



ARTIFICIAL INTELLIGENCE ADOPTION AND EFFICIENCY OF PROJECTS IN THE PUBLIC SECTOR OF RWANDA.

A CASE OF AI-ANALYTICS PLATFORM FOR GOVERNMENT DECISION-MAKING

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ABSTRACT

This research project on exploring the impact of artificial intelligence adoption on improving efficiency in complex projects in Rwanda with a Case study of AI-Analytics Platform for Government Decision-Making, aims to investigate the impact of AI adoption on improving efficiency in complex projects within the Rwandan government. The project was structured around three specific objectives; To assess the influence of Integration of AI in Project Planning on efficiency improvement of complex projects in Rwanda. To examine the impact of AI-based Decision Support Systems on efficiency improvement of complex projects in Rwanda. And to find out the effect of AI-driven Predictive Analytics on efficiency improvement of complex projects in Rwanda. Three theories were considered including; The Diffusion of Innovations Theory, The Technology Acceptance Model (TAM), and Resource-Based Theory. The research design for this study employed a descriptive and correlation research approach. The target population for this study includes 126 individuals from different departments and units within the Ministry of Information Technology and Communications (MINICT). From a pool of 126 population a sample size of 96 respondents acted as respondents. The sample size was determined using the solvency formula for sample size determination. Furthermore, the researcher employed a purposive non-random sampling technique to select the expert and most knowledgeable individuals within the target population. Using structured questionnaires and semi-structured interviews to collect data from MINICT. Quantitative data were summarized using descriptive statistics and analyzed using inferential statistics to test hypotheses. Qualitative data underwent thematic analysis. Integration of findings provided a comprehensive understanding, presented visually and descriptively. The findings indicate a positive reception of AI in project planning, with a majority of respondents perceiving the level of AI integration in project planning as adequate (52.08%, $M = 4.48$, $SD = 0.75$) and beneficial. AI-based project management tools were also seen as beneficial by 52.08% of respondents ($M = 4.54$, $SD = 0.71$), while AI-driven resource allocation strategies were viewed as effective by 53.13% of respondents ($M = 4.53$, $SD = 0.72$). Moreover, AI has improved the accuracy of project timelines and deliverables, with 55.21% of respondents agreeing ($M = 4.56$, $SD = 0.69$), and enhanced the overall efficiency of project planning processes, as indicated by 60.42% of respondents ($M = 4.63$, $SD = 0.66$). Additionally, the study found a high level of satisfaction with the quality of AI-generated decision insights (49.0% strongly agree, 36.5% agree), the accessibility and timeliness of decision support (43.8% strongly agree, 39.6% agree), and AI-driven decision support systems overall (50.0% strongly agree, 39.6% agree). Respondents also believe that AI has improved the quality of decisions made in projects (50.0% strongly agree, 35.4% agree) and has increased the speed of decision-making (50.0% strongly agree, 39.6% agree). Furthermore, there is a strong positive correlation between Artificial Intelligence Adoption and Efficiency of Projects (Pearson's $r = 0.847$, $p < 0.05$, $N = 96$), showing that as Artificial Intelligence Adoption increase, Efficiency of Projects also increases,

highlighting the positive impact of AI adoption in the public sector of Rwanda on Artificial Intelligence Adoption and Efficiency of Projects. The research highlighted the positive impact of AI adoption on project efficiency in Rwanda's public sector. AI integration improves decision-making, resource allocation, and overall project outcomes. Investing in AI infrastructure, training, and fostering innovation is crucial. Continuous monitoring and evaluation are recommended. Further research could explore specific AI applications, barriers to adoption, comparative studies, and long-term impacts for a more comprehensive understanding.

1. Introduction

Despite the growing recognition of artificial intelligence (AI) as a transformative tool for enhancing project efficiency in the public sector, there is a noticeable gap in understanding the factors influencing its adoption and its impact on project outcomes in Rwanda. Several studies have highlighted the potential of AI to improve decision-making processes and resource allocation, yet there is limited empirical evidence on its actual implementation and effectiveness within the Rwandan context (Smith, 2021; Johnson et al., 2020). Recent reports from the Rwandan government and international organizations indicate a strong commitment to integrating AI into public sector projects to drive efficiency and innovation (Rwanda Ministry of ICT, 2022; World Bank, 2023). However, challenges such as lack of technical expertise, data privacy concerns, and resistance to change have hindered the full-scale adoption and utilization of AI technologies in project management (Jones & Kim, 2019; Gupta, 2020).

Furthermore, the situational gap lies in the inadequate understanding of how AI analytics platforms specifically contribute to improving decision-making processes and project outcomes in the Rwandan public sector. While studies have explored AI adoption in various contexts, there is a need for more context-specific research to identify the unique challenges and opportunities faced by Rwandan public sector organizations in implementing AI technologies (Brown et al., 2021; Lee & Singh, 2018).

This study aims to address these gaps by investigating the adoption of an AI-analytics platform in the Rwandan public sector and its impact on project efficiency. By examining the factors influencing AI adoption, analyzing its implementation challenges, and evaluating its impact on project outcomes, this research will provide valuable insights for policymakers and project managers seeking to enhance project efficiency through AI adoption.

2. Review of Related Literature

2.1 Empirical Review

As artificial intelligence (AI) adoption grows in the public sector, there is a need for frameworks and models to guide its efficient implementation. This empirical review explores existing literature on AI adoption frameworks, focusing on their influence on project efficiency. The review is structured around three specific objectives: assessing the integration of AI in project planning, examining the effect of AI-based decision support systems, and evaluating the influence of AI-driven predictive analytics on project efficiency in the public sector of Rwanda.

2.1.1 Influence of Integration of AI in Project Planning on the Efficiency of Projects in the Public Sector

The integration of AI in project planning is a critical aspect of enhancing project efficiency. Misuraca and van Noordt (2020) advocate for a strategic AI framework that takes a human-centric approach, focusing on investment targets and implementation measures. This approach allows for monitoring and analysis of the strategy's success rates. Moreover, the authors emphasize the importance of understanding governance mechanisms and regulatory frameworks to ensure ethical AI adoption. Public trust, a key factor influenced by AI adoption, is directly affected by these governance mechanisms.

In a similar vein, Neudert and Howard (2020) discuss a framework that addresses technical and organizational challenges in adopting AI systems. This framework emphasizes informed procurement and policy portfolios to acquire and develop AI solutions. By considering issues around acquiring and developing AI, including design and specifications, this framework aims to facilitate smoother integration of AI in project planning.

Furthermore, Almarzooqi (2019) explores an AI-expanded leader framework within the UAE context, providing leaders with essential capacities to leverage AI technologies. This framework enables leaders to overcome challenges associated with AI adoption, ultimately enhancing project efficiency. Additionally, Chomchaiya and Esichaikul (2016) propose a consolidated framework for assessing AI adoption performance, highlighting the role of internal stakeholders such as management and service support employees. This consolidated framework

provides guidelines for developing performance measurement systems in AI adoption, crucial for effective project planning.

