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Adoption Factors of Artificial Intelligence and the Performance of Infrastructure Projects in Kenya

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Abstract

This study explored the adoption factors of Artificial Intelligence (AI) and the performance of infrastructure projects in Kenya, with a focus on Nairobi County Constituency. A mixed-methods approach was applied, combining quantitative surveys with qualitative interviews, and data were collected from 60 respondents out of a targeted 65, representing a high response rate of 92%. The findings revealed that organisational factors strongly affect AI adoption: 72.2% of respondents confirmed that top management supports AI initiatives, yet 61.1% reported that employees' capacity is low, 66.7% indicated that budget allocations for digital innovation are inadequate, and 55.6% pointed to an organisational culture resistant to change. Awareness levels showed a similar pattern, with 61.1% of participants indicating they understood how AI could be applied in construction workflows, but only 38.9% had received any form of AI-related training or exposure. Despite this gap, optimism about AI's value was high, with 77.8% agreeing that AI improves decision-making and project efficiency. Technological readiness was identified as the most critical barrier, as only 38.9% reported system compatibility with AI tools, 72.2% cited the unavailability of relevant software as a major limitation, and 66.7% agreed that technological complexity hinders adoption. Qualitative insights echoed these challenges but also revealed cautious optimism, with respondents highlighting AI's potential to enhance project scheduling, cost control, risk management, and workplace safety. The study concludes that for AI adoption to progress meaningfully in Kenya's construction industry, firms must strengthen organisational capacity, invest in awareness and training programmes, and upgrade technological infrastructure. Addressing these barriers will enable firms to unlock AI's transformative potential, enhance efficiency and safety, and accelerate digital transformation toward global competitiveness. The study recommends targeted AI training, improved technological infrastructure, dedicated innovation funding, effective change management, and supportive government policies to enhance AI adoption in the construction sector.

Keywords: *Artificial intelligence, performance, infrastructure projects, Kenya*

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1.0 Introduction

The construction industry is a major contributor to global and national development but continues to face persistent challenges such as cost overruns, project delays, and safety risks (Bilal et al., 2025). These problems are often attributed to traditional project management methods and the sector's slow pace in adopting emerging technologies. Artificial Intelligence (AI), which includes tools for automation, predictive analytics, and decision-making, offers an opportunity to enhance efficiency, safety, and overall project performance. Artificial Intelligence usage globally is rapidly increasing due to the need to improve efficiency in production through data-driven methods. The expert system emerged in the 1970s, when AI research was conducted to identify a system that can solve various problems within a given area of knowledge (Weber & Schütte, 2019). The study aimed at identifying a system that could follow a set of rules and knowledge without hitches but within a specified speed. Conversation with computers became a reality in the early 1990s (Githui, 2019). The experiments were done to see the systems developed, shifting focus to try things like news reading, online shopping, and web browsing. Examples of technology companies that have adopted AI successfully include Facebook, Google, IBM, and Microsoft.

The USA is among the world's developed countries that have embraced AI in their operations. The government is continuously funding research on AI to determine ways of adopting the technology in various fields (Weber & Schütte, 2019). In the recent past, the US government has engaged in various policy formations that will guide the use of AI in the socio-economic sphere of the country. According to Weber & Schütte (2019), various offices and bureaus were established by the government to support the AI initiative, such as the Technology Engagement Team and the Bureau of Information Resource Management. The government believes that the adoption of AI will solve various economic challenges facing the country, regardless of the propaganda from outside (Gartner et al., 2021). Generally, the US government is committed to seeing a change in the approaches used in the manufacturing, production, service, and commercial sectors

Despite its potential, AI adoption in construction remains low, especially in developing countries. Factors such as high costs, limited technical capacity, and organisational resistance to change hinders its effective integration (Ali et al., 2025). In Africa, adoption is further challenged by weak infrastructure and limited investment. While developed nations are progressively incorporating AI, many African countries, including Kenya, have not yet established practical frameworks for implementation (Khosrowshahi & Arayici, 2021). The African governments need to take an approach to ensure socio-economic benefits to their countries instead of relying on a wholesale approach that already exists on the global front (Alsheibani et al., 2018). Therefore, African governments need to support the development of a responsible AI ecosystem that will enable innovators and researchers to thrive. Countries like China are striving to support the growth of AI in Africa through their policy framework that supports technological investment funding for African countries. China's wide engagement with African governments has facilitated AI infrastructure development through capacity building and funding (Gwagwa et al., 2021). Generally, Africa is in a better position to embrace AI technology and take full advantage if the governments consider it a viable option.

