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Analyzing Artificial Intelligence (AI) Technology Integration in Project Management: A Case Study of ZESCO Operations in Lusaka

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Abstract

This study investigates the integration of Artificial Intelligence (AI) in project management within ZESCO operations in Lusaka. The study was informed by the following objective the current level of AI adoption, potential benefits, the role of AI in quality control, and barriers to AI integration. Using a mixed-methods approach, data was collected from a sample of 60 participants, including project managers, engineers, technical experts, and senior management. Structured questionnaires were administered to 50 participants to gather quantitative data, and 10 semi-structured interviews provided qualitative insights into strategic implementation, challenges, and AI benefits. Statistical analysis, including descriptive and inferential statistics via SPSS, was employed to interpret quantitative data, while thematic analysis examined qualitative responses. Triangulation strengthened the study's validity by integrating data from multiple sources and methods. Results indicate that 64% of respondents indicated very low integration of AI in project management at ZESCO, while 26% report low integration. Notably, 80% of employees have not attended AI training in the last two

years, leading to limited familiarity with predictive analytics, natural language processing, and machine learning. Key AI benefits identified include productivity gains (36%) and decision-making improvements (24%), although 52% perceive AI's effectiveness as neutral. Predictive analytics and automated testing are highlighted for enhancing quality control, with a positive correlation (coefficient 0.558) between performance tracking and AI integration. However, significant barriers remain, including resistance to change (32%), high implementation costs (38%), and limited scalability (36%). The study recommends that the government facilitate AI training programs, policymakers establish supportive regulatory frameworks, ZESCO prioritize scalable AI infrastructure, and organizational leaders implement change management strategies to address resistance. These steps would collectively enhance AI adoption, optimize project management, and position ZESCO for greater productivity and efficiency. Limitations include potential response bias and limited generalizability beyond the Lusaka operations.

Keywords: Artificial Intelligence, Integration, Project Performance, ZESCO, Project Management, Predictive Analytics, Benefits, Barriers, Cost Savings, Risk Management, Efficiency

1. Introduction

1.1 Background

The integration of Artificial Intelligence (AI) into various industries has in recent years transformed traditional business operations, including project management (Holzmann *et al.*, 2022) [14]. Its integration in project management has gained significant attention due to its potential to enhance efficiency, decision-making, and overall project success (Soomro *et al.*, 2019 [25]; Musa *et al.*, 2020). AI technologies encompass a range of tools and techniques, including machine learning, natural language processing, predictive analytics, and robotics. These technologies are increasingly being utilized to automate routine tasks, analyze complex data sets, and optimize resource allocation within project management.

A Project is "a temporary endeavor designed to produce a unique product, service or result with a defined beginning and end,

undertaken to meet unique goals and objectives". "Project management is the application of knowledge, skills, tools, and techniques to a broad range of activities in order to meet the requirements of a particular project" (Project Management Institute, 2000, 4) [21].

Artificial Intelligence (AI) is according to Russel, *et al* (2020), referred to the simulation of human intelligence in machines that are programmed to think and act like humans. This includes tasks such as learning, problem-solving, and decision-making.

Smith (2019), indicates that the impact of AI on project management primarily revolves around automating repetitive tasks such as scheduling, budget tracking, and risk analysis. Globally, organizations are leveraging AI to automate repetitive tasks, optimize resource allocation, and improve overall project outcomes. AI enables project managers to make data-driven decisions by analyzing large datasets and predicting outcomes (Anantrasirichai & Bull, 2021) [1].

In Zambia, the potential of AI to revolutionize project management is gradually being recognized. The government has demonstrated commitment by drafting the National Artificial Intelligence Strategy, aimed at promoting AI integration across sectors (Ministry of Technology and Science, 2024) [19]. Private sector initiatives, such as AI-powered customer engagement systems, also reflect a growing interest in leveraging AI for operational efficiency (BongoHive, 2023) [3].

ZESCO Limited, Zambia's state-owned electricity company, is actively integrating artificial intelligence (AI) and advanced technologies to modernize its operations and improve efficiency (The Turbine, 2023). A notable example is ZESCO's collaboration with Reliance Datatech to leverage Microsoft's cloud computing services. This partnership aims to establish a secure, scalable, and agile infrastructure for the utility. Central to this initiative is the implementation of Microsoft Sentinel, a cloud-based Security Information and Event Management (SIEM) solution (Reliance Datatech, 2024) [23].

Microsoft Sentinel provides a comprehensive view of security through AI-driven threat detection and response, streamlining processes by eliminating the need for traditional security infrastructure setup and maintenance. This approach not only strengthens cybersecurity measures but also achieves significant cost savings, with reductions of up to 48% compared to conventional SIEM solutions. These advancements underscore ZESCO's commitment to embracing AI and advanced technologies to enhance service delivery and operational resilience (Reliance Datatech, 2024) [23].

