

Revolutionizing Project Management: How Artificial Intelligence is Shaping the Future of Project Planning and Execution

Ayodeji Ajiboye¹ Olayemi Windokun¹ Segun Aguda^{1*}

1. Missouri State University, 901 South National Avenue, Springfield, Missouri 65897

* E-mail of corresponding author: spa9s@MissouriState.edu

Abstract

With the COVID-19 pandemic came new challenges. One such challenge was in project management processes, including coordinating team members through remote work and managing suppliers who could not be visited in person. In response, artificial intelligence (AI) emerged as an essential tool across industries in transforming project management by driving improvement in planning and execution. The following article explicates how AI helps a project manager through predictive analytics, smart resource allocation, real-time insights, and task automation to make better decisions and improve operational efficiency with correct forecasting. AI-powered tools help increase the predictability of the risks to be faced, optimize resource utilization, and automate repetitive tasks so that a project manager can focus on strategic goals. This, in turn, helps the companies improve project deliverables by embedding AI further in their operations to give themselves a competitive edge in the dynamically changing market.

Keywords: Project Management, Artificial Intelligence

DOI: 10.7176/EJBM/16-10-10

Publication date: December 30th 2024

1. The Emergence of AI in Today's World and Its Relevance in Project Management.

In this present digital landscape, artificial intelligence has emerged to reshape industries through a much-improved state of data analysis, automation, and elevated decision-making processes. Artificial intelligence, otherwise known as AI, is applied in a wide array of fields to improve productivity with increased precision through insights driven by algorithms and automated workflows: from healthcare to finance and manufacturing. AI makes most large-scale, industrial approaches and/or tasks efficient. It has the capacity to process bulk information in the shortest time at a high level of accuracy. This is an actionable insight that was previously unreachable. Artificial intelligence traces back several decades ago when the Industrial Revolution was on the rise.

Immediately after World War II, many people began working on intelligent machines. Probably the first researcher to work in AI was Alan Turing in 1947. Some sources trace the origins of AI back to his conceptualization of a "thinking machine" in the 1950s (Theodor & Herman, 2024). Since then, AI has passed through several ups and downs and is currently going through a new hype phase. For instance, AI is being used in novel scenarios, such as the COVID-19 pandemic, to detect and diagnose patients and develop drugs and vaccines (Taboada et al., 2023). However, such a step in AI was further accelerated by the pandemic, where the need for remote work in project management necessitated new ways of collaboration, task monitoring, and productivity. AI-driven tools allowed virtual scheduling, resource allocation, and risk assessment to help managers adapt to dynamic conditions. This period revealed AI's potential to handle uncertainties and optimize project outcomes under crisis. Since then, the usage of AI in Project Management has grown to be even more popular. AI tools ensure more added advantages in project management, where the project manager can study historical data and, thus, predict project outcomes with increased precision.

Traditional project management methods rely very strongly on human judgments, which are eminently prone to oversight and inefficiency. With AI, this process automates, analyzes patterns, and uncovers risks early. Predictive analytics, therefore, powered by machine learning, enables the project managers to predict possible delays, cost overruns, or resource shortages well in time for them to take pre-emptive measures. AI-based technologies are being used in various works in the construction industry, which will help enhance budget management and time efficiency for successful project delivery with this predictive capability. AI and machine learning systems can be used to process metadata in order to predict the future; hence, these will be helpful in the

bidding of projects. Artificial Intelligence-based technologies like robots are also being used to do repetitive work in construction such as real-time monitoring of job site progress, thus improving job site productivity (Kushal & Lochana, 2021). AI automation systems can do even so much more in project management. It can manage routine administrative tasks such as scheduling and document control and allows project managers to focus on strategic decision-making. Process automation cuts down manual errors, maintains project documentation consistently, and therefore raises productivity. In other words, AI dynamically readjusts the schedule, optimizes resource allocation, and enables data-driven decisions in agile settings that have high levels of project complexity-value addition. AI finds its relevance in project management because of the facilitation it brings to all the processes involved in making these projects work effectively and efficiently, thereby allowing predictive insights into improving project outcomes. Considering the present continuous evolution of AI, their integration into project management shows even greater promises of the advantages underlining the indispensable role of AI in modern project execution.

2. Intelligent Resource Allocation and Scheduling

AI-driven resource allocation and scheduling have been proven to transform project management by moving it onto a data-driven platform that enhances its efficiency and effectiveness. Artificial intelligence algorithms dynamically adjust schedules, assign resources in real-time, and take into consideration project priorities, deadlines, and team capability. Artificial intelligence contributes to the optimization of project timelines by analyzing various parameters and dependencies within a construction project. Machine learning algorithms can evaluate historical performance data, identify critical paths, and suggest optimal sequencing of tasks to streamline the construction process. By considering the interdependencies among different project elements, AI-driven tools assist in creating realistic and achievable project schedules. This optimization not only improves overall project efficiency but also aids in meeting deadlines and client expectations (Nwankwo et al., 2024). Artificial intelligence algorithms also analyze historical project data, current resource availability, and team performance metrics by leveraging machine learning and optimization techniques to make informed scheduling decisions that would be very difficult and time-consuming to replicate manually. In a study by Grace E. Egbedion, while comparing the scheduling accuracy between projects managed with old methods and those managed with the use of AI algorithms, it was found that projects managed using AI had a better degree of scheduling accuracy – with the mean deviation from the planned schedule just about 5%, when compared to 15% in the projects managed using old methods (Grace, 2024).