AI in Africa is yet to take off, as the continent still lags in its positioning for advancing technology globally. Research indicates that out of the 55 countries in Africa, only three have embraced AI in their economy (Gries & Naudé, 2021). A survey index ranks Mauritius, Egypt and South Africa at the top of the list of countries that have adopted AI in their operations. Generally, most African

countries have pulled the rest of the world backwards in adopting technological changes in various aspects of their economy. Like other African countries, Kenya suffers from a lack of required infrastructure to adopt AI in their businesses (Vadlamudi, 2019). Although the government had established an AI task force, this innovation is yet to be operational in the country.

Kenya is among the countries in the world trying to embrace the concept of AI in business, healthcare, agriculture, education, and government services. The use of AI in Kenya is believed to bring transformative changes to various sectors of the economy (Ahmad Bhatti, 2019). Research indicates that Kenya is among the countries rapidly embracing innovations for economic transformation. The government of Kenya needs AI more than ever to bring transformation in its services and approaches (Nyongesa et al., 2020). Most government files get reported missing because they still use hardcopy systems to save them. Some files that get saved in soft copies are mostly lost because of hackers and fraudsters. The business setting also needs AI to improve productivity and increase output.

The increase in the adoption of AI in Kenya is posing potential benefits for the future generation. There will be faster production of goods and services with less human interference. This implies that Kenya will enjoy quality goods and services with fewer errors (Nyongesa et al., 2020). The rise in AI adoption will save most businesses from the cost of labour. However, several skills taught in most universities in Kenya will be irrelevant since they will not be required anywhere in the job market. Most graduates will be forced to undertake refresher courses to cope with the changing business world (Githui, 2019). The government of Kenya needs to emphasise the adoption of AI through policy frameworks that will create an enabling environment for this innovation. There is also a need for thorough research on the future of AI in Kenya, based on the slow pace at which it is taking shape.

In relation to construction sectors, which are expanding with increased infrastructure investments, the adoption of AI tools and systems remains minimal. Key barriers include lack of awareness, inadequate training, budget constraints, and outdated technology (Mutisya & Njeri, 2022; Zaland et al., 2025). Other sectors have not been left out; hence the business sector has suffered various challenges ranging from a lack of skilled labour to system failures. Although thousands of graduates come out of universities and tertiary colleges, there is still an experience gap in the job market (Mvurya, 2020). Most companies spend more on training new, fresh graduates than they would have spent on hiring a consultant in the field. According to Githui (2019), the adoption of AI seems to be the solution that Kenyan businesses need to keep up with the high pace of global business dynamics.

However, adopting innovations in Kenya is a process that could take several years before its realisation. Most shareholders and stakeholders in businesses seem to be uncooperative when it comes to vital decisions that could shape the future of their businesses (Weber & Schütte, 2019). Therefore, adopting AI in Kenya is a long process, but the government can intervene through various policies that support technological innovations. Several factors influence the determination of IA. They include organisational awareness factors and technological factors (Radhakrishnan & Chattopadhyay, 2020). First, organisational factors are characteristics within the organisation's internal environment capable of supporting AI adoption.

Organisational factors include business culture, finances, objectives, leadership styles, knowledge available, and strategic direction. According to Weber & Schütte (2019), organisational factors determining the adoption of AI revolve around the need to automate systems and reduce direct

human engagement to reduce labour costs. AI can perform tasks with specific instructions and rules similar to those given to humans in the business (Mvurya, 2020). The main organisational factors playing a role in determining the adoption of AI include business strategies, finances, culture (awareness), capacity, and technologies.

Various aspects of research in AI technology adoption have been addressed by various researchers in the previous sections. The main study purpose was to answer the question of what the determinants of AI technology adoption for Kenyan businesses are. Specifically, the study answered the question of how organisational, environmental and technological factors determine AI adoption. It was based on a comparative analysis between theoretical knowledge and raw data collected from the field. Additionally, the NCA Report (2019) affirms that, within the construction sector in Kenya, the gap between theoretical interest and practical implementation is especially visible in towns such as Maua, where construction projects frequently face inefficiencies and delays. This study investigated factors influencing the adoption of AI in the construction sector in Maua, Kenya. Specifically, it examined organisational, awareness-related and technological factors affecting AI integration and evaluates how AI adoption impacts construction project performance in terms of safety, efficiency, and automation.

