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Empowering project management with artificial intelligence exploring opportunities, challenges, and best practices

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Abstract

Artificial intelligence (AI) implementation in project management is providing various benefits, including time-saving, efficient data management, and allocation of resources. Even though the AI supervision system for the project can be thought of as a mechanism that manages tasks and carries out standard management activities without the need for human supervision or input. The massively parallel machine can now recognise and swiftly get around workflow obstacles thanks to the use of AI, which has caused it to conform to specified rules and procedures. The expanded understanding of alternative outcomes offered by AI-based project management has significantly improved the decision-making process. The current study aimed to examine the recent project management techniques using AI while exploring the opportunities it gives in the procedure facilitating rapid project execution and assuring quality. The study also highlighted the challenges faced by project managers due to data breaches, safety concerns, and employment insecurities. In addition, to help the project manager in implementing AI effectively with minimising risks, best practices and models have been discussed and explored in this study. The study utilised a semi-structured interview with project managers who are associated with several international organisations. The primary data was used in this study obtained from the open-ended questions and respondent component of the data that was gathered. Even though books and journals served as the central information sources for this study, only peer-reviewed materials were used. The findings of this study concluded that project management is heavily impacted by AI implementation due to its accessible automation, efficiency, and decision-making capabilities.

Keywords: Obstacles, concluded, automation

Introduction

AI and Project Management

The project's oversight AI is defined as a system that manages projects and carries out everyday management chores without the assistance or input of any human beings. In addition to developing an awareness of the fundamentals of project management, this development automated routine everyday chores (Borbida, 2021) ^[15]. The machine then makes recommendations and performs additional difficult jobs using the knowledge it has gained. The AI project management system improved the project's outlays while saving time (Gil *et al.*, 2021) ^[35]. Because AI was taught to adhere to specific regulations and workflows, the supercomputer could recognise and quickly resolve workflow obstacles. The decision-making process became considerably more efficient due to AI-based project management's increased insights into the potential outcomes.

Additionally, this accelerated pace of the activities boosts and increases the company's productivity. Additionally, AI increased the planning accuracy of projects and assisted project managers; this assistance was crucial for the administration of complicated projects (Darko *et al.*, 2020) ^[24]. The AI technology also introduced data visualisation, which allows leaders to track projects in real-time (Elmas and Babayev, 2021) ^[30].

In this study, the researcher will examine how leaders and project managers are affected by AI. The importance of AI to business is also demonstrated in the study. The report also discussed how crucial it is for project managers to comprehend the fundamentals of artificial intelligence.

Problem Statement

The use of AI in project management has increased dramatically; however, there are still challenges.

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The main concern is that corporate executives ignored suggestions for making financial investments in AI systems because these tools are still in the early stages of development. Many people think traditional programmes are superior to AI-based project management systems. As an illustration, despite claims to the contrary, an app development company's AI-based agile project management solution needed to be better received (Pan and Zhang, 2021)^[59]. Similarly, achieving a balance between quick analytics and intelligence is essential for effective implementation because biases in management teams and AI algorithms have hampered the acceptance of the technology (Albahri *et al.*, 2023)^[5]. Additionally, data preparation is essential when introducing AI-based solutions, requiring a significant time commitment and personnel training (Kordon and Kordon, 2020)^[48].

Aims and Objectives

The study aimed to investigate how modern project management techniques have been impacted by artificial intelligence (AI). The results highlighted substantial AI-related obstacles that project board directors must navigate. As a result of the research's findings, project managers were able to detect problems. It also allowed managers to use AI-based project management tools more successfully and effectively. The study offered information on the steps required for implementing AI systems successfully. It also revealed certain negative aspects of AI-based project management systems. This research provided insightful advice and knowledge that will help project managers better grasp and utilise AI. The core objectives of this study are;

- Gain an understanding of the impact of AI on Project the board.
- Recognition of the risks associated with project management utilising AI.
- Advice on the finest methods the project manager should use to successfully incorporate artificial intelligence into their projects

Research Statement

Concerns exist around the employment of artificial intelligence that may or may not be relevant to the project's objectives. A variety of outside variables can impact the success of a project. It has a long-term impact on the company's capacity for logic and freedom.

