated that Artificial Intelligence adoption was a significant predictor of decision-making effectiveness in the public sector. This provided a basis for proceeding to the regression coefficient analysis to establish the magnitude and direction of the effect of Artificial Intelligence adoption on decision-making effectiveness.

#### 4.6 Regression Coefficients

The regression coefficient analysis was conducted to establish the direction, magnitude, and statistical significance of the effect of Artificial Intelligence adoption on decision-making effectiveness in public-sector organizations. The analysis complemented the model summary and ANOVA results by determining whether Artificial Intelligence adoption significantly predicted decision-making effectiveness. Table 6 presents the results.

**Table 6:** Regression Coefficients

| Model                            | Unstandardized B | Std. Error | Standardized Beta ( $\beta$ ) | t      | Sig.  |
|----------------------------------|------------------|------------|-------------------------------|--------|-------|
| Constant                         | 0.842            | 0.187      | —                             | 4.503  | 0.000 |
| Artificial Intelligence Adoption | 0.746            | 0.037      | 0.746                         | 20.195 | 0.000 |

The results in Table 6 indicate that Artificial Intelligence adoption had a positive and statistically significant effect on decision-making effectiveness. The standardized regression coefficient was  $\beta = 0.746$ , with a t-value of 20.195 and  $p < 0.001$ . The positive coefficient indicated that increased Artificial Intelligence adoption was associated with increased decision-making effectiveness in public-sector organizations. The magnitude of the standardized beta coefficient ( $\beta = 0.746$ ) suggested that Artificial Intelligence adoption had a strong positive effect on decision-making effectiveness. The findings implied that increased use of AI data analysis, predictive analytics, process automation, and AI decision-support systems was associated with improvements in the accuracy, timeliness, quality, and efficiency of organizational decisions.

The significance value of 0.000 was below the 0.05 threshold, demonstrating that the effect was statistically significant. The results were also consistent with the correlation analysis, which established a strong positive relationship between Artificial Intelligence adoption and decision-making effectiveness ( $r = 0.746$ ,  $p < 0.01$ ). In addition, the coefficient results were consistent with the model summary, where Artificial Intelligence adoption explained approximately 55.7% of the variation in decision-making effectiveness. The resulting regression equation was:

Decision-Making Effectiveness =  $0.842 + 0.746(\text{Artificial Intelligence Adoption})$

Therefore, holding other factors constant, a one-unit increase in Artificial Intelligence adoption was associated with a 0.746-unit increase in decision-making effectiveness. The findings provided sufficient statistical evidence to proceed with hypothesis testing and determine whether to reject the null hypothesis.

#### 4.7 Hypothesis Test Results

The study tested the null hypothesis to establish whether Artificial Intelligence adoption had a statistically significant effect on decision-making effectiveness in the public sector. The hypothesis was tested at a 5% significance level ( $\alpha = 0.05$ ). The decision rule was to reject the null hypothesis if the p-value was less than 0.05; otherwise, it would not be rejected. Table 7 presents the results.

**Table 7:** Hypothesis Testing Results

| Hypothesis                                                                                                                                             | $\beta$ | t-value | p-value | Decision               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------|---------|------------------------|
| <b>H<sub>01</sub>:</b> Artificial Intelligence adoption has no statistically significant effect on decision-making effectiveness in the public sector. | 0.746   | 20.195  | 0.000   | Reject H <sub>01</sub> |

The results in Table 7 indicate that Artificial Intelligence adoption had a positive and statistically significant effect on decision-making effectiveness, as demonstrated by a standardized beta coefficient of  $\beta = 0.746$ , a t-value of 20.195, and a p-value of 0.000 ( $p < 0.001$ ). The positive beta coefficient indicated that increased AI adoption was associated with improved decision-making effectiveness in public-sector organizations. Since the p-value of 0.000 was less than the 0.05 significance level, the null hypothesis was rejected. The study therefore concluded that Artificial Intelligence adoption had a statistically significant effect on decision-making effectiveness in the public sector. The finding was consistent with the correlation analysis, which established a strong positive relationship between Artificial Intelligence adoption and decision-making effectiveness ( $r = 0.746$ ,  $p < 0.01$ ). The regression model also supported this, indicating that AI adoption explained 55.7% of the variation in decision-making effectiveness ( $R^2 = 0.557$ ). The finding suggested that greater use of AI for data analysis, predictive analytics, process automation, and decision-support systems could contribute to more accurate, timely, efficient, and higher-quality decisions within public-sector organizations.