1.1 Statement of the Problem

Globally, the construction industry continues to grapple with persistent challenges such as safety risks, cost overruns, inefficiencies, and frequent project delays. Despite advancements in digital innovation, the adoption of Artificial Intelligence (AI) in construction project management remains limited. Many construction firms face obstacles such as high implementation costs, technical complexity, and organisational resistance to change, which collectively hinder AI integration (Ali et al., 2025). These limitations are particularly concerning in an era where automation, precision, and real-time data processing are becoming essential to achieving efficiency and competitiveness in project delivery. Regionally, the situation is similar. While some African countries have begun to explore the application of AI to enhance safety, productivity, and project outcomes, adoption remains inconsistent and slow. Key challenges include inadequate infrastructure, lack of strategic investment, and insufficient digital skills among the workforce (Khosrowshahi & Arayici, 2021). This sluggish uptake has further widened the technological gap between developing nations and their more advanced counterparts.

In the Kenyan context, the construction sector remains largely reliant on manual and traditional methods, which continue to expose projects to inefficiencies, safety hazards, and resource mismanagement (Mutisya & Njeri, 2022). Although AI presents a transformative opportunity to automate dangerous tasks, improve decision-making, and optimise resource use, its adoption remains minimal. Contributing factors include limited technical expertise, poor awareness of AI's capabilities, low budgetary allocation for digital tools, and the absence of comprehensive digital policy frameworks to support AI integration. Despite the growing global relevance of AI, there is a significant gap in local academic literature focusing on its adoption within Kenya's construction industry. Much of the available research centres on technologically mature regions, offering little insight into the socio-economic and organisational dynamics affecting AI integration in rural or underdeveloped areas (Yigitcanlar, 2024). This study, therefore, sought to examine organisational, awareness-related and technological factors that influence the adoption of Artificial Intelligence in Kenya and the performance of infrastructure projects in Nairobi County, Kenya.

1.2 Objectives of the Study

i. To establish the extent to which organisational factors influence the adoption of Artificial Intelligence and Performance Infrastructure projects

ii. To assess the extent to which the level of awareness factors influences the adoption of Artificial Intelligence and the performance of infrastructure projects

iii. To determine the extent to which technological factors influence the adoption of Artificial intelligence and performance infrastructure projects

2.0 Review of Literature

This section covered an empirical literature review of the study variables

2.1 Organisational factors on the adoption of Artificial Intelligence

Organisational factors refer to the internal attributes, structures, and practices within a company that influence its ability to adopt and implement new technologies such as Artificial Intelligence (AI). These include elements such as leadership commitment, organisational culture, financial capability, staff competence, change management practices, and strategic alignment (Tsai & Tserng, 2004). In the context of the construction sector, these factors are critical in determining how effectively a firm can navigate the transition from traditional, manual practices to AI-driven methods that demand new workflows, skills, and mindsets.

Globally, organisations that have embraced AI in construction tend to exhibit high levels of innovation culture, proactive leadership, and strong strategic direction. Ghosh (2020) notes that the successful adoption of AI by leading construction firms in countries such as the United States, Germany, and Japan has been largely attributed to clear digital transformation agendas, robust investments in technological infrastructure, and executive-level support for AI initiatives. These firms also prioritise staff training and cross-functional collaboration, creating an environment where technological adoption is seen not as a disruption but as a competitive enabler. Such organisations also integrate AI into their long-term business strategies, thereby ensuring that adoption is not a one-time event but a continuous process of learning and innovation.

In the African context, however, the organisational environment presents more challenges. Mncube and Vanker (2021), in their study of South African construction firms, highlight significant barriers such as a lack of formal digital strategies, resistance from middle management, and limited institutional frameworks to guide technological transformation. Many firms continue to rely on outdated operational models, and there is a general reluctance to adopt technologies perceived as complex or foreign (Rane et al., 2024). Organisational inertia, driven by a lack of internal motivation and fear of job displacement, further complicates the adoption process. These challenges are often exacerbated by a lack of skilled personnel capable of managing AI systems, as well as inadequate investment in research and development.

In Kenya, organisational readiness for AI adoption in the construction industry remains uneven, particularly when comparing urban and rural settings. Mutua et al. (2022) observe that while construction firms in urban centres such as Nairobi are increasingly showing interest in AI technologies, especially in areas like project scheduling, risk management, and design automation, many of them lack the technical capacity and change management frameworks necessary for successful implementation. Executive support may exist in principle, but it is often not backed by sufficient training budgets or clear implementation roadmaps. Njuguna and Maina (2020) further

emphasise that construction SMEs in rural counties, including Meru, are significantly disadvantaged due to limited organisational structures that support technological innovation. These firms often operate with minimal strategic planning and possess limited financial and human resources to support technology adoption, making AI integration appear unattainable or irrelevant to their daily operations.