Significance of the Research

Artificial intelligence (AI) plays an essential role in project management, offering a variety of advantages and results. By automating routine operations, allowing managers to concentrate on more complicated issues, and improving the quality of deliverables while spending less on labour, AI-based project management solutions helped cut costs. Another benefit is predictive analytics, where AI examines project data from the past to estimate future elements, enhance visibility, and produce alarms for off-tracking (Abioye *et al.*, 2021)^[3]. Also, by eliminating unnecessary work, managers were free to focus on their primary duties. AI-based systems offer valuable insights by grouping and connecting various datasets, organising data, and spotting patterns that people would overlook. AI algorithms facilitate work delegation and give managers a comprehensive picture of the project and team. AI's accuracy is on par with nanotechnologies, which is advantageous for business tasks

that require precision. AI facilitates the effective re-planning of complex activities and the speedy release of bottlenecks, improving project performance. AI can also allocate resources effectively by utilising local knowledge and establishing objective priority checks for equitable resource distribution (Subramanian *et al.*, 2020)^[71].

Literature Review

AI Application in Project Management

Several literature papers show that using artificial intelligence in project management is a well-established concept. These studies emphasised the value of AI in contemporary project management, notably in areas like efficiency, success factors, and cost and effort prediction. Data analysis was facilitated by AI, which produced informative reports for enhanced decision-making and overcame managerial challenges (Tittl *et al.*, 2019)^[74]. According to Davahli (2020)^[25], commonly utilised artificial intelligence (AI) techniques and project management models include neural networks, support vector machines, and genetic algorithms.

Beyond the Office Environment - AI in Project Management

AI is employed for more than just office and indoor work management. The technology reportedly had a fundamental influence and digitally altered building project management, according to research on AI (Pan and Zhang, 2021)^[59]. This research effort examined the use of AI in construction management in great detail. In order to establish the current state of artificial intelligence (AI) in construction project management, as well as its future trends and culture, the study illustrated the findings of both qualitative analysis and scientometric cores. According to the study, the use of AI in the construction industry has grown dramatically over the previous ten years. This study focuses on bridging the divide between AI technology and the building industry (Elmousalami, 2020)^[31]. The construction industry's project management fundamentals are expected to undergo a dramatic transformation thanks to emerging AI concepts like intelligent robotics and digital twins.

FinTech Projects and Artificial Intelligence

As the ideas of fin-tech are growing in the globalised world, much literature has been published on the fundamentals of AI utilisation in the banking sector. According to published research, FinTech and AI technologies have reduced banks' comparative advantages due to their prodigious use of FinTech systems (Jakšič and Marinč, 2019)^[43]. The foundation of all FinTech ventures is made up of IT-driven technologies. The application of AI technology in project management is mainly responsible for this. These FinTech enterprises contributed to an increase in the economy. This study highlighted how frequently AI technology is used to manage these businesses.

AI Algorithms Used in Project Management

Support Vector Machines

According to Chauhan *et al.* (2019)^[21], the Support Vector Machine (SVM) is a supervised machine learning technique used to solve classification and regression problems in project management. SVM's importance in forecasting project performance at the pre-project planning stage, notably in cost performance, was underlined by Bhagat *et*

al. (2021) ^[13] research. The PCA-SVM hybrid model has demonstrated efficacy for precise pre-project planning prediction. SVM excels in situations requiring little input, offering quick fixes to hasten project planning under management cores.

Artificial Neural Networks (ANN)

Modern project management relies heavily on artificial neural networks (ANN), particularly for precisely estimating efforts, resources, costs, size, and time commitment. Based on the biological neural network system, artificial neurons joined together to form ANNs calculate inputs and produce outputs based on a threshold value (Zhang *et al.*, 2019) ^[20]. The study by Koopialipour *et al.* (2020) ^[47] brought attention to the difficulty of correct estimation in software project management and how underestimating tasks results in excessive time and resource consumption while overestimating a task results in a loss of competitive advantage.