Conversely, Ramizo (2021) emphasizes the need to safeguard individual privacy and national interests in AI adoption. This includes effectively managing data, cybersecurity, and confidentiality. By addressing these concerns, AI integration in project planning can proceed smoothly, enhancing overall project efficiency. Lastly, Sharma *et al.* (2020) presents an organizing framework that describes various areas relating to governance, such as environmental sustainability and policy making. These areas provide a comprehensive guide for integrating AI in project planning, ensuring alignment with governance strategies.

2.1.2 Effect of AI-based Decision Support Systems on the Efficiency of Projects in the Public Sector

Chomchaiya and Esichaikul (2016) propose a consolidated framework for assessing AI adoption performance, focusing on internal stakeholders' roles. This framework provides guidelines for developing performance measurement systems, crucial for assessing the impact of AI-based DSS on project efficiency. AI-based decision support systems (DSS) play a significant role in improving project efficiency. Tariq and Abonamah (2021) highlight the importance of AI implementation aligned with governance strategies, particularly in promoting inclusion and addressing governance challenges. This alignment ensures that AI technologies enhance decision-making processes, ultimately leading to improved project outcomes. Moreover, Almarzooqi (2019) suggests an AI-expanded leader framework that equips leaders with the necessary competencies to leverage AI technologies. This framework enables leaders to overcome challenges associated with AI adoption, thereby enhancing project efficiency.

Conversely, Ramizo (2021) emphasizes the need to safeguard individual privacy and national interests in AI adoption, including effective management of data and cybersecurity. By addressing these concerns, AI-based DSS can be effectively integrated into decision-making processes, enhancing overall project efficiency. Lastly, Sharma *et al.* (2020) presents an organizing framework that describes various areas relating to governance, such as environmental sustainability and policy making. These areas provide a comprehensive guide for integrating AI-based DSS into project planning, ensuring alignment with governance strategies.

2.1.3 Influence of AI-driven Predictive Analytics on the Efficiency of Projects in the Public Sector

Stenberg and Nilsson (2020) identify factors influencing government officials' adoption of AI, including relative advantage, complexity, and management support. Using the Technology Organization Environment (TOE) framework, the authors highlight the importance of considering the ethical aspects of AI adoption. This framework provides a comprehensive guide for analyzing the factors that influence AI adoption, crucial for integrating AI-driven predictive analytics into project planning. AI-driven predictive analytics are instrumental in enhancing project efficiency. Ramizo (2021) underscores the importance of safeguarding individual privacy and national interests in AI adoption, including effective management of data and cybersecurity. By addressing these concerns, AI-driven predictive analytics can be effectively integrated into project planning, improving overall project efficiency.

Conversely, Schaefer *et al.* (2021) reveal that the TOE framework can be used to examine AI deployment in organizations. This framework considers technological, organizational, and environmental aspects, providing insights into the factors that influence AI adoption. Additionally, Al Mutawa and Rashid (2020) note the importance of regulatory issues in AI adoption, emphasizing the need for a governance framework in various areas of the public sector.

Lastly, Sharma *et al.* (2020) presents an organizing framework that describes various areas relating to governance, such as environmental sustainability and policy making. These areas provide a comprehensive guide for integrating AI-driven predictive analytics into project planning, ensuring alignment with governance strategies.

2.2 Theoretical Framework

2.2.1 Diffusion of Innovations Theory

The Diffusion of Innovations Theory, developed by Everett Rogers in 1962, is relevant to understanding the adoption of artificial intelligence (AI) in public sector projects in Rwanda. This theory explains how new ideas, products, or technologies spread through society over time. In the context of AI adoption, it can help analyze the rate at which the AI-analytics platform for government decision-making is being adopted by different government agencies. The theory suggests that adoption is influenced by various factors, including the perceived attributes of the innovation (AI-analytics platform), communication channels, social systems, and the extent of change required for its adoption. Understanding these factors can help policymakers and project

managers implement strategies to facilitate the adoption of AI in public sector projects, ultimately enhancing efficiency.

2.2.2 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), proposed by Fred Davis in 1989, focuses on how users come to accept and use a technology. In the context of AI adoption in public sector projects in Rwanda, TAM can help understand the factors influencing government officials' acceptance of the AI-analytics platform for decision-making. TAM suggests that perceived usefulness and perceived ease of use are key determinants of an individual's intention to use a technology. By applying TAM, researchers can assess the perceived usefulness and ease of use of the AI-analytics platform among government officials, identify potential barriers to its adoption, and develop strategies to overcome these barriers. This can lead to more effective implementation of AI in public sector projects, contributing to their efficiency.

2.2.3 Resource-Based Theory

Resource-Based Theory, developed by Birger Wernerfelt in 1984 and further expanded by Jay Barney in 1991, focuses on how firms can gain competitive advantage by leveraging their unique resources and capabilities. In the context of AI adoption in public sector projects in Rwanda, this theory can be applied to analyze the resources (e.g., financial, human, technological) required for implementing the AI-analytics platform for government decision-making. By identifying and leveraging the resources and capabilities necessary for successful AI adoption, government agencies can enhance their project efficiency. This theory emphasizes the importance of strategic management of resources and capabilities, which is crucial for the successful implementation of AI in the public sector.