1.2 Statement of the Problem

The integration of Artificial Intelligence (AI) into project management has been widely recognized globally for its ability to enhance efficiency, decision-making, and resource optimization (Project Management Institute, 2023) [22]. However, in Zambia, particularly within ZESCO (Zambia Electricity Supply Corporation), the adoption of AI in project management remains in its infancy. This is compounded by challenges such as insufficient infrastructure, limited access to training, lack of expertise, high implementation costs, and inadequate regulatory frameworks (Ministry of Technology and Science, 2024; BongoHive, 2023) [19, 3]. Despite the acknowledged potential

benefits of AI in improving project management processes, including automation of routine tasks and enhanced quality control, the actual state of AI adoption and utilization in ZESCO's project management landscape remains unclear. This gap raises critical concerns about whether ZESCO's project management processes are positioned to leverage AI for better outcomes. Furthermore, the barriers to AI integration may undermine efforts to achieve efficiency, productivity, and competitiveness in project management. The lack of comprehensive studies and statistics on the current state, benefits, and barriers of AI in this domain calls for an in-depth investigation to inform policy and strategic interventions.

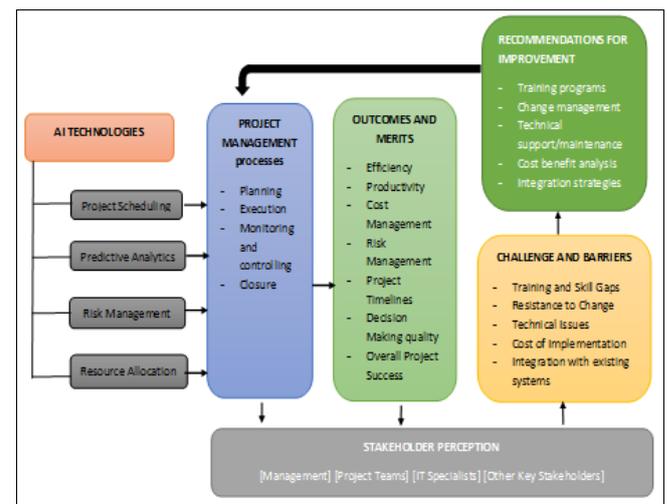
1.3 Objectives

The aim of this study was to analyze the integration of Artificial Intelligence (AI) in Project management, A case study of ZESCO operations in Lusaka. Specific objectives for this study include the following: To examine current state integration AI technology in project management processes of ZESCO operations in Lusaka, To analyze the potential benefits of AI integration into project management processes, To determine the role of AI in enhancing quality control in project performance, To determine Barriers to AI Adoption in project management processes.

1.4 Research questions

1. What is the current state of AI technology integration in the project management processes of ZESCO operations in Lusaka?
2. What potential benefits can be realized from integrating AI into the project management processes?
3. In what ways has AI contributed to quality control in the project?
4. What are some of the potential barriers to AI integration in project management processes?

1.5 Conceptual framework



Source: Researcher (2024)

Fig 1.1: Conceptual framework

Artificial intelligence (AI) tools and technologies feed into the Project Management Processes, influencing how planning, execution, monitoring, and closing are conducted. These processes affect various Outcomes and Metrics, which are used to measure the impact of AI in terms of

efficiency, productivity, cost management, risk management, project timelines, and decision-making quality. Stakeholder Perceptions play a crucial role in the acceptance and effective utilization of AI tools, affecting both the processes and the outcomes. Various Challenges and Barriers may arise, such as skill gaps, resistance to change, technical issues, high costs, and integration difficulties. By visualizing these components and their interconnections, the conceptual framework helps in understanding the comprehensive impact of AI in project management at ZESCO Limited and guides targeted interventions for improvement.

2. Literature Review

The integration of Artificial Intelligence (AI) technology in project management has gained significant attention in recent years (Holzmann *et al.*, 2022) ^[14]. Studies have shown that AI adoption in project management has improved project efficiency, reduced costs, and enhanced decision-making (Soomro *et al.*, 2019 ^[25]; Musa *et al.*, 2020). However, Hassan *et al.* (2019) ^[12] identified the primary challenges to AI adoption in project management in Malaysia as lack of expertise, data quality issues, and resistance to change.

Another study by Nguyen *et al.* (2023) ^[20] found that AI adoption in project management improved project efficiency by 25% and reduced costs by 15% in the French aerospace industry.

AI technologies such as machine learning, natural language processing (NLP), and predictive analytics are being increasingly applied in project management to automate routine tasks, optimize resource allocation, and improve risk assessment. Machine learning, a subset of AI, involves algorithms that learn from data to make predictions or decisions (Higgins *et al.*, 2023) ^[13].

The adoption of AI in project management varies globally due to differences in technological infrastructure, economic conditions, and cultural factors. Developed countries, with advanced technological infrastructures, are leading in AI adoption. In the United States, AI is gaining traction in the construction industry (Buchholz, 2020) ^[7]. AI-powered software optimizes project planning, improves resource allocation, and enhances risk management. Additionally, AI algorithms are employed to analyse building performance data and optimize energy consumption, aligning with the region's focus on sustainability.