Overall, the influence of organisational factors on AI adoption in the Kenyan construction sector is both profound and multifaceted. Strong leadership, strategic vision, investment in skills development, and a supportive culture are essential enablers. Conversely, the absence of these elements can create resistance, confusion, and ultimately failure in implementing AI solutions. For firms in rural Kenya, the development of organisational capacity and alignment with technological goals will be crucial in determining whether AI can be successfully adopted to improve efficiency, reduce project costs, and enhance construction outcomes.

2.2 Level of Awareness on the Adoption of Artificial Intelligence

Awareness factors encompass the degree of knowledge, understanding, and perception that individuals and organisations possess regarding Artificial Intelligence (AI) technologies, including their practical applications, potential benefits, associated risks, and implementation strategies. In the context of the construction industry, awareness is a foundational enabler of AI adoption, as it influences stakeholder attitudes, willingness to invest, and openness to change (Victor, 2023). A well-informed workforce and leadership are more likely to recognise the value of AI in enhancing productivity, reducing errors, and optimising project outcomes. Conversely, low awareness can result in scepticism, resistance, or the outright rejection of AI innovations, particularly when these are perceived as too complex, irrelevant, or threatening to job security.

At the global level, numerous studies underscore the critical role of awareness in driving AI integration within construction firms. McKinsey (2019) reported that in developed economies such as the United States, Germany, and South Korea, high levels of awareness about AI's operational and strategic benefits have significantly accelerated adoption. Construction professionals in these countries are frequently exposed to educational campaigns, industry seminars, case studies, and pilot programmes that demonstrate the tangible advantages of AI in areas such as site safety, design automation, and predictive maintenance. These awareness initiatives not only improve technical literacy but also help build trust and reduce resistance to AI technologies.

In the African context, however, the level of awareness remains considerably lower. Adekunle and Okonkwo (2021), in their study on construction firms across West Africa, found that many industry stakeholders lack a basic understanding of AI capabilities, leading to widespread underutilisation of existing digital tools. One of the key challenges identified is the limited visibility of successful AI use cases within the local industry, which prevents stakeholders from fully appreciating how AI can be customised and scaled to fit their specific contexts (Moore, 2000). In addition, the scarcity of structured training programmes and industry-led sensitisation campaigns means that many construction professionals remain unaware of global trends and innovations, creating a gap between technological advancement and local practice.

The situation in Kenya reflects similar challenges, albeit with some emerging signs of progress. According to a 2023 report by the Kenya National Innovation Agency (KENIA), interest in AI is on the rise among urban-based and tech-savvy professionals, especially in major cities like Nairobi and Mombasa. However, this enthusiasm has not yet permeated rural counties; many construction

firms continue to rely on manual, labour-intensive methods. The report highlights that limited access to AI education, training materials, and local demonstration projects has contributed to a significant awareness gap between urban and rural firms. Karanja (2022) reinforces this observation by emphasising the urgent need for targeted outreach initiatives, including government-sponsored awareness campaigns, localised workshops, and public-private partnerships aimed at showcasing AI's relevance and feasibility in rural construction contexts.

2.3 Technological Factors on the Adoption of Artificial Intelligence

Technological factors refer to the availability, accessibility, adequacy, and compatibility of the technological infrastructure and tools necessary for the adoption and effective implementation of Artificial Intelligence (AI). In the construction sector, this includes both physical infrastructure, such as reliable internet connectivity, computing hardware, and power supply, and digital resources like AI software, cloud computing platforms, data analytics tools, and system integration capabilities (Follini et al., 2017). Additionally, the presence of technical expertise, cybersecurity protocols, and user support systems are vital components that influence an organisation's technological readiness for adopting AI solutions. Without a supportive technological environment, even the most willing firms may struggle to integrate AI into their operational frameworks.

Globally, countries with advanced digital ecosystems have demonstrated significantly higher levels of AI adoption in the construction industry. The World Economic Forum (2020) emphasised that in nations such as China, the United States, and the United Kingdom, strong ICT infrastructure, high-speed internet, and widespread access to advanced software tools have enabled construction firms to implement AI for real-time data collection, project management automation, and building information modelling (BIM) (Bilal et al., 2025). These firms also benefit from mature technology supply chains, partnerships with AI solution providers, and access to cutting-edge research and development, all of which foster a conducive environment for experimentation and scaling of AI solutions. In these contexts, technological preparedness directly translates into operational efficiency, cost savings, and improved project quality.