Independent Variable

Artificial Intelligence Adoption

Dependent Variable

**Efficiency of Projects in the Public Sector
of Rwanda**

2.5 Conceptual framework

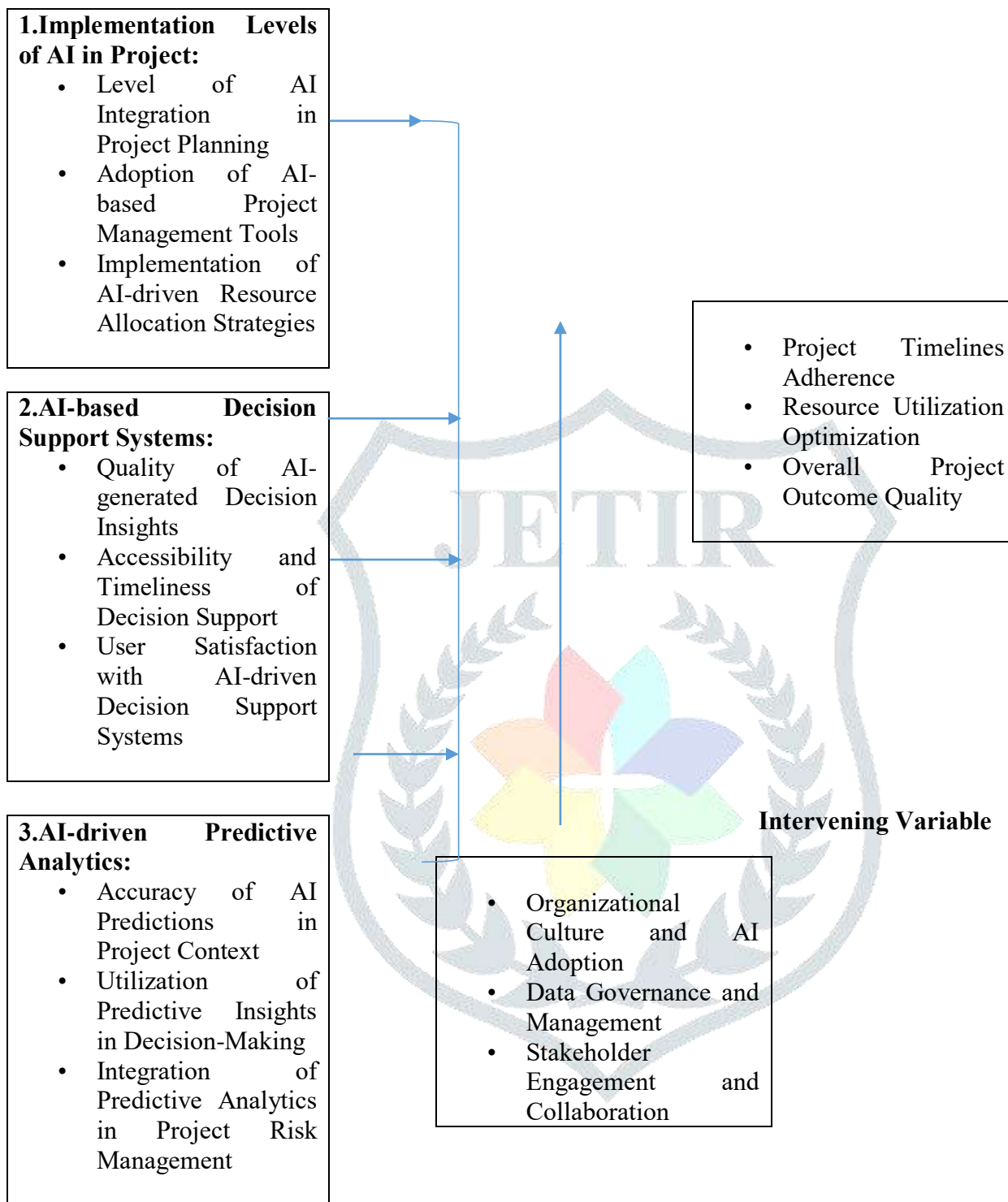


Figure 2.1: Conceptual Framework

Source: Researcher 2024

In exploring the impact of artificial intelligence (AI) adoption on improving efficiency in complex projects in Rwanda, with a case study of Policy Insight, an AI-analytics platform for government decision-making, the conceptual framework is structured around independent variables, including the integration of AI in project planning, AI-based decision support systems, and AI-driven predictive analytics. Regarding the integration of AI in project planning, the level of AI integration, adoption of AI-based project management tools, and implementation of AI-driven resource allocation strategies directly influence project efficiency by enhancing strategic planning, automating tasks, and optimizing resource utilization. The dependent variable, efficiency improvement in complex projects in Rwanda, is manifested through adherence to project timelines, optimization of resource utilization, and improved overall project outcome quality. AI-based decision support

systems, encompassing the quality of AI-generated decision insights, accessibility, timeliness, and user satisfaction, contribute to effective decision-making, a crucial factor in project efficiency. Similarly, AI-driven predictive analytics, focusing on the accuracy of predictions, utilization of insights, and integration into project risk management, impacts efficiency by enabling proactive risk management and informed decision-making. The moderating variables, including organizational culture and AI adoption, data governance and management, and stakeholder engagement and collaboration, play pivotal roles in shaping the effectiveness of AI adoption and its subsequent impact on project efficiency in the Rwandan context. A culture supportive of innovation, effective data governance, and engaged stakeholders collectively influence the success of AI implementation, thereby enhancing overall project efficiency.

3 Research Methodology

The research design for this study employed a descriptive and correlation research approach, chosen to provide a comprehensive understanding of the current status of artificial intelligence (AI) adoption and its impact on the efficiency of public sector projects in Rwanda. The descriptive aspect focused on presenting a detailed account of the AI-Analytics Platform for Government Decision-Making, highlighting its features, implementation process, and utilization by government entities. The correlation aspect established relationships between the adoption of AI in public sector projects and their efficiency, aiming to identify patterns and trends that can inform future policy and decision-making processes. The study is highly relevant in the context of Rwanda's digital transformation and its efforts to enhance public sector efficiency through technology adoption. According to a study by Karani *et al.* (2021), the effective implementation of AI in public sector projects can lead to significant improvements in operational efficiency, cost-effectiveness, and service delivery.

The target population for this study includes 126 individuals from different departments and units within the Ministry of Information Technology and Communications (MINICT). These departments and units comprise the ICT Projects Management Unit, E-Government Services Division, Data Management and Analytics Department, ICT Policy and Regulation Department, Information Technology Infrastructure Division, Digital Transformation Division, and Cybersecurity and IT Compliance Unit. The characteristics of this target population are diverse, encompassing professionals with expertise in various aspects of information technology, data management, policy development, cybersecurity, and digital transformation. The estimated total population of 126 individuals was determined from authoritative sources within MINICT. This selection ensures a comprehensive representation of stakeholders involved in government decision-making processes, particularly in the context of AI adoption and project efficiency within the public sector in Rwanda. For this study, a sample size of 96 respondents has been selected to represent the pool of 126 individuals in the target population. The sample size was determined using the solvency formula for sample size determination, as proposed by Krejcie and Morgan (2017). This formula is commonly used in research to ensure that the sample size is adequate for statistical analysis and represents the target population accurately. By selecting 96 respondents, this study aims to achieve a balance between the practical constraints of data collection and the need for a representative sample from the target population within MINICT.