In contrast, developing countries face challenges such as limited access to advanced technologies and lack of skilled workforce. However, initiatives to bridge the digital divide and enhance AI capabilities are underway. For example, India is investing in AI education and infrastructure to boost its AI-driven project management capabilities (Li *et al.*, 2021).

In Africa, several trends and developments are also noteworthy. Machine learning (ML) is being increasingly adopted in African project management for its predictive capabilities. ML algorithms analyze historical project data to forecast project timelines, budgets, and resource needs (Kanyilmaz *et al.*, 2022) ^[16]. The integration of Artificial Intelligence (AI) technology in project management has gained significant attention in Nigeria in recent years. Studies have shown that AI adoption in project management has improved project efficiency, reduced costs, and

enhanced decision-making (Ogunsanya *et al.*, 2020; Adenuga *et al.*, 2019).

Despite the potential benefits, the adoption of AI in project management across Africa faces several challenges. Many African countries lack the advanced technological infrastructure necessary to support sophisticated AI applications. This limitation hinders the widespread adoption of AI technologies in project management (Marnewick, 2020) ^[18]. There is also a shortage of professionals with the skills required to develop, implement, and manage AI technologies. This skill gap is a significant barrier to the adoption of AI in project management (Adeoye & Elegbede, 2022) ^[2].

Likewise, Zambia currently has not developed any legislation to directly address the risk of the use and deployment of AI. However, legislation such as the Data Protection Act 2021 has been established to provide an effective system for the use and protection of personal data, to regulate use transmission, storage and otherwise processing of data. In addition, through the Ministry of Science and Technology, an announcement of the eminent release of an AI strategy was made (KPMG, 2024).

According to a report by the Zambia Information and Communications Technology Authority (ZICTA), (2021), the Zambian government has initiated several initiatives to promote AI adoption in various sectors, including project management. The report highlighted the need for capacity building and infrastructure development to support AI adoption.

The risks and ethical challenges associated with the development and application of artificial intelligence (AI) are significant. Nevertheless, individuals, organizations, and governments share a collective responsibility to ensure the ethical implications of AI usage are considered. AI deployment in Zambia remains in its early stages. It is therefore crucial for organizations to accompany AI implementation with appropriate mitigation strategies. Establishing an AI ethics and governance committee within an organization's structure is essential. Such a committee would primarily focus on conducting ethical impact assessments related to the use of AI technologies within the organization (KPMG, 2024). Additionally, it would monitor compliance with both local and international regulatory frameworks and oversee the ongoing implementation and usage of AI technologies. Furthermore, a landmark discovery using artificial intelligence (AI) has ignited a surge in exploration activity, while government reforms aim to unlock the country's vast mineral potential.

3. Research Methodology

3.1 Research Design/Method/Approach

The research design for this study was a mixed-methods approach, combining both qualitative and quantitative methods. This study adopted a pragmatist research paradigm, which focused on practical approaches to research problems and combined multiple methods to understand complex phenomena (Tashakkori & Teddlie, 2010) ^[26].

The target population for this study included project teams in transmission, operations within ZESCO operations. Respondent were drawn from two ZESCO offices in Lusaka, Malaiti House and Headquarters. A purposive and simple random sampling techniques was used to select

participants for both the quantitative and qualitative components of the study (Braun & Clarke, 2006) [4].

A purposive sampling technique was used to select participants for both the quantitative and qualitative components of the study. Purposive sampling ensured that only individuals with relevant experience and knowledge of AI and project management at ZESCO were included, which enhanced the validity of the findings (Etikan, Musa & Alkassim, 2016) [11].

The sample size was determined based on the principles of saturation for qualitative interviews and statistical power calculations for surveys (Bryman and Bell, 2019) [5]. A total sample size employed for this study was 60 respondents. Structured questionnaires were distributed to 50 selected participants to gather quantitative data. 10 Semi-structured interviews. Statistical analysis was done using SPSS (Statistical Package for the Social Sciences). Thematic analysis for qualitative data was used and Informed consent was obtained from all those who participated in the study (Braun & Clarke, 2006) [4].

Concurrent triangulation was employed to enhance the validity and reliability of the study findings by integrating data from multiple sources and methods. Qualitative and quantitative data was triangulated to corroborate findings and provide a comprehensive understanding of the research topic (Braun & Clarke, 2006) [4].

Ethical considerations are paramount in this study. Informed consent is obtained from all participants, ensuring they are aware of the study's purpose and their rights as participants (Israel & Hay, 2006) [15].

Confidentiality and anonymity are maintained to protect participants' identities and the integrity of the data. The study adheres to ethical guidelines set by relevant institutional review boards (Israel & Hay, 2006) [15].