Genetic AI Algorithm

The Genetic Algorithm (GA) in artificial intelligence used binary character arrays to represent potential solutions, manipulating them to find better answers to real-world project management challenges (Lambora *et al.*, 2019) ^[50]. According to research by Guo and Zhang (2022) ^[37], GA significantly impacts project management by finding polynomial issue solutions quickly and offering a potential method to handle these complications. Among GA's benefits for project management was its assistance with product design, processing, supply network planning, forecasting, and facility layout. Additionally, GA was crucial in operational management, particularly capacity planning and inventory control. These research findings showed that GA was a commonly used technique in the management system.

Benefits of AI-based Project Management

The Tools of AI are predominantly used in this management sector for numerous advantages. Many kinds of literature mention some of the vital advantages of AI-based project management. It was emphasised in several of the study literature that AI-based project management had legitimate predictive analytics. The project's numerous components could not be managed at all times, which caused fallout at some stages, which is why it was significant. According to Saber *et al.* (2019) ^[66], the AI-enabled analysis is based on historical data sheets to create the finest predictive framework feasible. This framework reduced adverse effects during project management and advancement.

Challenges in Implementing AI in Project Management

Apart from the benefits of AI usage in project management, numerous inevitable challenges are associated (Weber *et al.*, 2022) ^[78]. AI systems and their structure rely on data to facilitate the formation of predictions and informed decisions. Therefore, the data availability and quality relevant to the organisational requirement can be more challenging (Stone *et al.*, 2022) ^[70]. According to Chan and Zary's (2019) ^[19] systematic review, the development of the AI system in medical education is a multidisciplinary approach which requires a team of experts and data scientists to access and manage the quality of the pile of data, a physician team to consistent the data relevancy and accuracy (Weber *et al.*, 2022) ^[78].

Abioye *et al.* (2021) ^[3] discussed that due to the growing use of automation technologies like AI and IoT, construction occupations are the third most in danger of automation in the upcoming ten years. By the middle of the 2030s, the majority of construction positions with medium to low educational requirements face a high risk of automation (38–45%) (Evans-Pughe, 2018) ^[33]. In this case, the workforce is concerned about losing their employment while considering AI a threat to their duties and resistant to introducing AI into project management. However, such technology may result in the development of new job categories designed to integrate and retrain the industry's displaced personnel (Kelepouris, 2023) ^[46]. Construction AI researchers, trainers, and engineers will become more common as a result of the deployment of digital technologies, including AI, in the sector. Researchers will be responsible for improving the use of AI in the construction sector by continually conducting research and bringing innovation to the industry. Engineers will be required to develop state-of-the-art AI solutions ideal for construction (Weber *et al.*, 2022; Stone *et al.*, 2022) ^[78, 70].

Furthermore, one of the most severe modern problems is a security breach that results in the unintentional or intentional loss, alteration, transparency, or utilisation of protected data that is sent, stored, or otherwise processed, which can lead to significant either immediate or indirect costs and irreversible difficulties in maintaining an organisation's solvency and image (Kelepouris, 2023) ^[46]. Weber *et al.* (2022) ^[78] found that prejudices in the data that AI systems are trained on can occasionally be preserved, creating ethical questions, mainly when used in decision-making processes that can potentially affect people's chances and lives. Moreover, susceptible information is used in AI deployment; safeguarding this data from illicit use or intrusions is a significant problem (Polona Tominc, Dijana Oreški and Maja Rožman, 2023) ^[61]. The need to balance AI's requirement for substantial volumes of structured or standardised data with the right of individuals to privacy is perhaps the industry's biggest hurdle (Celik *et al.*, 2022) ^[18]. Since AI algorithms can be complicated, it might be challenging to comprehend how they arrive at particular results.

When accuracy is necessary for a result, machine learning becomes more difficult. To win the trust of stakeholders and promise that rules are followed, project management must be transparent and easily interpretable (Tangi *et al.*, 2023) ^[72]. While AI may support decision-making and offer insightful data, it could become overly reliant on the artificial intelligence system (Stone *et al.*, 2022) ^[70]. As human judgement and expertise are still essential, artificial intelligence (AI) should be seen as a tool to enhance rather than totally replace human talents (Merhi, 2023) ^[52].