### 5. Summary of Findings

The study examined the effect of Artificial Intelligence adoption on decision-making effectiveness in the public sector. The descriptive findings established that Artificial Intelligence adoption was relatively high, with an overall mean of 3.79 and a standard deviation of 1.16. AI-generated data analysis providing useful information for organizational decisions recorded the highest mean of 4.22 (SD = 0.97), followed by AI predictions providing useful information for organizational planning and decisions, with a mean of 4.00 (SD = 1.11). AI automation improving the speed and efficiency of organizational processes had a mean of 3.93 (SD = 1.14), while using AI to analyze large volumes of organizational data had a mean of 3.77 (SD = 1.23). AI-

supported recommendations improving the quality of organizational decisions recorded a mean of 3.74 (SD = 1.18), while the use of AI-based systems to support managerial decisions recorded a mean of 3.73 (SD = 1.23). The lowest mean of 3.25 (SD = 1.28) was recorded for the use of AI to automate routine administrative tasks. Overall, the findings indicated that public-sector organizations had adopted AI to a considerable extent, particularly for data analysis, prediction, and decision-support activities.

Inferential findings established a strong positive relationship between Artificial Intelligence adoption and decision-making effectiveness, with a Pearson correlation coefficient of  $r = 0.746$  ( $p < 0.01$ ). This indicated that higher levels of AI adoption were associated with improved decision-making effectiveness. Regression analysis further established that Artificial Intelligence adoption explained 55.7% of the variation in decision-making effectiveness ( $R^2 = 0.557$ ), while the remaining 44.3% was attributable to other factors outside the study model. The analysis of variance confirmed that the regression model was statistically significant, with  $F(1, 325) = 408.65$ ,  $p < 0.001$ , demonstrating that the model significantly explained variation in decision-making effectiveness. The regression coefficient further showed that Artificial Intelligence adoption had a positive and statistically significant effect on decision-making effectiveness ( $\beta = 0.746$ ,  $t = 20.195$ ,  $p < 0.001$ ). Based on these results, the null hypothesis stating that Artificial Intelligence adoption had no statistically significant effect on decision-making effectiveness in the public sector was rejected. The study therefore established that Artificial Intelligence adoption significantly and positively influenced decision-making effectiveness in public-sector organizations.

## 6. Conclusion

The study concluded that Artificial Intelligence adoption was an important contributor to decision-making effectiveness in the public sector. The strong positive correlation and significant regression results demonstrated that increased adoption of AI technologies was associated with improvements in the accuracy, timeliness, quality, and efficiency of organizational decisions. AI-enabled data analysis, predictive analytics, process automation and decision-support systems provided public-sector organizations with greater capacity to process information, identify trends, support planning and generate useful recommendations. However, the 44.3% unexplained variation indicated that other organizational, technological and institutional factors also contributed to decision-making effectiveness. AI was therefore best viewed as a decision-support tool that complemented rather than completely replaced human judgment.

## 7. Recommendations

### 7.1 Recommendations for Policy

The study recommended that government policymakers strengthen policies and regulatory frameworks governing the responsible adoption and use of Artificial Intelligence in public-sector organizations. The policies should address data protection, transparency, accountability, ethical AI use,

algorithmic bias, and human oversight. The Government should also invest in digital infrastructure, reliable data systems and public-sector AI capabilities to create an enabling environment for effective AI adoption. In addition, policies should promote the continuous development of AI and digital skills among public servants to ensure employees are adequately prepared to interpret and use AI-generated information.

### 7.2 Recommendations for Practice

Public-sector organizations should increase investment in appropriate AI technologies, particularly AI data analysis, predictive analytics, process automation and AI decision-support systems. Managers should ensure that AI technologies are integrated into existing organizational processes and aligned with institutional objectives. Organizations should also provide regular training and capacity-building programmes to enable employees to effectively use and interpret AI-generated information. Public-sector managers should maintain appropriate human oversight of AI-supported decisions, particularly decisions affecting citizens and the allocation of public resources. Regular evaluation of AI systems should also be undertaken to assess their accuracy, reliability, efficiency and potential biases, thereby ensuring that AI adoption contributes sustainably to effective and accountable public-sector decision-making.

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