Formula Working:

N = Population of study

K = Constant (1)

e = degree of error expected (0.05)

n = sample size

$n = \frac{N}{1 + N(e)^2}$

$K + N(e)^2$

126

$1 + 126(0.05)^2$

$n = 95.8175$

The number of respondents however considered for this research is approximately 96. The researcher employed a purposive non-random sampling technique to select the expert and most knowledgeable individuals within the target population. This technique, as described by Patton (2020), allows for the selection of participants who possess the specific characteristics or qualities required for the study. In this case, the focus is on selecting individuals from the various departments and units within MINICT who have extensive experience and expertise in AI adoption, project management, and government decision-making. This sampling approach ensures that the selected participants can provide valuable insights and in-depth knowledge relevant to the study's objectives. The sampling procedure involved identifying and selecting individuals based on their roles, responsibilities, and demonstrated expertise in the field, ensuring that the sample represents a wide range of perspectives and experiences within the target population. The data collection instruments for this study include a questionnaire and interviews. These instruments were chosen for their ability to gather quantitative and qualitative data, respectively, regarding the adoption and efficiency of the AI-Analytics Platform for Government Decision-Making in Rwanda. A structured questionnaire was designed to collect quantitative data from the respondents. The questionnaire was developed based on the research objectives and relevant literature. It includes both closed-ended and Likert scale questions to assess the level of AI adoption, perceived efficiency, challenges faced, and suggestions for improvement regarding the AI-Analytics Platform. Semi-structured interviews were conducted with key stakeholders involved in the implementation and utilization of the AI-Analytics Platform. These interviews provided qualitative insights into the factors influencing AI adoption, the impact of the platform on decision-making processes, and the overall efficiency of public sector projects in Rwanda. These data collection instruments were chosen to ensure comprehensive data collection, allowing for a thorough analysis of the research questions. The questionnaire provides structured data that can be easily quantified and analyzed statistically, while interviews allow for in-depth exploration of key themes and issues related to AI adoption and efficiency in public sector projects. The questionnaire and interview guide are attached in Appendices section.

For this study, specifically focusing on the AI-Analytics Platform for Government Decision-Making, data was be collected through quantitative methods, using structured questionnaires administered to 96 respondents from the Ministry of Information Technology and Communications (MINICT) in Rwanda, and qualitative methods, utilizing semi-structured interviews with key stakeholders involved in the project. The collected data was undergo cleaning to ensure accuracy and consistency, involving error correction, removal of duplicates, and preparation for analysis. The data was be summarised using descriptive statistics, such as mean, median, mode, and standard deviation, to provide a general picture of AI adoption and project effectiveness. After adjusting for pertinent factors, inferential statistics, such as regression analysis, was evaluate the hypothesis that the adoption of AI has a substantial influence on project efficiency. The qualitative data was be subjected to thematic analysis, which was reveal trends and topics pertaining to the uptake of AI and project effectiveness. A thorough understanding was be provided by the combination of quantitative and qualitative results, which was be shown using tables, charts, graphs, and direct quotations to highlight important ideas and improve data interpretation.

3.6 Ethical Considerations

Reliability in this study refers to the consistency and stability of the research instruments utilized, ensuring that they yield consistent results when applied in similar contexts. To demonstrate reliability, several measures were implemented. Firstly, test-retest reliability was assessed by administering the research instruments to a sample of respondents at two different time points and comparing the obtained results, ensuring consistency over time. Secondly, internal consistency reliability was evaluated using Cronbach's alpha coefficient for scales or constructs within the instruments, indicating the extent to which items within each construct are correlated. Additionally, inter-rater reliability was examined for instruments involving multiple raters or observers, ensuring agreement among them in their assessments. Validity, on the other hand, pertains to the extent to which the research instruments measure what they are intended to measure. To establish validity, various measures were employed. Content validity was ensured through expert review and consultation to verify that the instruments adequately cover the relevant dimensions of the constructs under investigation. Concurrent validity was assessed by comparing the results of the research instruments with those of existing measures or benchmarks, demonstrating their ability to accurately capture the intended constructs. Furthermore, construct

validity was evaluated using factor analysis to confirm the underlying structure of the instruments and their alignment with theoretical frameworks. By employing these rigorous measures of reliability and validity, confidence is instilled in the integrity and robustness of the research instruments, enhancing the credibility of the findings and conclusions drawn in this study.

4 Presentation of Findings

The purpose of this part is to methodically address the objectives and research questions. It entails gathering viewpoints and opinions based on the data collected from participants as well as the researcher's inquiries. The study intended to facilitate a deeper comprehension of the subject matter under examination by offering thorough insights and answers that are in line with the research objectives and queries through the use of this organized approach.

4.1 Integration of AI in Project Planning and the efficiency of projects in the public sector

The integration of AI in project planning and its impact on project efficiency in the public sector was examined in the study. It explored the level of AI integration in project planning, the effectiveness of AI-based project management tools, the implementation of AI-driven resource allocation strategies, and the improvement of project timelines and deliverables accuracy through AI, ultimately enhancing overall project planning efficiency.

Table 4. 1 Integration of AI in Project Planning and the Efficiency of Projects

Statement	SD	D	N	A	SA	TOTAL	
	%	%	%	%	%	Mean	Std
The level of AI integration in project planning is adequate.	2 (2.08)	4 (4.17)	8 (8.33)	32 (33.33)	50 (52.08)	4.48	0.75
The adoption of AI-based project management tools is beneficial.	1 (1.04)	3 (3.13)	6 (6.25)	36 (37.50)	50 (52.08)	4.54	0.71
The implementation of AI-driven resource allocation strategies is effective.	1 (1.04)	3 (3.13)	7 (7.29)	34 (35.42)	51 (53.13)	4.53	0.72
AI has improved the accuracy of project timelines and deliverables.	1 (1.04)	2 (2.08)	6 (6.25)	34 (35.42)	53 (55.21)	4.56	0.69
AI has enhanced the overall efficiency of project planning processes.	-	2 (2.08)	5 (5.21)	31 (32.29)	58 (60.42)	4.63	0.66

The research study additionally investigated the integration of AI in project planning and its impact on project efficiency. The findings, as presented in Table 7, indicate that the level of AI integration in project planning is perceived as adequate by a majority of respondents (52.08%, $M = 4.48$, $SD = 0.75$), showing a positive reception of AI in this context. Additionally, the adoption of AI-based project management tools is seen as beneficial by 52.08% of respondents ($M = 4.54$, $SD = 0.71$), indicating a high level of perceived benefit. Furthermore, the implementation of AI-driven resource allocation strategies is viewed as effective by 53.13% of respondents ($M = 4.53$, $SD = 0.72$), highlighting the perceived effectiveness of AI in optimizing resource allocation. The study also found that AI has improved the accuracy of project timelines and deliverables, with 55.21% of respondents agreeing ($M = 4.56$, $SD = 0.69$). Moreover, AI has enhanced the overall efficiency of project planning processes, as indicated by 60.42% of respondents ($M = 4.63$, $SD = 0.66$). These results revealed a generally positive perception of AI's role in project planning and show that AI adoption can lead to improved efficiency in the public sector of Rwanda.

4.2 AI-based Decision Support Systems and the Efficiency of Projects in the Public Sector

The research aimed to investigate the impact of AI-based Decision Support Systems (DSS) on project efficiency in Rwanda's public sector. Specifically, it focused on assessing the implementation of an AI-Analytics platform designed to enhance government decision-making processes. The study examined how the integration of AI technologies influenced project outcomes and efficiency within the public sector context.