Best Practices for AI Implementation in Project Management

Companies seek resilience to gain a competitive advantage in the dynamic environment. Over 80% of AI initiatives fail to deliver meaningful benefits or a profitable return on investment. Using well-established best practices for AI & Data project management is the key to preventing these adverse outcomes (Vial *et al.*, 2022) ^[77]. Understanding and identifying the problem that the organisation wants to address and determining if AI is the correct answer are the cornerstones of every AI project. In the most successful and

intelligent AI implementation practices, the industry's leading players are utilising cognitive project management for AI (CPMAI) (Shipra Swati and Kumar, 2023) ^[68]. This technique is used as a vendor-neutral method for sophisticated big data analytics and artificial intelligence. This methodology for AI projects contains best practices for agile and iterative techniques for brief sprints for projects and is based on the well-known, data-centric CRISP-DM methodology (Shipra Swati and Kumar, 2023) ^[68]. CPMAI offers a cutting-edge big data and AI project methodology, strategy, process, and plan template that outlines the stages that projects, including AI, big data, and machine learning, should take to succeed (Caballero, 2021) ^[17]. The first phase of the CPMAI process for any AI project is obtaining information about the business needs and requirements. Understanding data is the second stage of the CPMAI technique for any AI project (Aboukadri *et al.*, 2022; Frye *et al.*, 2021) ^[4, 34].

Methods

Interpretivism Research Philosophy

The study of various knowledge modalities is intrinsically connected to the research philosophy. The preferred research philosophy is intimately related to the researcher's point of view (Alharahsheh and Pius, 2020) ^[6]. It directs the procedure for gathering data, conducting an analysis, and interpreting the results. There is no denying that the choice of research philosophy is influenced by the practical consequences of the philosophy (Van Der Walt, 2020) ^[75]. The researcher's presumptions and beliefs about the study question heavily influence the research philosophy. This particular research study used the interpretivism philosophy. Junjie and Yingxin (2022) ^[45] stated that the core beliefs of the interpretivism philosophy are focused on the researcher's position as a respected observer of society. According to Hürlimann and Hürlimann (2019) ^[41], the researcher's own interests are intricately tangled with this research philosophy. Its main goal is to analyse the results of qualitative research thoroughly.

Inductive Approach

Bingham and Witkowsky (2021) ^[14] described that the inductive approach is sometimes referred to as inductive reasoning. The method started with theories and observations, then study procedures. The induction approach, which focused on extracting the pattern from the data, made it easier to explain (Teru *et al.*, 2020) ^[2]. This particular technique placed a great focus on the application of solid theories in the formulation of the research questions and the subsequent goals and objectives. The researcher was also able to apply inductive reasoning to utilise existing hypotheses (Cranmer *et al.*, 2020) ^[23]. This methodology plays a crucial part in this study's pursuit of comprehensive observation and shift to generalisation, demonstrating that it is the best method for achieving the study's goals (Benitez-Correa *et al.*, 2019) ^[12]. Thus, the present research relies on the Induction or Inductive Reasoning methodology.

Qualitative Research Method

The implication of a qualitative research design is thought of as a systematic method for conducting a real analysis that provides an in-depth understanding of social norms in the context of the natural world (Chandra and Shang, 2019). The qualitative investigation frequently relied on human

experiences. Qualitative more than numerical data, relies on descriptive findings of research projects. The inquiry upon which the study is based further supports or refutes the research hypothesis or presumptions. The data used in the qualitative research study may be used for comprehensive ideas and viewpoints. In this specific study, the data produced based on the facts and results are classified as qualitative since they provide information that cannot be represented in numerical statistics.