However, in many African countries, the state of technological infrastructure remains a major barrier to AI adoption. Owolabi et al. (2020) observed that construction firms across Nigeria face persistent challenges such as poor internet connectivity, unreliable electricity supply, and lack of access to specialised AI tools. These deficiencies limit the ability of firms to deploy or even test AI applications, particularly those that require cloud integration, real-time analytics, or high computational capacity. Moreover, the cost of acquiring AI-compatible equipment and software is often prohibitive, especially for small and medium-sized enterprises (SMEs) that operate on limited budgets. As a result, the technological environment in much of Sub-Saharan Africa is not yet sufficiently developed to support widespread adoption of AI in construction.

In the Kenyan context, there are both opportunities and constraints when it comes to technological factors affecting AI uptake. According to the Communications Authority of Kenya (CAK, 2022), the country has made considerable progress in expanding internet access and mobile connectivity. However, there is still a significant digital divide between urban and rural areas. While construction firms in Nairobi and other urban centres may have access to modern tools such as drones, AI-powered planning systems, and digital project dashboards, firms in rural counties like Meru often lack basic infrastructure. Mwangi and Kimani (2023) noted that in rural Kenya, the adoption of AI is hindered by limited broadband coverage, high costs of digital equipment, and a

lack of locally available technical support services. Furthermore, many construction professionals in these areas are unfamiliar with AI tools due to the absence of exposure or hands-on training, which further limits the potential for effective integration.

3.0 Research Methodology

A mixed-methods approach was applied, combining quantitative surveys with qualitative interviews, and data were collected using questionnaires and observation. The study targeted 180 professionals within the industry, out of which the final sample frame was reached randomly and a purposive sampling technique was used for 60 respondents. Data was analysed through the use of Microsoft Excel, and findings were reported through tables and charts.

4.0 Results and Findings

The results and findings are presented in sections.

4.1 Organisational Factors and Adoption of Artificial Intelligence

Respondents were asked to assess the extent to which several organisational factors influence the adoption of Artificial Intelligence (AI) within their construction company. These factors included top management support, employee skill levels, budget availability, and organisational culture. The findings are summarised in the table below.

Table 1: Organisational Factors on the Adoption of AI

Statement	Agree (%)	Neutral (%)	Disagree (%)
Top management supports AI initiatives	72.2%	11.1%	16.7%
Staff lack adequate skills to implement AI	61.1%	22.2%	16.7%
Budget allocation for AI is insufficient	66.7%	22.2%	11.1%
Organisational culture resists change	55.6%	33.3%	11.1%

The results indicate that organisational leadership plays a supportive role in driving AI adoption, with 72.2% of respondents affirming that top management is committed to AI initiatives. This suggests a promising environment for digital innovation at the leadership level. However, several internal challenges persist. A significant portion of respondents (61.1%) acknowledged that employees lack adequate skills to effectively implement AI technologies. This highlights a pressing need for continuous training and professional development to enhance technical capacity within the workforce. Budgetary constraints also emerged as a critical barrier, with 66.7% of participants agreeing that financial resources allocated toward AI are inadequate. This could limit investments in AI tools, software, and capacity-building programs, thereby slowing down adoption. Additionally, over half of the respondents (55.6%) pointed to organisational culture as resistant to change, particularly in adopting unfamiliar digital systems. This resistance may stem from entrenched practices, generational gaps in technology acceptance, or a lack of clear communication about the benefits of AI. These findings underscore the importance of addressing

internal structural and cultural barriers through targeted interventions, including leadership-driven change management strategies, increased budgetary prioritisation, and upskilling initiatives. The interplay of these organisational factors will largely determine the pace and success of AI integration in the Kenyan construction sector.