4. Results/Findings

4.1 Presentation of research Findings

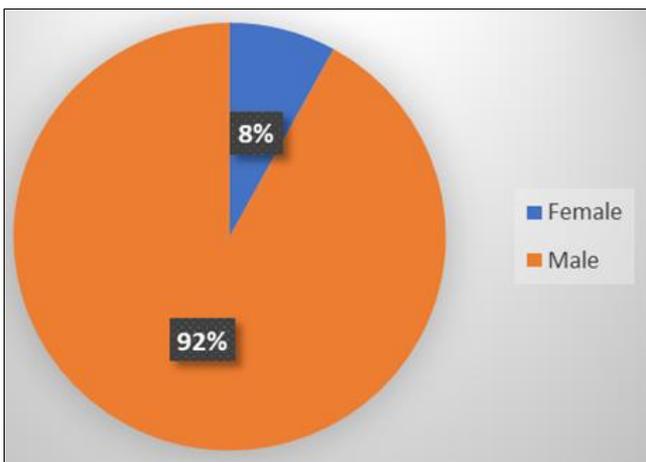


Fig 4.1: Gender of the Respondent

The study requested the participant to indicate their gender. The result in figure 4.1.1 show that 92% of the respondents representing the majority in the study were male while only 8% of the respondent which were the minority were female.

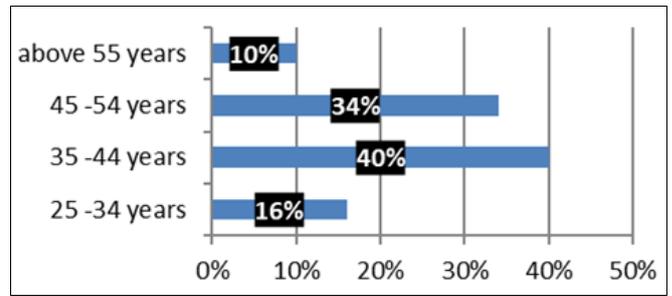


Fig 4.2: Age of respondents

Figure 4.1.2 showed that the majority of the respondents representing 40% were in the age range of 35 to 44 years, 34% of the respondent in the age range of 45 to 54 years, 16% of the respondent were in the age range of 25 to 34 years and 10% of the respondent representing the minority were above 55 years.

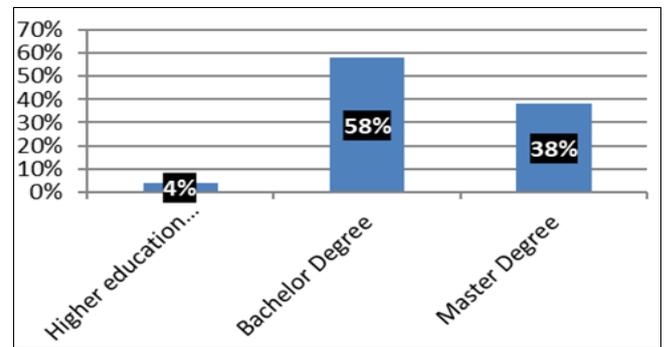


Fig 4.3: Highest Level of Education

The results presented in figure 4.1.4 show that 58% of the respondent represented the majority were bachelor's degree hold, 38% of the respondent were master's degree holder while 4% of the respondent had higher education diploma/certificate level qualifications.

Table 4.1: Current Role in ZESCO Operations

Current role	Percent (%)
Project Manager	16
Engineer	80
Other	4
Total	100

The results in Table 4.1 show that 80% of the respondent were engineers representing the majority, 16% of the respondent were project manager and only 4% of the respondent representing the minority indicated the other category.

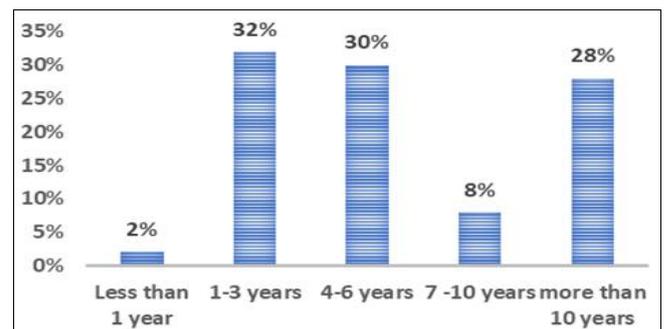


Fig 4.4: Years of Experience in PM

The results in Figure 4.4 show that 32% of the respondents presented the majority that had 1 to 3 years' experience in project management, 30% of the respondent had 4 to 6 years' experience, 28% of the respondent had more than 10 years, 8% of the respondent had 7 to 10 years and only 2% of the respondent which were the minority had less than 1-year experience in project management.