Descriptive Research Design

In this study, the researcher used a descriptive research methodology founded on precisely and methodically characterising a context, a population, and a phenomenon. This study's research question focuses on the fundamentals of where, what, and when, and the descriptive research technique is well suited to answering these research questions (Aggarwal and Ranganathan, 2019) ^[1]. A descriptive research strategy makes it simpler for the researcher to accomplish their study objectives. The most crucial and acceptable design for this study is based on objectively observing, describing, and documenting participant viewpoints before analysing and reporting on the results. It is feasible to obtain precise information regarding the study's main objectives using a descriptive research approach. The researcher can receive a reliable conclusion by combining the data and information gathered during the investigation with this research strategy. Thus, this research study supported the descriptive research methodology.

Narrative Research Strategy

With the help of the narrator's account, the researcher could comprehend the practical components due to the pattern and approach of narrative inquiry. The primary method of gathering data for this study was conducting interviews. The responses to the semi-structured questions were left open-ended (Thomas *et al.*, 2021) ^[73]. The researcher conducted semi-structured interviews during which he investigated the opportunities, challenges, and best practices in project management by using AI.

Data Collection and Analysis

Both forms of data, secondary and primary data, were extracted for this study. The researcher interviewed project managers affiliated with several international organisations. The information was taken from the data's open-ended question and response portion. Even though the review of publications and journals served as the primary source of information for this study, only those were peer-reviewed. The findings of this recent study focused on highlighting artificial intelligence's effects on the fundamentals of project management. The conclusions and data used in the data analysis were derived from both data collection methods, starting with primary data collection and continuing with secondary data collection. The acquired data were analysed using an inductive approach and critically discussed in the context of prior knowledge and literary works to show artificial intelligence's influence on project management's fundamentals.

Results

Impact Factors and Long-term Effects of AI on Project Management- Opportunities

The data collecting and analysis in the context of project

management demonstrated the six impact elements crucial in deploying and accepting AI in project management.

1. The shifting business environment has an impact on project planning and management. The reorganisation of the project tasks, each of which has countless separate sub-operations and the AI allowed project managers to quickly re-plan projects as part of project management (Zhu *et al.*, 2022) ^[81]. This aspect of AI significantly influences how it is used in project management's fundamentals.
2. Numerous project managers demonstrated throughout the interview how artificial intelligence enabled them to comprehend raw data related to project management. According to Benaben *et al.* (2019) ^[11], this added to the reality that most project managers used AI-based tools to manage the enormous dataset. As a result, the use of artificial intelligence in data interpretation also influenced project management and generated countless opportunities for future adoption.
3. By offering predictive insights, AI also has a significant influence on the fundamentals of project management. According to the present research study, AI can forecast an organization's future course in project management, enabling the business to prepare for upcoming issues. Many organizations have already used AI to overcome future obstacles (Holzmann *et al.*, 2022) ^[40]. Thus, the project management's use of AI has improved future planning.
4. The primary fact about artificial intelligence was highlighted from the interviews with various project managers and secondary data analysis (Pan and Zhang, 2021) ^[59]. Artificial intelligence is primarily adopted by reputable organisations, including the health care and social sector because the process automation and streamlining of tasks are associated with a significant capital reduction. Therefore, cost or capital reduction is the most essential effect related to the application of AI.
5. The feature of providing deep insights highlights artificial intelligence in the production of influence on project management. As the technology played a crucial part in sifting out data from the unprocessed data accessible for the organisations, artificial intelligence supplied insights into project management that led to actionable insights (Grover *et al.*, 2020) ^[36]. In this study, another significant element emphasised was the provision of insight that constructed the path for adequate future adoption opportunities for AI within the project management.

Longer Terms Effect

The results of this study made clear that the introduction and use of AI in the context of project management will have long-term implications for project management. Project managers frequently use MindBridge, a technical business connected to the creation of an AGI-based application that spots problems and gives data analysis of the project's financial components. PickNik is another significant firm with a long-term impact perspective on AI deployment, as the company offers robotics help to other organisations to save time and money (Dow *et al.*, 2021) ^[26]. With the

introduction of longer-term consequences, these organisations played a crucial role in project management.