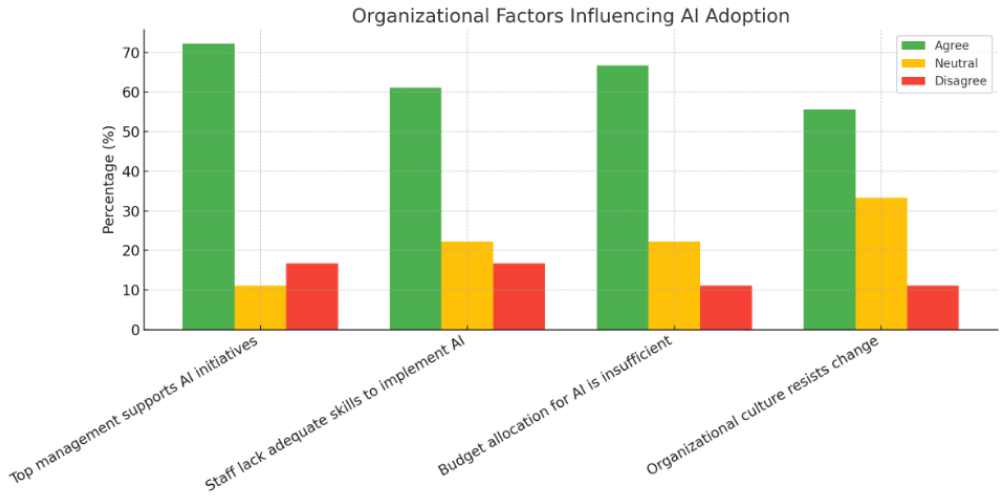

Figure 1: Organisational factors influencing AI adoption

4. 2 Awareness Factors and Adoption of AI

Respondents were asked to assess their level of awareness concerning Artificial Intelligence (AI) in the construction industry. This included their understanding of AI's potential uses, exposure through training or education, and perceptions of how AI affects decision-making and efficiency. The results are presented in the table below.

Table 2: Level of Awareness and Adoption of AI

Statement	Agree (%)	Neutral (%)	Disagree (%)
I understand how AI can be used in construction	61.1%	27.8%	11.1%
I have received AI-related training or exposure	38.9%	16.7%	44.4%
The company promotes awareness of AI applications	50.0%	27.8%	22.2%
AI improves decision-making and efficiency	77.8%	11.1%	11.1%

The findings reveal that while theoretical understanding of AI is relatively strong, as 61.1% of respondents agree they understand how AI can be used in construction, practical exposure remains limited. Only 38.9% of respondents confirmed they had received any form of AI-related training or exposure, while 44.4% explicitly disagreed, suggesting a significant experience gap. Half of the respondents (50%) acknowledged that their company promotes awareness of AI applications,

although a substantial 27.8% remained neutral. This neutrality may point to inconsistent communication or outreach strategies within the organisation regarding AI initiatives. Notably, the belief in AI's benefits is firm: 77.8% of participants agreed that AI enhances decision-making and project efficiency. This optimism suggests a latent readiness to adopt AI, provided that awareness initiatives are improved and practical exposure is increased. In summary, the results indicate a promising attitude toward AI's potential impact, but a lack of sufficient training and structured awareness programmes is likely impeding more robust adoption. Bridging this gap through targeted educational workshops, on-site demonstrations, and exposure to real-world use cases could significantly accelerate AI integration in the construction sector.

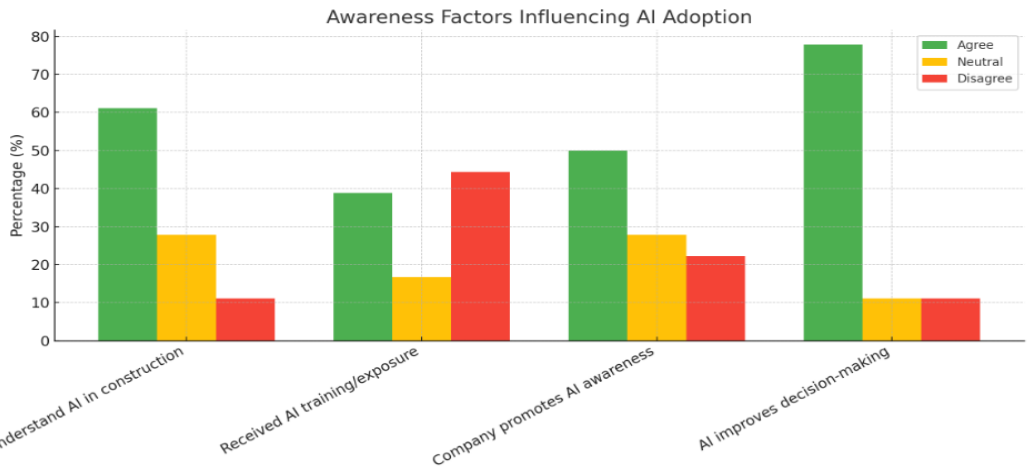

Figure 2: Awareness Factors influencing AI Adoption

4.3 Technological Factors and Adoption of AI

This section assessed the extent to which technological infrastructure, compatibility, and complexity influence the adoption of Artificial Intelligence (AI) in construction. Respondents were asked to evaluate various statements related to internet reliability, system integration, software availability, and the technical challenges associated with AI.