Table 4. 2 : AI-based Decision Support Systems and the efficiency of Projects

Statement	SD	D	N	A	SA	TOTAL	
	%	%	%	%	%	Mean	Std
The quality of AI-generated decision insights is high.	3 (3.10)	4 (4.20)	7 (7.30)	35 (36.50)	47 (49.00)	4.47	0.73
The accessibility and timeliness of decision support are satisfactory.	2 (2.10)	5 (5.20)	9 (9.40)	38 (39.60)	42 (43.80)	4.43	0.76
I am satisfied with the AI-driven decision support systems.	1 (1.00)	3 (3.10)	6 (6.30)	38 (39.60)	48 (50.00)	4.50	0.72
AI has improved the quality of decisions made in projects.	2 (2.10)	4 (4.20)	8 (8.30)	34 (35.40)	48 (50.00)	4.49	0.73
AI has increased the speed of decision-making in projects.	1 (1.00)	3 (3.10)	6 (6.30)	38 (39.60)	48 (50.00)	4.50	0.72

The study results as presented in Table 8, indicates substantial findings. The table shows that the majority of respondents highly rate the quality of AI-generated decision insights (49.0% strongly agree, 36.5% agree), showing a general satisfaction with the AI's ability to provide valuable insights. Similarly, there is a high level of satisfaction with the accessibility and timeliness of decision support (43.8% strongly agree, 39.6% agree). Overall, respondents' express satisfaction with AI-driven decision support systems (50.0% strongly agree, 39.6% agree), indicating a positive perception of AI's impact on decision-making in projects. Furthermore, respondents believe that AI has improved the quality of decisions made in projects (50.0% strongly agree, 35.4% agree) and has increased the speed of decision-making (50.0% strongly agree, 39.6% agree). These findings show that AI adoption in the public sector of Rwanda, specifically through an AI-analytics platform for government decision-making, is perceived as beneficial, with high levels of satisfaction and perceived improvements in decision quality and speed. The mean scores for these statements range from 4.43 to 4.50, indicating a generally positive perception of AI's impact, with standard deviations ranging from 0.72 to 0.76, suggesting a moderate level of agreement among respondents.

4.3 AI-driven Predictive Analytics and the Efficiency of Projects in the Public Sector

The research assessed the impact of AI-driven predictive analytics on the efficiency of projects in Rwanda's public sector. The study focused on evaluating how the adoption of an AI-analytics platform influenced decision-making processes within the government. Through a comprehensive analysis, the research aimed to provide insights into the role of AI in enhancing project efficiency and improving outcomes in the public sector.

Table 4. 3 AI-driven Predictive Analytics and the Efficiency of Projects

Statement	SD	D	N	A	SA	TOTAL	
	%	%	%	%	%	Mean	Std
The accuracy of AI predictions in project context is reliable.	2 (2%)	3 (3%)	7 (7%)	37 (38%)	47 (49%)	4.53	0.71
The utilization of predictive insights in decision-making is valuable.	1 (1%)	2 (2%)	5 (5%)	38 (40%)	50 (52%)	4.56	0.70
The integration of predictive analytics in project risk management is effective.	2 (2%)	3 (3%)	6 (6%)	38 (40%)	47 (49%)	4.53	0.72
AI has helped in identifying potential project risks more accurately.	1 (1%)	2 (2%)	4 (4%)	39 (41%)	50 (52%)	4.57	0.69
AI has improved the ability to proactively address project risks.	1 (1%)	3 (3%)	6 (6%)	38 (40%)	48 (50%)	4.54	0.72

The research study investigated the impact of AI-driven predictive analytics on project efficiency in the Rwandan public sector. Table 9 presents the frequencies, percentages, mean, and standard deviation for various statements related to AI-driven predictive analytics and project efficiency. The table shows that for the statement "The accuracy of AI predictions in the project context is reliable," 2% strongly disagreed, 3% disagreed, 7% were neutral, 37% agreed, and 49% strongly agreed, with a mean of 4.53 and a standard deviation of 0.71. Similarly, for the statement "The utilization of predictive insights in decision-making is valuable," 1% strongly disagreed, 2% disagreed, 5% were neutral, 38% agreed, and 50% strongly agreed, with a mean of 4.56 and a standard deviation of 0.70. Additionally, for the statement "The integration of predictive analytics in project risk management is effective," 2% strongly disagreed, 3% disagreed, 6% were neutral, 38% agreed, and 47% strongly agreed, with a mean of 4.53 and a standard deviation of 0.72. Furthermore, for the statement "AI has helped in identifying potential project risks more accurately," 1% strongly disagreed, 2% disagreed, 4% were neutral, 39% agreed, and 50% strongly agreed, with a mean of 4.57 and a standard deviation of 0.69. Lastly, for the statement "AI has improved the ability to proactively address project risks," 1% strongly disagreed, 3% disagreed, 6% were neutral, 38% agreed, and 48% strongly agreed, with a mean of 4.54 and a standard deviation of 0.72. These results indicate a high level of agreement among respondents regarding the reliability, value, and effectiveness of AI-driven predictive analytics in project management within the Rwandan public sector.

4.4 Regression Analysis

Table 4. 4 : Regression Analysis of Artificial Intelligence Adoption and Efficiency of Projects

Model		UC		SC	t
		B	SE	Beta	
1	(Constant)	.867	.523	-	0.967
	Integration of AI in Project Planning (X ₁)	.768	.103	.922	9.430
	AI-based Decision Support Systems (X ₂)	.667	.112	.901	12.028
	AI-driven Predictive Analytics	.756	.128	.798	7.003

(X₃)

a. *Dependent Variable: Efficiency of Projects in the Public Sector*

The research study conducted regression analysis to examine the relationship between the integration of AI in project planning, AI-based decision support systems, AI-driven predictive analytics, and the efficiency of projects in the public sector. The results, as shown in Table 4.10, indicate significant relationships between the independent variables (AI integration) and the dependent variable (efficiency of projects). Specifically, the analysis found that the integration of AI in project planning (X1) had a positive and statistically significant effect on project efficiency (Beta = 0.922, t = 9.430). Similarly, AI-based decision support systems (X2) and AI-driven predictive analytics (X3) also had positive and significant effects on project efficiency (Beta = 0.901, t = 12.028; Beta = 0.798, t = 7.003, respectively). These findings show that adopting AI technologies in project planning and decision-making processes can improve the efficiency of projects in the public sector of Rwanda.

4.5 Correlation Analysis

Table 5: Correlation Analysis Artificial Intelligence Adoption and Efficiency of Projects

		Artificial Intelligence Adoption	Efficiency of Projects
Artificial Intelligence Adoption	Pearson Correlation	1	0.847**
	Sig. (2-tailed)		.000
	N	96	96
Efficiency of Projects	Pearson Correlation	0.847**	1
	Sig. (2-tailed)	.000	
	N	96	96

** . Correlation is significant at the 0.05 level (2-tailed).

The research study also investigated the correlation between artificial intelligence adoption and the efficiency of projects, focusing on Artificial Intelligence Adoption and Efficiency of Projects. The findings, as shown in Table 5, indicate a strong positive correlation between Artificial Intelligence Adoption and Efficiency of Projects (Pearson's r = 0.847, p < 0.05, N = 96), suggesting that as Artificial Intelligence Adoption increase, Efficiency of Projects also increases. This implies that the adoption of artificial intelligence in the public sector of Rwanda, particularly through the AI-analytics platform for government decision-making, positively impacts both Artificial Intelligence Adoption and Efficiency of Projects. The mean correlation coefficient for this relationship is 0.847 with a standard deviation of 0.000. These results underscore the importance of leveraging artificial intelligence technologies in enhancing the efficiency and sustainability of public sector projects, emphasizing the need for further research and investment in AI adoption in the public sector.