Challenges of AI-based Project Management

- a) The aspect of security worry was the main danger that was emphasised during the research investigation. Since the AI technology used for project management is based on algorithms, it does not adhere to the organisations' security policies (Alhayani *et al.*, 2021) ^[7]. The AI that puts a company's data and assets in danger of security might be disastrous for the organisation in achieving desired results.
- b) The autonomy of human workers was a target of AI as well. After being adopted, AI-based technology quickly took over the management landscape, and many project managers and staff members prospered due to the sense of "Slaves" that this supremacy engendered for human managers (Borgesius, 2020) ^[82]. Due to their loss of control over the technology setup and the ability to derail the project managers, this dominance might lead to utter organisational devastation.
- c) The AI targeted low-skilled vocations that were frequently connected with repetitive operations. The project management automation induction rendered low-skilled tasks unworkable for human personnel (Bruhn and Anderer, 2019) ^[16]. AI still needs to work on effectively doing some of the most straightforward jobs, including dividing the responsibilities and task assignments.
- d) The privacy danger was another significant concern and restriction for using AI. The AI system breached the limited region because the AI algorithm cannot discriminate between processed and restricted data (Saura *et al.*, 2022) ^[67]. This AI component is linked to encouraging unethical data processing and gathering in institutional settings.
- e) The AI's predictive analytics occasionally produced false findings based on insufficient data. Due to the difficulty of managing events based on false findings while working with many stakeholders, many AI-based initiatives under this aspect failed (Dubey *et al.*, 2022). Thus, one of the main risks associated with implementing AI in project management was the effect factor itself.

Best AI Tools for Project Management- Best Practices

The results of this study identified some of the top AI technologies used by project managers across various project management areas. Specifically, Chatbots were widely used in project management cores. Another significant AI-based technology mentioned in this recent research report is Zivebox. In light of the narrative interview-based conversation with project managers, other crucial tools that seemed crucial and most appropriate for project management were Rescoper, Clarizen, Polytone, and ClickUp (Alshaikhi and Khayyat, 2021; Prifti, 2022) ^[8, 62]. Thus, the current study revealed certain significant AI technologies that were crucial for project automation in project management (Table 01).

Table 1: Tools on automating project management tasks

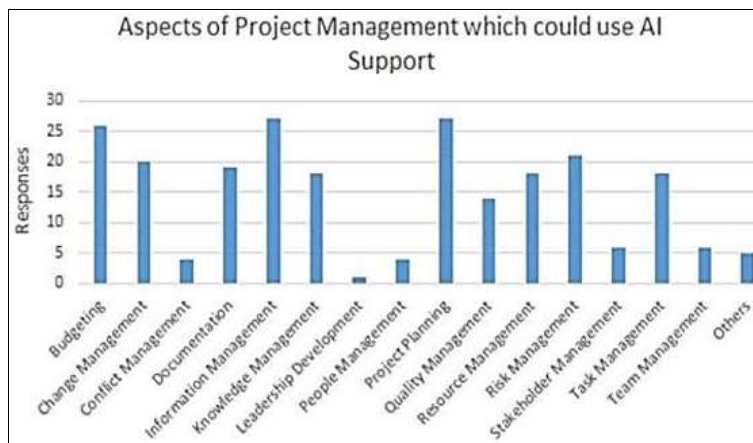
Tool Name	Description
Chatbots	It is created by the team members with the Api.ai platform in order to develop a lot of messaging that helped in asking team members different things like 'What is urgent?' 'Show that what the team is working on?' and 'What is happening at this day?'.
Zivebox	The use of AI is to determine the duration of the time needed to complete the task. It helps to analyze the productivity of every member of the team and also helps in sorting through the communication databases at enterprise-level
Rescoper	Assist in handling the tedious management parts so that the team stays more targeted
Clickup	Helps in predicting the best member of the team for some particular task and helps in assigning the tasks. It helps in tagging users to leave comments, which depends on the relevant contexts. It is responsible for visualizing updates and notifications. It enables to predict deadlines that fails to meet. It helps in making correct time estimates for specific tasks.
Polydone	The objective is to maintain the budget and time in an accurate manner.
Clarizen	This process helps to track and share data. Moreover, this tool allows the information to be more accessible to the IT people in making the customized decisions and workflows based on the requirements.