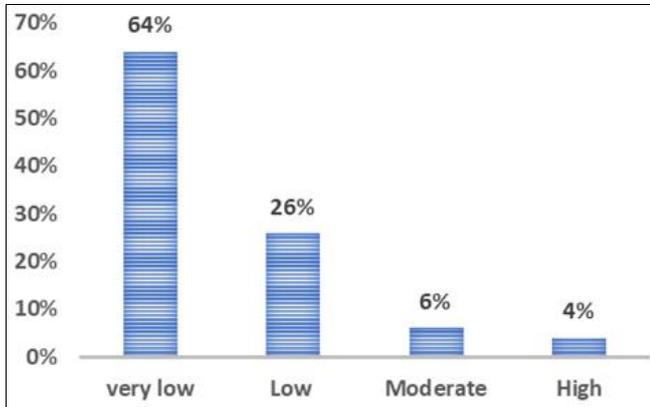


Fig 4.5: Level of AI integration in PM within ZESCO operations

The results in Figure 4.5 show that the majority of the respondents, 64% perceived AI integration within ZESCO operations as very low. This indicates that AI is not widely implemented or utilized within the organization. 26% of respondents saw AI integration as low, suggesting that while some aspects of AI may be present, they are still limited in scope and impact. 6% believed that AI was moderately integrated, implying that a small portion perceived AI as somewhat involved in ZESCO operations. Only 4%, believed there is a high level of AI integration, indicating that a minority see AI as playing a significant role.

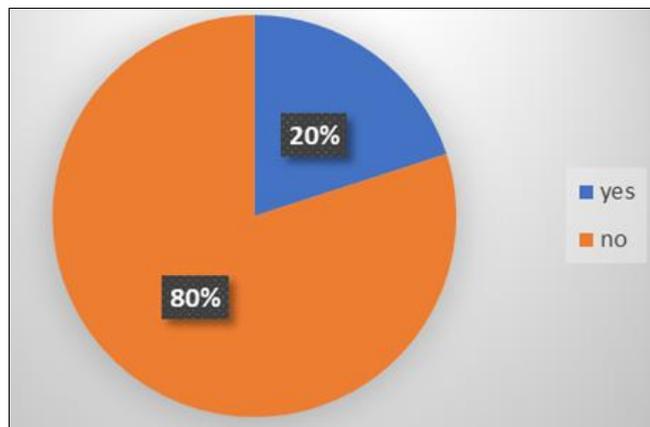


Fig 4.6: Any AI or Digital Technology Training attended in the last two years

The study requested the respondents to indicate if they had attended any AI or digital technology training in the last two years. The results in Figure 4.6 show that the majority of the respondents (80%) had not attended any training in AI or digital technology in the last two years while 20% of the respondents indicated that they had attendant some training in AI/digital technology in the last two years.

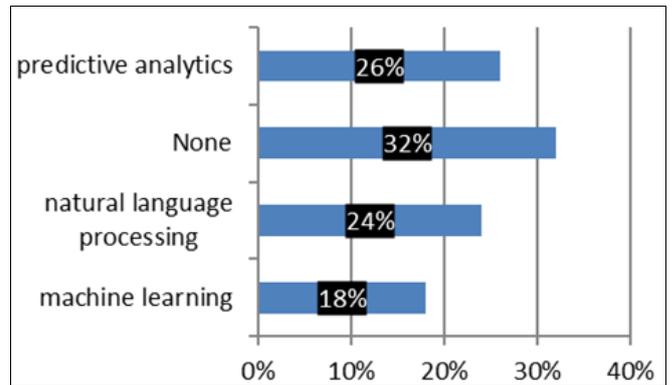


Fig 4.7: Most commonly used AI technology in ZESCO's PM processes

The study requested respondent to indicate the AI technology that was most commonly used in ZESCO's project management. The highest percentage (32%) of respondents indicated None usage of AI technology, 26% of the respondents indicated predictive analytics as the most commonly used AI technology, 24% of the respondents indicated natural language processing and the lowest percentage (18%) of the respondents indicated machine learning as the most commonly used AI technology.

Table 4.2: Effectiveness of AI Technology in improving Project Management processes

Effectiveness of AI	Percent (%)
Ineffective	8
Neutral	52
Effective	28
Very effective	12
Total	100

The results in Table 4.2 show that the majority (52%) of the respondent were neutral on the effectiveness of AI in improving Project Management, 28% of the respondents indicated that AI is effective in this regard, 12% of the respondents indicated very effective while 8% of the respondents perceived AI to be ineffective in improving project management processes.

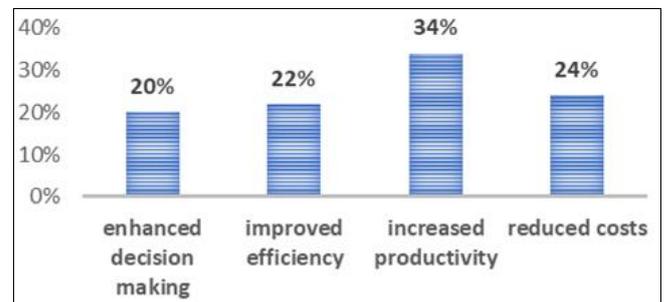


Fig 4.8: Primary benefit of AI integration in ZESCO's PM processes

The results in Figure 4.8 show that 34% of respondents indicated increased productivity as a primary benefit of AI integration in project management processes, 24% of the respondents indicated reduced costs, 22% of the respondents

indicated improve efficiency and 20% of the respondents indicated enhanced decision making as a primary benefit.