Table 3: Technological Factors and Adoption of AI

Statement	Agree (%)	Neutral (%)	Disagree (%)
The company has reliable internet and IT infrastructure	55.6%	27.8%	16.7%
Existing systems can integrate with AI tools	38.9%	22.2%	38.9%
Lack of AI tools/software limits adoption	72.2%	16.7%	11.1%
Technological complexity hinders AI adoption	66.7%	22.2%	11.1%

The findings suggest that while more than half of the respondents (55.6%) believe that their organisation has access to reliable internet and IT infrastructure, this alone is not sufficient to support seamless AI integration. Only 38.9% of participants agreed that existing systems are compatible with AI tools, while an equal proportion (38.9%) disagreed. This split response indicates that integration challenges are a significant hurdle to effective AI adoption. Furthermore, a large majority (72.2%) agreed that the unavailability of AI tools and software significantly limits adoption. This highlights a pressing need for investment in up-to-date AI-enabled platforms and systems. Similarly, 66.7% of respondents reported that technological complexity is a major barrier to AI implementation. This finding aligns with global literature, which identifies the steep learning curve and need for specialised technical expertise as inhibitors to the adoption of advanced technologies. In summary, the data clearly shows that technological factors, especially system compatibility, tool availability, and perceived complexity, pose critical challenges to the widespread use of AI in the construction sector. To enhance AI adoption, organisations must prioritise investments in modern infrastructure, ensure software compatibility, and provide technical support and training to bridge the digital skill gap.

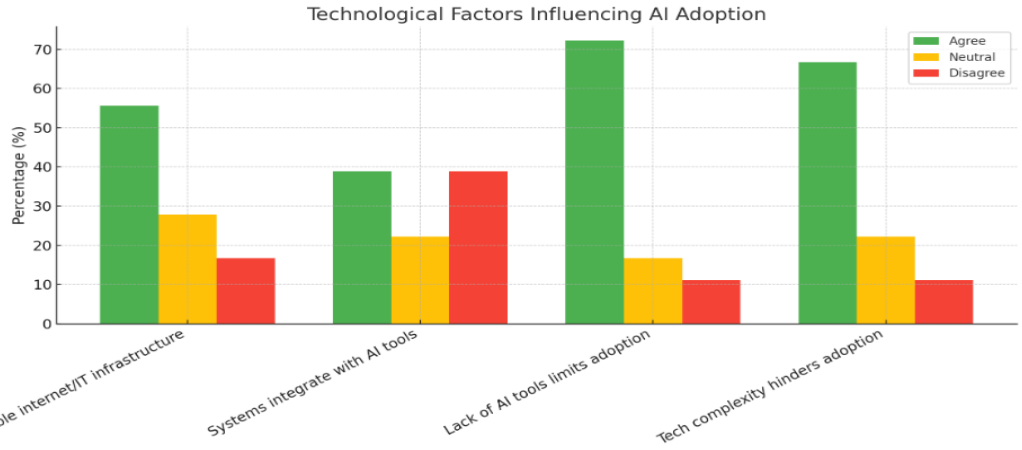

Figure 3: Technological Factors Influencing AI adoption.

4.4 Qualitative Insights, hence Thematic Analysis

The qualitative data obtained through semi-structured interviews offered rich insights into the perceptions, challenges, and expectations regarding Artificial Intelligence adoption in the construction sector of Igembe South. Several dominant themes emerged from the analysis:

On Resistance to Change: *A notable proportion of contributors expressed apprehension about AI, citing fears of job redundancy and distrust in replacing human judgement with automated systems. This resistance was particularly strong among long-serving employees and middle management, who felt threatened by the technological shift.*

On the Need for Capacity development*: The overwhelming consensus among interviewees was the urgent need for structured training and capacity-development programmes. Participants acknowledged that while AI holds promise, the current workforce lacks the requisite knowledge and practical skills to implement or interact with AI technologies effectively.*

***On the Infrastructure Restrictions**: Many respondents pointed out that rural construction firms suffer from poor IT infrastructure, including inconsistency of internet connectivity, outdated hardware, and minimal investment in digital systems. These infrastructural challenges were seen as a significant barrier to embracing AI solutions.*

Cautious Hopefulness: Despite the concerns, there was a general sense of optimism about the potential benefits of AI. Respondents highlighted areas such as project cost reduction, improved accuracy in planning, and enhanced safety protocols as promising outcomes of AI integration, provided the right support structures are established.

4.5 Discussions of the Findings

Organisational leadership plays a generally supportive role in the adoption of AI technologies. A significant majority of respondents (72.2%) affirmed that top management is supportive of AI-related initiatives. Despite this positive stance from leadership, the actual implementation of AI is impeded by internal challenges. These include inadequate staff competencies, with 61.1% of respondents agreeing that employees lacked sufficient skills to implement AI technologies, and insufficient budget allocation, as highlighted by 66.7% of participants. Moreover, a substantial 55.6% of respondents noted that their organisational cultures are resistant to change, particularly in adopting advanced technological solutions such as AI. These findings suggest that while management support exists, the internal environment may not yet be fully conducive to embracing innovation.