Discussion

Data Integration and Capital Reduction by AI-based Project Management

Over the past five years, AI has been embraced by several businesses in a variety of organisational settings (Graph 01). Incorporating machine learning algorithms into many organisations' operations and project management cores led

to ground-breaking results (Battisti *et al.*, 2022) [9]. IKEA is one example of a company that utilised AI and AR, which led to significant success on international forums (Ozturkcan, 2021) [58]. Essential project management goals were data gathering and data interpretation, and industries, including banking, logistics, and healthcare, employed AI technology to overcome data management challenges.



Graph 1: Areas where support can be used for project management (BUTT, 2018 as cited in Elrajoubi, 2019)

AI-based project management, influenced by task automation and repeated task completion, reduces the cost of capital. This component was singled out as one of the critical impact aspects of the current study's findings, which are connected with the application of AI. According to research, AI is predicted to reduce capital costs by 25% in the area of project management in the healthcare sector (Belharet *et al.*, 2020) [10]. The fact that AI is linked to cost indicators and predictive analytics was also proved by several earlier research studies, making this technological development an integral part of cost reduction in project

management (Mishra and Tripathi, 2021) [53]. Cost management is crucial for any company's success in the modern business world; as a result, several AI-based solutions, such as Zivebox and Polydone, strongly emphasise time and cost management. These tools have proven helpful for companies regarding their projects' financial and fiscal management. Therefore, these statistics made it abundantly evident that thanks to technical improvements, AI has become an efficient tool for project management.

Nano Projects and Longer-Term AI Effects

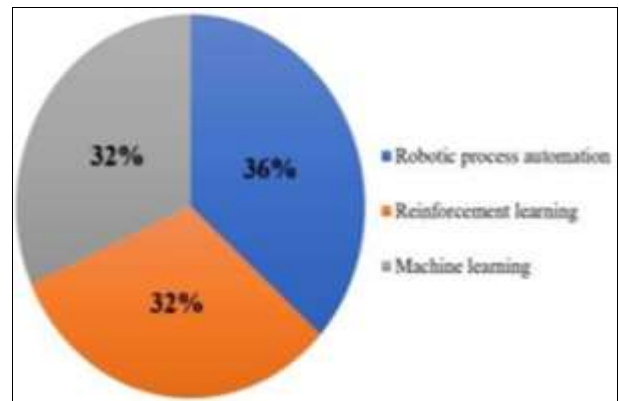
In this Nano Project management context, precision was necessary to achieve the intended business goals. On such a little and constrained level, precision was not something that the soft skills could offer. The results of recent studies revealed that, according to data gathered from project managers working for various types of organisations, 80% of them stated that AI-based project management offered the accuracy needed to meet the objectives of each Nano project linked to and aligned with a major business project. This demonstrated how AI claimed to have a significant influence on the level of Nano-projects. The results of earlier research investigations also supported the idea that managers may manage a varied workforce team while simultaneously handling a number of duties thanks to artificial intelligence (Choi *et al.*, 2021) [22]. These findings came to the conclusion that AI is connected to the development of major effects on the basis of Nano-project Management.

The study's research findings revealed an intriguing truth, namely that many organisations chose to implement AGI and ASI to cause the influence of AI on project management over a longer period of time. Further investigation reveals that the change of the whole Project Management Office (PMO) inside corporate organisations is related to the use of such a powerful extent. The fact that PMO is linked to some passive functions that don't have direct consequences on the project was noted in numerous studies. In the long run, AI adoption is projected to replace these passive PMO functions (Niederman, 2021) [56]. The tactical and knowledge-intensive tasks, such as decision-making, functioned as the PMO's main function. Technological developments, however, were unable to completely replace the PMO in this regard, although they did have the ability to speed up the decision-making process.