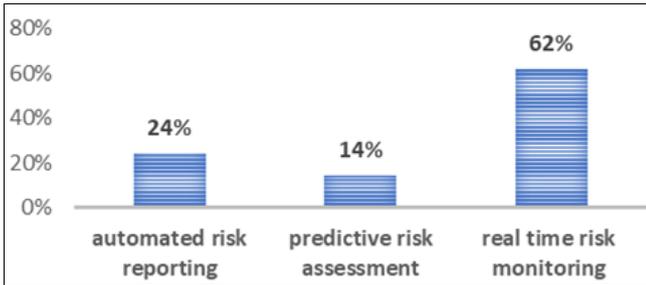


Fig 4.9: Potential benefit of AI integration in risk management

The results in Figure 4.9 show that the majority of respondents comprising 62% indicated real time risk monitoring as a potential benefit of AI integration in risk management, 24% of the respondents indicated automated risk reporting and only 14% comprising the minority of the respondent indicated predictive risk assessment as a potential benefit.

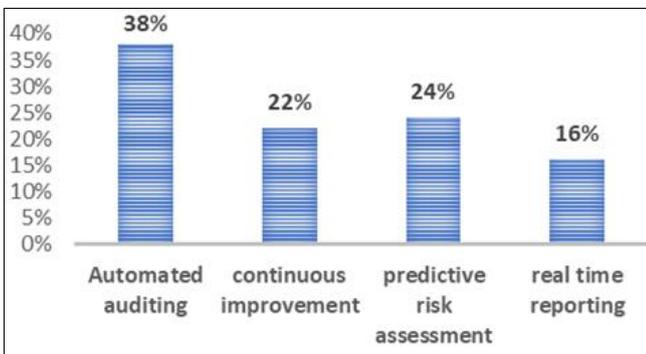


Fig 4.10: How can AI improve quality assurance in project management?

The results in Figure 4.10 show that 38% of the majority respondents indicated automated auditing, 24% of the respondent indicated predictive risk assessment, 22% of the respondent indicated continuous improvement and 16% of the respondents indicated real time reporting.

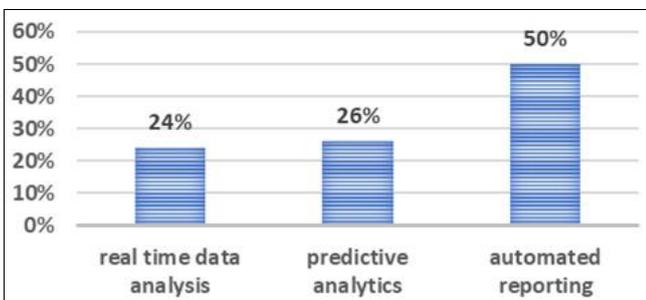


Fig 4.11: How can AI integration improve decision-making in management?

The study requested respondent to indicate how AI integration can improve decision-making in management. Figure 4.11 show that the majority (50%) of the respondents indicated automated reporting can improve decision making in management, 26% of the respondent indicated predictive analytics and 24% of the respondent indicated real time data analysis.

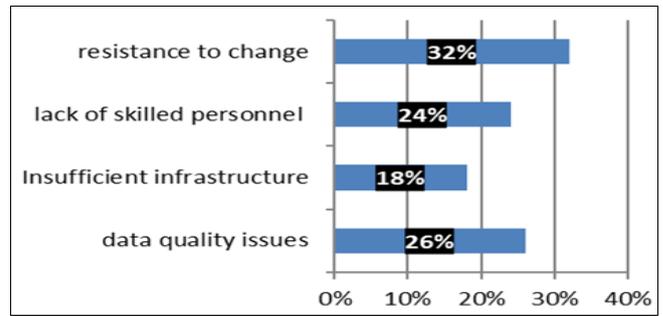


Fig 4.12: Primary barrier to AI adoption in project management

The results in Figure 4.12 indicate that 32% of the majority respondents indicated resistance to change, 26% of the respondent indicated data quality issues, 24% of the respondents indicated lack of skilled personnel and 18% of the respondents indicated insufficient infrastructure.

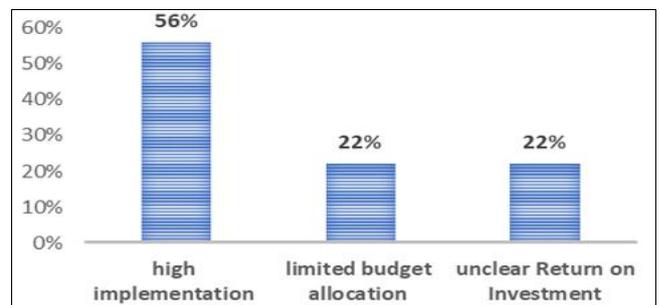


Fig 4.13: Financial barrier to AI adoption

The result in Figure 4.13 show that 56% of the respondents which were the majority indicated high implementation costs, 22% of the respondents indicated limited budget allocation and another 22% of the respondents indicated unclear or delayed return on investment which makes most organizations hesitant to commit to AI projects.