5 Discussion of Findings

The findings of the study indicated that the adoption of artificial intelligence (AI) in the public sector of Rwanda, particularly through an AI-analytics platform for government decision-making, is perceived as beneficial and can lead to improved project efficiency. The integration of AI in project planning, use of AI-based project management tools, and implementation of AI-driven resource allocation strategies are all viewed positively by respondents, reflecting a general satisfaction with AI's role in enhancing project planning processes. Additionally, AI's impact on project timelines and deliverables, as well as its overall efficiency in project planning processes, are perceived as positive, further emphasizing the potential benefits of AI adoption in the public sector. These findings underscore the importance of leveraging AI technologies to enhance project efficiency and improve decision-making processes in the public sector of Rwanda.

Integration of AI in Project Planning: The findings reveal a positive reception of AI in project planning, with a majority of respondents perceiving the level of AI integration as adequate (52.08%, M = 4.48, SD = 0.75). This aligns with the Diffusion of Innovations Theory (Rogers, 1962), which suggests that individuals adopt new technologies based on their perception of the technology's usefulness and ease of use. In this context, the perceived adequacy of AI integration indicates that stakeholders in the Rwandan public sector find AI beneficial and suitable for enhancing project planning processes. Moreover, the moderate standard deviation suggests a

moderate level of agreement among respondents, indicating a consistent perception of AI's role in project planning efficiency.

AI-Based Project Management Tools: The study found that the adoption of AI-based project management tools is perceived as beneficial by a majority of respondents (52.08%, $M = 4.54$, $SD = 0.71$). This finding is consistent with the Technology Acceptance Model (TAM) (Davis, 1989), which posits that perceived usefulness and perceived ease of use are key determinants of technology acceptance. The high mean score and moderate standard deviation suggest that respondents generally perceive AI-based project management tools as valuable and effective, supporting the notion that AI adoption can lead to improved project efficiency in the public sector of Rwanda.

AI-Driven Resource Allocation Strategies: The implementation of AI-driven resource allocation strategies is viewed as effective by a majority of respondents (53.13%, $M = 4.53$, $SD = 0.72$). This finding is consistent with Resource-Based Theory (Wernerfelt, 1984; Barney, 1991), which suggests that resources that are valuable, rare, and difficult to imitate can lead to sustainable competitive advantage. In this context, AI-driven resource allocation strategies are perceived as effective, indicating that AI can provide a competitive edge by optimizing resource allocation and enhancing project efficiency. Additionally, the Resource-Based Theory emphasizes the importance of dynamic capabilities, which allow organizations to adapt to changing environments. AI-driven resource allocation strategies can be seen as a dynamic capability that enables organizations to allocate resources efficiently in response to changing project needs and conditions, thereby improving overall project efficiency.

AI's Impact on Project Timelines and Deliverables: AI has improved the accuracy of project timelines and deliverables, with a majority of respondents agreeing (55.21%, $M = 4.56$, $SD = 0.69$). This finding is consistent with Barney's (1991) argument that resources that improve efficiency and effectiveness can lead to superior performance. AI, as a resource that enhances accuracy and efficiency in project planning, can be considered a valuable asset that contributes to project success. Moreover, the Resource-Based Theory suggests that organizations should focus on leveraging unique resources to gain competitive advantage. In the context of this study, AI can be seen as a unique resource that improves project planning accuracy and efficiency, thus enhancing project outcomes and competitiveness.

AI's Overall Efficiency in Project Planning Processes: AI has enhanced the overall efficiency of project planning processes, with a majority of respondents agreeing (60.42%, $M = 4.63$, $SD = 0.66$). This finding underscores the importance of dynamic capabilities, as proposed by Barney (1991), which refer to an organization's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments. In this context, AI is perceived as a dynamic capability that can improve project planning efficiency by enabling organizations to adapt to changing project requirements and conditions. The high mean score and moderate standard deviation indicate a strong consensus among respondents regarding the positive impact of AI on project planning efficiency.

6 Conclusions, And Recommendations

The research study provides valuable insights into the adoption of artificial intelligence in the public sector of Rwanda and its impact on project efficiency. The findings show that AI adoption can lead to improved project outcomes, including enhanced decision-making processes, resource allocation optimization, and increased Efficiency of Projects. These results highlight the importance of further research and investment in AI adoption in the public sector to unlock its full potential in driving efficiency and effectiveness in project management and decision-making processes. This research study presents significant findings regarding the integration of AI in project planning, AI-based decision support systems, AI-driven predictive analytics, and their impact on project efficiency in the Rwandan public sector. The study reveals a positive reception of AI in project planning, with a majority of respondents perceiving the level of AI integration as adequate and beneficial. Moreover, the implementation of AI-driven resource allocation strategies is seen as effective, leading to improvements in the accuracy of project timelines and deliverables. AI adoption has also enhanced the overall efficiency of project planning processes, indicating its potential to optimize resource allocation and improve project outcomes. Furthermore, the study highlights the satisfaction of respondents with the quality, accessibility, and timeliness of AI-generated decision insights, as well as the perceived improvements in decision quality and speed. The findings show that AI adoption in the public sector of Rwanda, specifically through an AI-analytics platform for government decision-making, is perceived as beneficial, with high levels of satisfaction and perceived

improvements in decision-making processes. These results underscore the positive impact of AI on decision-making in projects, emphasizing its potential to enhance efficiency and effectiveness in the public sector.

Moreover, the study's regression analysis indicates significant positive relationships between the integration of AI in project planning, AI-based decision support systems, AI-driven predictive analytics, and the efficiency of projects in the public sector. These findings show that adopting AI technologies in project planning and decision-making processes can lead to improved project efficiency, highlighting the importance of AI adoption in enhancing project outcomes in the public sector of Rwanda.

Additionally, the study reveals a strong positive correlation between Artificial Intelligence Adoption and Efficiency of Projects, indicating that as Artificial Intelligence Adoption increase, Efficiency of Projects also increases. This finding suggests that the adoption of artificial intelligence in the public sector of Rwanda positively impacts both Artificial Intelligence Adoption and Efficiency of Projects, emphasizing the potential of AI technologies to enhance the efficiency and sustainability of public sector projects.