Smooth Data Processing and Re-planning

The current study additionally extended and underlined the aspects of straightforward data processing from raw data and re-planning the project management strategy and tactics as some of the critical impact variables connected to AI consequences on project management. These advantages of technical development are directly related to increased productivity in project management (Graph 02). In addition to this, several studies expounded on the fact that project

managers were able to increase project management efficiency via the use of AI cores based on machine learning algorithms and robotic automation (Paško *et al.*, 2022) [60]. Hence, it was determined that project managers were embracing the digital AI cores based on the large number of effect factors they had.



The top technologies project managers said are boosting project management productivity vote %

Graph 2: Source: PMI's pulse of the profession survey

Impact of Insight Provisions and Predictive Analytics

The project managers' access to the AI's predictive analytics also played a significant influence component. The results of the current study proved that project managers' decisions to use AI-based tools were influenced significantly by their predictive analytical skills. According to a report released in 2018 by "PMI's Pulse of Profession 2018" in which some organisations were listed as "Champions" as 80% of the projects got finished within the window of assigned and designed time frame; the aspect of time was not only achieved, but the projects stayed within budget and also achieved the desired outcomes (Fig 01). According to the research of Richardson and Jackson (2018) [64], 40% of the organisations on that list used predictive analytics in conjunction with AI-based project management. In technical terms, this advantage is frequently connected to the delivery of insight. Thus, the data mentioned above and the findings supported the current study's conclusions that predictive analytics is a key influencing variable for AI-based project management.

Champions	
Average percentage of projects using predictive approaches	44%
Average percentage of projects using agile approaches	30%
Average percentage of projects using hybrid approaches	23%
Average percentage of projects using "other" approaches	4%

Source: PMI Pulse of Profession, 2018

Fig 1: Champions use the approach best suites for them

Challenges of AI-based Project Management

For the project managers, the security aspects have significantly created challenges using AI due to the fragile and irrelevant algorithm structure unaware of the organisation's policies. According to Kumar *et al.* (2023) [49] findings, the focus on security is acceptable since poorly

managed AI systems pose dangers to an organisation's assets and data. However, Montasari *et al.* (2020) [54] emphasised that it's crucial to understand that the security issues related to AI-based project management aren't caused by AI itself but rather by how it is used and incorporated inside the company. In some cases, data breaches have been

seen due to the similar trends of the data integrated with which the AI trained and failed to discriminate between securing and publishing. In the same vein, Ibrahim *et al.* (2020) ^[42] discussed that Data breaches might have a disastrous effect on a company's reputation, stock price, and the economy. The results showed that project managers mostly worry about data safety and security risks while using AI in tasks and managing data security. Gupta *et al.* (2020) ^[38] claimed that data privacy protection is essential in the use of technology, including AI. In mitigation of this challenge, Li *et al.* (2023) ^[51] discussed that ensuring AI systems follow applicable data protection laws and employ privacy-preserving measures is crucial.

Conclusion

Artificial intelligence (AI) potencies and capabilities are vast in various disciplines, and its implementation in project management can improve the project's quality and can save time for more productive things. Project managers, however, understand the opportunities and value of its integrity in processing and are also aware of various tools and technologies that have facilitated them. Project managers are required to adopt a planned and determined strategy if they are willing to integrate AI into projects effectively (Pan and Zhnag, 2023) ^[83]. According to El Khatib and Al Falasi (2021) ^[28], project managers should start by examining a thorough requirements analysis and identifying jobs and processes that can be automated or enhanced with AI. In addition, it is crucial to carefully evaluate how AI will affect human employees and their tasks in order to make sure that it assists rather than replaces human talents, as asserted by Smids *et al.* (2020) ^[69]. In a similar line, Moore *et al.* (2021) ^[55] recommended that to prevent incorrect inferences and protect critical project data, appropriate data quality and security assurance procedures are essential. Enholm *et al.* (2022) ^[32] emphasised AI and its use in business processing and found that adopting AI requires creating an environment where learning and acceptance are valued. In this case, Psyché *et al.* (2023) ^[63] presented guidelines for programmes for training and upskilling that should be carried out to provide managers for projects and team members the abilities they need to use AI efficiently. However, Verma *et al.* (2022) ^[76] concluded that continual review and feedback will help AI systems be optimised, and their advantages appreciated.

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