Table 4.3: Significant Technological Barrier to AI adoption

Significant technological barrier	Percent (%)
Data security concerns	46
Integration with existing systems	18
Limited scalability	36
Total	100

The study requested respondents to indicate significant technological barrier to AI adoption. 46% of the majority respondents indicated limited scalability, 24% of the respondents indicated data security concerns and 18% of the respondents indicated integration with existing system.

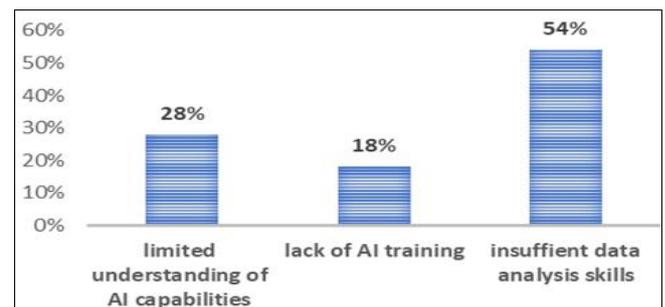


Fig 4.14: knowledge-related barrier to AI adoption

The results in Figure 4.14 show that 54% of the majority respondents indicated insufficient data analysis skills, 28% of the respondent indicated limited understanding of AI capabilities, 24% of the respondents indicated all of the above and 18% of the respondent indicated lack of AI training.

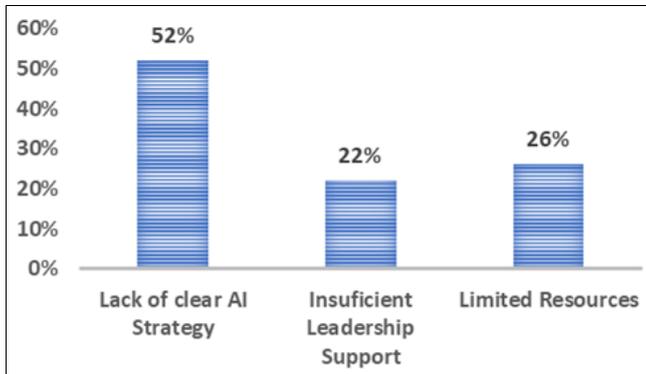


Fig 4.15: Organizational barrier to AI adoption

The study requested respondents to indicate organizational barrier to AI adoption. Figure 4.16 show that 52% of the majority respondents indicated lack of clear AI strategy, 26% of the respondent indicated limited resources and 22% of the respondents indicated insufficient leadership support.

Table 4.4: Model Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig
	B	Std	Beta		
(Constant)	-.453	.754		-.601	.551
Any improvement in Project Planning accuracy due to AI	-.175	.247	-.154	-.710	.481
Any Impact of AI on resource allocation efficiency	.272	.180	.329	1.510	.138
Accuracy of Performance Tracking Through AI	.558	.255	.322	2.185	.034

a. Dependent Variable: integration of Artificial Intelligence (AI)

The constant (intercept) is -0.453, with a standard error of 0.754. This value represents the baseline level of AI integration when all independent variables are zero. However, this result is not statistically significant (p = 0.551), as indicated by the significance level, meaning it does not add meaningful information by itself.

This factor has an unstandardized coefficient of -0.175, meaning that for each unit increase in project planning accuracy, the integration of AI would theoretically decrease by 0.175 units. The effect size is small and the p-value (0.481) indicates that this effect is not statistically significant. The standardized coefficient (Beta) of -0.154 suggests a weak negative relationship in this sample.

This factor has an unstandardized coefficient of 0.272, suggesting a positive but statistically non-significant (p = 0.138) relationship with AI integration. The standardized coefficient (Beta) of 0.329 indicates that this factor might have a relatively larger impact compared to others, though this effect lacks statistical support.

This variable has an unstandardized coefficient of 0.558, which is statistically significant (p = 0.034), implying a strong positive relationship with AI integration. For every unit increase in performance tracking accuracy due to AI, there is an associated increase of 0.558 units in the integration of AI. The standardized coefficient (Beta) of 0.322 suggests this is one of the most impactful factors in the model. Overall, only the accuracy of performance tracking through AI has a statistically significant effect on the integration of AI, while the other factors are not significant at conventional levels.

4.2 Discussion of findings

The findings on AI integration in ZESCO's project management processes reveal insights that highlight both the progress and limitations in the company's adoption of digital technologies. With only 6% of respondents indicating moderate, 4% respondents indicated high while 64% rating AI as very low, it's evident that ZESCO's AI incorporation in project management is developing but far from complete. This aligns with broader trends in AI adoption across industries, particularly in sectors and regions where infrastructure and resources for advanced technologies may still be evolving. For ZESCO, a significant 26% of respondents rated AI integration as low.

This finding is consistent with research by Bughin *et al.* (2017), which observed that, globally, many organizations in traditional industries struggle with implementing AI at scale. Reasons include infrastructure challenges, cost barriers, and a limited availability of trained personnel. ZESCO's pattern of adoption fits into a common model for AI in sectors where technological advancements are met with operational constraints. Here, AI tools may be piloted or used in isolated projects but are not yet a part of the overarching project management framework.