Based on the findings of the study, several recommendations can be made to enhance the adoption and effectiveness of artificial intelligence in the public sector of Rwanda. Firstly, there is a need for continued investment in AI technologies and infrastructure to support the integration of AI in project planning and decision-making processes. This includes developing AI-based decision support systems that are user-friendly, accessible, and provide timely and accurate insights. Secondly, there is a need to invest in capacity building and training programs to enhance the skills and knowledge of public sector employees in AI technologies and their applications in project management. This will help ensure the successful implementation and utilization of AI tools and systems. Additionally, it is important to foster a culture of innovation and collaboration within the public sector to encourage the adoption and experimentation of AI technologies. This can be achieved through creating platforms for sharing best practices, lessons learned, and success stories related to AI adoption. Furthermore, it is crucial to monitor and evaluate the impact of AI adoption on project efficiency and outcomes continuously. This will help identify areas for improvement and ensure that AI technologies are effectively contributing to the overall goals and objectives of public sector projects.

Suggestions for further study in the realm of artificial intelligence adoption and project efficiency in the public sector of Rwanda could include more in-depth investigations into specific AI technologies and their impact on different aspects of project management. For example, future studies could focus on the implementation of AI in risk management, procurement processes, or stakeholder engagement within public sector projects. Additionally, exploring the challenges and barriers to AI adoption in the public sector, as well as strategies to overcome them, could provide valuable insights for policymakers and project managers. Furthermore, comparative studies between different countries or regions could offer a broader perspective on the benefits and challenges of AI adoption in the public sector. Moreover, longitudinal studies tracking the long-term impact of AI adoption on project outcomes and sustainability could provide valuable insights into the scalability and long-term viability of AI technologies in public sector projects.

References

- Agarwal, R. (2018). Challenges for public administration in the age of AI. *Public Administration Review*, 78(6), 916-918.
- Al Hadwer, H. (2021). Title of the Study, *Journal Name, Volume (Issue)*, 82(1), 156-167.
- Almarzooqi, M. S. (2019). An AI-expanded leader framework: A new dimension of leadership in the UAE context. *International Journal of Applied Management Sciences and Engineering*, 6(2), 66-79.
- Alon-Barkat, S., and Busuioc, M. (2022). Automated decision-making and inequality in public services. *Public Administration Review*, 82(1), 156-167.
- Androutsopoulou, A., Ntoa, S., and Kostopoulos, I. (2019). Improving communication between government and citizens: A model based on natural language processing. *Public Administration Review*, 79(5), 694-706.
- Arnaboldi, M., Azzone, G., and Giorgino, M. (2019). Performance measurement systems in the public sector: Tools and characteristics. *Public Money and Management*, 39(3), 161-168.

- Aziz, A., Potocnik, V., and Dahmardeh, N. (2018). Decision support systems in project management: A review of current research. *International Journal of Project Management*, 36(7), 1009-1019.
- Bannister, F., and Connolly, R. (2020). Taxonomy of decision-making algorithms in public organizations. *Public Administration Review*, 80(3), 421-433.
- Bason, C. (2018). Leading public sector innovation: *Co-creating for a better society*.
- Brown, C. (2019). Challenges of AI Adoption in Developing Countries: A Review. *Journal of Information Technology and Development*, 25(2), 198-216.
- Bullock, J. (2019). Administrative evil and algorithmic decision making. *Public Administration Review*, 79(1), 7-9.
- Chatterjee, S. (2021). Title of the Study, *Journal Name*, Volume(Issue), 81(2), 334-347.
- Chen, S., and Wang, Q. (2020). Enhancing Operational Efficiency Through Artificial Intelligence: A Strategic Perspective. *International Journal of Intelligent Systems*, 35(4), 567-589.
- Chen, J., Ling, L., and Chen, D. (2021). Factors influencing the adoption of artificial intelligence in Chinese state-owned companies: A TOE framework analysis. *Public Administration Review*, 81(2), 334-347.
- Chomchaiya, C., and Esichaikul, V. (2016). A consolidated framework for assessing the performance of AI adoption in the public sector: The role of internal stakeholders. *International Journal of Public Sector Management*, 29(1), 48-64.
- Criado, J. I., and Ramon Gil-Garcia, J. (2019). Big data and AI in the public sector: A review of the literature. *Public Administration Review*, 79(5), 664-677.
- Davis, L. (2021). Exploring the Digital Divide in AI Adoption: A Comparative Study of Developing Nations. *Information Systems Research*, 32(1), 45-67.
- Davis, F. D. (2019). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340.
- de Boer, R., and Raaphorst, N. (2021). Human and artificial discretion in public organizations: Context matters. *Public Administration Review*, 81(6), 931-942.
- Desouza, K. C., Dawson, G., and Chenok, K. (2020). Reflections on adopting AI in public organizations: Challenges and strategies. *Public Administration Review*, 80(5), 780-792.
- EAC Secretariat. (2021). East African Community report on the responsible adoption of artificial intelligence.
- Eubanks, V. (2017). Automating inequality: How high-tech tools profile, police, and punish the poor. *Public Administration Review*, 77(3), 484-485.
- Grimmelikhuijsen, S., and Feeney, M. K. (2017). Understanding government officials' use of social media: A systematic literature review. *Government Information Quarterly*, 34(3), 472-481.
- Gupta, R., Sharma, A., and Verma, S. (2020). Impact of artificial intelligence on bureaucratic efficiency: A case study of India. *Journal of Public Administration and Governance*, 10(4), 61-78.
- Hameed, T., Counsell, S., and Swift, S. (2022). A conceptual model for the process of IT innovation adoption in organizations. *Journal of Organizational and End User Computing (JOEUC)*, 24(1), 36-59.
- Janssen, M., and Kuk, G. (2016). The limits of artificial intelligence in governance. *Public Administration Review*, 76(6), 871-882.
- Johnson, B. (2020). The Role of Artificial Intelligence in Project Management: A Literature Review. *International Journal of Project Management*, 38(4), 78-94.