On awareness, the study revealed that the conceptual understanding of AI among construction professionals is relatively strong. Approximately 61.1% of the respondents agreed that they understood how AI could be applied in construction workflows. However, this awareness does not translate into practical readiness. Only 38.9% of respondents had received any form of training or exposure to AI, while 44.4% explicitly stated they had not. Although half of the respondents acknowledged that their companies promote AI awareness, the lack of structured training programmes appears to limit the practical integration of AI tools. Despite this gap, the perception of AI remains largely positive, with 77.8% of respondents agreeing that AI improves decision-making and project efficiency. This points to an underlying readiness to adopt AI, provided that the barriers related to education and exposure are addressed.

Technological factors also play a critical role in determining AI adoption. The findings indicated that while 55.6% of respondents believed their organisations have access to reliable internet and IT infrastructure, the lack of compatible systems remains a pressing issue. Only 38.9% of respondents agreed that existing systems in their firms are compatible with AI tools, while an equal percentage disagreed, highlighting technological incompatibility as a key challenge. Additionally, a notable 72.2% of respondents stated that the unavailability of AI tools and software significantly limits adoption. Furthermore, 66.7% of participants agreed that the complexity of AI systems hinders their application within local construction firms. These statistics suggest that even where basic infrastructure exists, it may not be adequate to support the seamless integration of more advanced AI technologies.

5.0 Conclusion

Based on the findings of this study, it can be concluded that the adoption of Artificial Intelligence in the Kenyan construction sector, particularly in rural areas like Maua, Igembe South, is influenced by a complex interplay of organisational, awareness-related, and technological factors.

Organisationally, there is evidence of strong leadership support for AI initiatives. However, this support is often undermined by limited staff competencies, inadequate funding, and entrenched cultural resistance to technological change. These internal barriers highlight the need for a more strategic approach to change management and workforce development. In terms of awareness, while a conceptual understanding of AI is present among many professionals, actual exposure to and training in AI remains limited. This gap between knowledge and practice suggests that awareness alone is insufficient for meaningful adoption. Practical training and consistent exposure to AI applications are essential to move the workforce from theoretical familiarity to confident usage. Technologically, the study concluded that while some firms possess basic infrastructure, significant hurdles remain in the form of system incompatibility, lack of tools, and complexity in implementation. Without addressing these infrastructural limitations, AI adoption efforts are likely to remain fragmented and ineffective. Overall, the study affirms that while the construction sector in Maua shows interest in adopting AI, current conditions—especially in rural areas—are not yet fully supportive. There is a foundational level of readiness, but progress will depend on addressing institutional, educational, and technological gaps in a deliberate and coordinated manner.

6.0 Recommendations

In light of the above conclusions, several recommendations are proposed to facilitate AI adoption in the construction sector in Maua and similar contexts. First, there is an urgent need to invest in professional development and capacity-building initiatives. Construction firms should implement structured training programmes, workshops, and certifications tailored to different professional roles to equip employees with the technical skills required to understand, implement, and manage AI tools. Training should also emphasise practical applications of AI relevant to the local construction context, such as project scheduling, cost estimation, quality assurance, and risk detection. Second, firms must prioritise upgrading their technological infrastructure. Investments should be directed toward acquiring modern IT equipment, compatible software, and cloud-based platforms that can support scalable AI integration. Collaborations with AI service providers and technology consultants can offer access to the necessary tools and technical expertise, especially for small and medium-sized enterprises operating in rural areas.

Third, organisations should allocate dedicated budgets toward innovation and digital transformation. This includes not only the purchase of tools but also funding for pilot projects. feasibility studies, and post-implementation evaluations. Financial commitment from leadership is essential to build momentum and sustain progress in AI adoption. Fourth, a shift in organisational culture is necessary to address resistance to change. Management should implement change management programmes that emphasise communication, participation, and incentives to build employee trust and engagement. Employees should be involved in the planning and implementation of AI initiatives, and success stories from early adopters should be shared to build momentum and reduce fear. Finally, support from the government and industry associations is crucial. Policy frameworks should be developed to support AI innovation in construction through grants, tax incentives, technical assistance, and public-private partnerships. Regulatory support can also help standardise training curricula and encourage firms to adopt digital practices aligned with national development goals.

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