Training in AI and digital technology at ZESCO also presents a substantial barrier to integration, with 80% of respondents reporting that they had not attended AI-related training within the last two years. This finding aligns closely with multiple studies that identify lack of training as a critical bottleneck in AI adoption. For instance, according to Deloitte's Global Human Capital Trends report, the demand for upskilling in AI and digital competencies is often unmet, especially in organizations undergoing digital transformation without extensive support from technology experts (Deloitte, 2021)^[10]. In such cases, the lack of digital literacy hinders employees' ability to implement AI tools effectively, which can lead to resistance or inefficient use of AI technologies (Deloitte, 2021)^[10].

Empirical studies have similarly found that AI adoption in project management is directly influenced by the digital skill set available within an organization. For example, a study by Brynjolfsson *et al.* (2017) emphasized the "complementary" relationship between AI and human expertise. This implies that the most successful AI projects occur when employees are not only familiar with AI technologies but are also trained to adapt and troubleshoot these systems in real-world applications. Without training, as seen at ZESCO, AI tools may become underutilized or ineffective, as employees lack the confidence and technical know-how to leverage them fully.

In examining the barriers to AI adoption in project management, a recent study found that resistance to change

was the most significant primary barrier, with 32% of respondents selecting this as the primary challenge. This result aligns with existing empirical research, which highlights that organizational culture and resistance to new technology are major factors impeding AI adoption in many industries. For instance, a study by Jha *et al.* (2020) identified organizational resistance as one of the top factors hindering the adoption of emerging technologies in project management.

Resistance to change often stems from the fear of job displacement, skepticism about AI's effectiveness, or the perceived complexity of integrating new systems into existing workflows. In the context of project management, employees may be hesitant to trust AI-based tools for decision-making, fearing that these systems could undermine their roles or reduce their autonomy.

Similarly, the issue of data quality, indicated by 26% of respondents in the study, is another widely recognized barrier to AI adoption. AI systems rely heavily on large datasets to make accurate predictions and informed decisions. If these datasets are incomplete, biased, or inaccurate, the effectiveness of AI tools is severely compromised. This barrier was also highlighted by Chen *et al.* (2022) [8], who noted that the quality of input data directly affects the output of machine learning algorithms. Data quality issues are particularly prevalent in project management, where diverse and unstructured data, such as project plans, timelines, and performance metrics, are often scattered across different systems and formats. Without proper data cleaning and standardization, AI models may struggle to produce reliable results, further deterring organizations from fully embracing these technologies.

The first key knowledge-related barrier identified by the study was insufficient data analysis skills, which was selected by 30% of the respondents as a primary challenge. This finding resonates with the research of Chen *et al.* (2022) [8], who argue that effective data analysis skills are fundamental for implementing AI systems, as AI relies heavily on large volumes of data to generate accurate predictions and insights. Without the ability to interpret and analyze data effectively, organizations may struggle to fully leverage AI technology. According to a study by Brynjolfsson and McAfee (2017) [6], data analytics is central to AI's success in modern organizations, as it allows decision-makers to understand the patterns and correlations within data that drive AI models. The gap in data analysis skills can thus significantly hinder AI adoption, preventing organizations from unlocking the full potential of AI systems.

Another major knowledge-related barrier, identified by 28% of respondents, was limited understanding of AI capabilities. This reflects the broader concern that many organizations fail to grasp the full potential of AI and how it can be applied to their specific needs. The complexity of AI technologies often leads to misconceptions and underutilization. Empirical studies, such as those by Deloitte (2021) [10], emphasize the importance of building a foundational understanding of AI at the organizational level to foster successful adoption. The limited understanding of AI's capabilities can result in underinvestment, poor implementation strategies, and missed opportunities for innovation. Furthermore, lack of awareness and understanding can create resistance to adopting AI technologies, as leaders and employees might be hesitant to

trust or engage with systems that they perceive as too complex or unproven.

4.3 Conclusion

The integration of Artificial Intelligence (AI) into project management has been widely recognized globally for its ability to enhance efficiency, decision-making, and resource optimization. However, in Zambia, particularly within ZESCO (Zambia Electricity Supply Corporation), the adoption of AI in project management remains in its infancy. This is compounded by challenges such as insufficient infrastructure, limited access to training, lack of expertise, high implementation costs, and inadequate regulatory frameworks. Despite the acknowledged potential benefits of AI in improving project management processes, including automation of routine tasks and enhanced quality control, the results from this study reveal that the actual state of AI adoption and utilization in ZESCO's project management landscape remains low. This gap raises critical concerns about whether ZESCO's project management processes are positioned to leverage AI for better outcomes. Furthermore, the barriers to AI integration may undermine efforts to achieve efficiency, productivity, and competitiveness in project management. The findings on AI integration in ZESCO's project management processes reveal several insights into its current usage, perceived benefits, and barriers within the organization.

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