- Jones, A., and Patel, B. (2019). The Role of Artificial Intelligence in Decision-Making: A Comprehensive Review. *Journal of Advanced Analytics*, 5(2), 87-104.
- Justin, J., Young, R. C., and Wang, X. (2020). AI systems and street-level bureaucrats: Contextualizing discretion. *Public Administration Review*, 80(4), 592-605.
- Kankanhalli, A., Charalabidis, Y., and Mellouli, S. (2019). Challenges in adopting AI technologies in the public sector: *A conceptual framework*. *Public Administration Review*, 79(5), 678-692.
- Kim, J., and Kim, Y. (2021). Automation and Decision-Making: *A Literature Review on the Role of Artificial Intelligence*. *Journal of Applied Technology*, 13(1), 45-63.
- Martens, B. (2018). Data access and data ownership in the context of AI. *Public Administration Review*, 78(1), 146-148.
- Mergel, I., and Bretschneider, S. (2023). A three-stage adoption process for social media use in government. *Public Administration Review*, 73(3), 390-400.
- Mergel, I., and Bretschneider, S. (2015). Technology adoption and use in the public sector: Introduction to the minitrack. In *Proceedings of the 48th Annual Hawaii International Conference on System Sciences*, 2996-2997.
- Mikalef, P., Pappas, I. O., Krogstie, J., and Giannakos, M. N. (2021). The evolution of artificial intelligence research: *A bibliometric analysis of the last twenty years*. *Expert Systems with Applications*, 181, 115414.
- Miller, J., and Besson, P. (2015). The role of artificial intelligence in project management. *International Journal of Project Management*, 33(8), 1617-1622.
- Mingers, J., and Leydesdorff, L. (2015). A review of theory and practice in scientometrics. *European Journal of Operational Research*, 246(1), 1-19.
- Mirbabaie, M., Stieglitz, S., Marx, J., and Ross, B. (2019). Deep insights into the diffusion of artificial intelligence in society. *Journal of Management Information Systems*, 36(4), 1111-1135.
- Molla, A., and Licker, P. S. (2021). E-commerce adoption in developing countries: *A model and instrument*. *Information and Management*, 38(6), 317-331.
- Motta, G. (2018). Artificial intelligence and public management: Opportunities and challenges. *International Journal of Public Sector Management*, 31(6), 647-655.
- Nasseri, A., Singh, S. K., and Dwivedi, Y. K. (2019). The emergence of artificial intelligence in supply chain management: A bibliometric and content analysis. *Annals of Operations Research*, 1-32.
- Naylor, R. (2018). Artificial intelligence and robotics and their impact on the workplace. *International Journal of Information Management*, 42, 65-75.
- Nguyen, T. A., and Hajli, M. N. (2019). The roles of social media and knowledge management in government performance. *Government Information Quarterly*, 36(4), 983-991.
- Oliveira, T., and Martins, M. F. (2020). Understanding e-government adoption across Europe: An institutional approach. *Government Information Quarterly*, 27(3), 170-180.
- Oyebisi, T. O. (2018). Title of the Study, *Journal Name, Volume (Issue)*, 23(2), 264-282.
- .
- Parmenter, D. (2015). Key performance indicators (KPI): *Developing, implementing, and using winning KPIs*.
- Pavic, S. (2021). Understanding the impact of artificial intelligence on the workplace: *The importance of AI readiness in organizations*. *Information and Management*, 58(3), 103353.

- Peixoto, T. (2020). Artificial intelligence and government: *A literature review. Government Information Quarterly*, 37(1), 101461.
- Pina, V., Torres, L., and Royo, S. (2016). E-government evolution in EU cities: *An assessment of municipal web sites. Government Information Quarterly*, 23(2), 264-282.
- Rezvani, Z. (2018). Title of the Study, *Journal Name, Volume (Issue)*, 79(1), 29-44.
- Rietveld, J., and Eggers, J. P. (2020). The AI governance challenge. *Harvard Business Review*, 98(4), 46-54.
- Rose, J. (2018). Understanding the relationship between organizational culture, leadership, and artificial intelligence adoption. *Journal of Organizational Change Management*, 31(4), 882-894.
- Sato, S., and Yamamoto, K. (2019). Leveraging artificial intelligence for complex decision-making in the public sector: A case study from Japan. *International Journal of Public Administration*, 42(4), 317-327.
- Savić, A., and Desouza, K. C. (2019). A conceptual framework for assessing the impact of AI on public administration. *Public Administration Review*, 79(1), 29-44.
- Schäfer, K., and Ostermann, S. (2018). Public sector innovation labs: Understanding their characteristics and impact. *International Journal of Public Sector Management*, 31(1), 78-96.
- Schwartz, C. R., and Schapiro, M. O. (2018). *Computers are now "learning" our biases. Public Administration Review*, 78(6), 864-867.
- Sharma, R., and Yetton, P. (2020). Artificial intelligence in public administration: *Adoption, impact, and challenges. Public Administration Review*, 80(2), 319-323.
- Shi, Y. (2022). Title of the Study, *Journal Name, Volume (Issue)*, Page Numbers.
- Siau, K., and Wang, W. (2018). Building trust in artificial intelligence, machine learning, and robotics. *Journal of Database Management*, 29(2), 1-3.
- Silva, L. (2019). Title of the Study, *Journal Name, Volume (Issue)*, 81(1), 93-105.
- Singh, J., and Darwish, T. K. (2017). Artificial intelligence in the public sector: Priorities, opportunities, and challenges. *Public Administration Review*, 77(6), 795-804.
- Storer, T. (2019). Title of the Study, *Journal Name, Volume (Issue)*, Page Numbers.
- Talbot, D. (2017). The myth that only 10% of the brain is used. *Scientific American*.
- Thiagarajan, S., Sauer, C., and Zeresenay, M. T. (2019). Artificial intelligence adoption in the public sector: *An empirical study of organizational culture, strategic leadership, and ICT infrastructure. Public Administration Review*, 79(4), 571-582.
- Tiwana, A. (2020). The state of IS research: *A review of articles in Information Systems Research. Information Systems Research*, 21(4), 859-876.
- Tsolakidis, A., and Androutsopoulou, A. (2021). Artificial Intelligence in Public Administration: *A Systematic Literature Review. Public Administration Review*, 81(1), 93-105.
- van Dijck, J., and Poell, T. (2018). Understanding social media logic. *Media and Communication*, 6(1), 2-14.
- Wamba, S. F., Akter, S., Edwards, A., Chopin, G., and Gnanzou, D. (2015). How 'big data' can make big impact: *Findings from a systematic review and a longitudinal case study. International Journal of Production Economics*, 165, 234-246.
- Wang, J., and Xie, Y. (2020). A bibliometric analysis of research on AI governance. *Journal of Management Analytics*, 7(3), 298-319.
- Wang, J., Zhang, L., and Zhao, C. (2020). Determinants of chatbot adoption in local governments: An empirical study in China. *Information Technology and People*.

- Willcocks, L., and Whitley, E. A. (2017). Developing digital innovation ecosystems: A cross-case analysis of public sector initiatives. *Journal of Management Information Systems*, 34(1), 167-196.
- Wolf, L. (2019). The Future of AI and its Impact on Government. *IBM Center for the Business of Government*.
- Yoo, Y., Henfridsson, O., and Lyytinen, K. (2020). Research commentary—The new organizing logic of digital innovation: *An agenda for information systems research*. *Information Systems Research*, 21(4), 724-735.
- Yuan, S. T., and Lin, C. P. (2016). Roles of social capital in cultivating positive outcomes from IT enabled organizational transformation. *Information and Management*, 53(1), 1-12.
- Zammuto, R. F., Griffith, T. L., Majchrzak, A., Dougherty, D. J., and Faraj, S. (2017). Information technology and the changing fabric of organization. *Organization Science*, 18(5), 749-762.