Among the main advantages of Artificial intelligence in resource allocation is that it considers optimized use of resources by knowing exactly where the workload should be dispersed across teams to eliminate overutilization or underutilization via intelligent scheduling. This prevents operational costs from going overboard and saves one from burnout. Secondly, AI algorithms can make such a prediction and adjustment to prevent bottlenecks, which reduces downtime and enhances productivity. Its adaptability is a very important characteristic on complex projects because of the nature of priorities and constraints that are expected to shift at the blink of an eye and must have responsive adjustments.

AI-powered scheduling allows the project manager to hit milestones more predictably because the technology aligns resources precisely with what is required for the project. In fact, with continuous monitoring and realignment of schedules from ever-evolving real-time data, AI will also help a project manager apportion scarce resources effectively to critical tasks, making sure that important activities are prioritized and deadlines are met.

3. Predictive Analytics for Proactive Risk Management

The use of predictive analytics powered by artificial intelligence is reshaping risk management in project management, enabling proactive responses to potential challenges. With its ability to process vast amounts of historical and real-time data, AI gives project managers deep insights into patterns and trends that may indicate risks, such as project delays, budget overruns, or resource shortages. By identifying these issues before they fully materialize, predictive analytics offers a strategic advantage that traditional methods may lack (Kalogiannidis et al., 2024).

AI's forecasting capabilities allow project managers to make data-driven adjustments to project plans and resources, which can mitigate potential issues before they disrupt project timelines or budgets. For instance,

machine learning models can analyze previous project data to forecast delays, enabling managers to redistribute resources or adjust schedules accordingly. This proactive approach not only minimizes the risk of costly disruptions but also fosters excellent reliability in achieving project milestones. Based on the research done by Grace E. Egbedion on comparing traditional methods and AI on a Fintech Company's Fraud Detection and

Risk Management. It was revealed that the AI system provided high accuracy in predicting potential fraud, allowing the company to manage risks proactively. Also, with AI, there was improved resource allocation efficiency, which helped to manage risk more appropriately. Comparing the results of the traditional and AI models showed that resource allocation efficiency improved from 70% to 90%, ensuring that the right resources were deployed at the right time to address potential risks (Grace, 2024).

Furthermore, since traditional risk assessment methods often rely on historical data and fixed models, which can adapt slowly to new or emerging risks, artificial intelligence leverages advanced algorithms and real-time data to detect potential risks earlier and with greater precision. Analyzing vast amounts of data and uncovering complex patterns helps financial institutions stay ahead of potential threats and make more informed decisions (Haider, 2024). Hence, AI's predictive analytics enhances budget management by highlighting potential financial risks early on, allowing project managers to adjust expenditures and maintain budget alignment. In addition, it enables more effective resource allocation, reducing the likelihood of shortages or over-allocation.

4. Enhanced Decision-Making with Real-Time Insights

In today's world of project management, with increasingly complex projects and dynamic challenges from global operations, demands for correctness and timeliness in decision-making have become more and more necessary. With this demand, AI is now proving to be transformative; its new capability to handle and analyze data on a large scale gives project managers real-time insights that enable informed, data-driven decisions. Now, advanced algorithms and generative artificial intelligence feature the identification of patterns, correlations, and anomalies within project data budget usage, resource allocation, and team performance metrics, which are relatively fast. Machine learning algorithms can analyze large volumes of data to identify patterns and trends that would be difficult or impossible for human beings to find. Also, generative AI can help with predictions about project performance. Equipped with this information, a project manager may then make an improved decision regarding his project. Artificial intelligence can help a project manager by offering better insight and information on aspects such as cost estimates, feasibility of timelines, and resource bottlenecks that may arise (Opeyemi & Tolulope, 2024). Such insight gives the manager a better perspective of the prevailing health of the projects through predictive analytics that may attempt to pre-empt probable delays or bottlenecks.

Perhaps most important of its functions, AI can help the PM with decision-making by inspecting the trends in performance within the team and operational efficiency. With these AI-driven insights at hand, managers will be able to spot instances where teams need extra support, training, or other resources to optimize their productivity levels and develop a proactive attitude toward adjustments in projects. In this way, one will be able to make swift and agile responses to changed circumstances in projects as real-time data flows in, enabling the project to keep in step with overarching strategic objectives and minimizing the risk of project overruns. AI's impact on project management also extends to better alignment with organizational goals (Serge-Lopez et al. 2020). The real-time insights are helping to keep the project headed in the proper direction: the outcomes align with the strategic priorities, and the stakeholders have gained transparency.

However, organizations and project managers should also cautiously apply artificial intelligence in their daily work. As impressive as generative artificial intelligence is in bringing singular abilities to project management, human decision-making remains at the very core of project success. Human project managers possess a range of skills and qualities that are not easily emulated with AI systems alone. Some of the key qualities that human project managers possess and that are valuable include decision-making, problem-solving, creativity, and interpersonal skills. These are highly valuable in a complex, dynamic project environment where adaptability, intuition, and social intelligence can be a great aid. Understanding the contribution of human intelligence gives a complete view of the interaction between generative AI and human decision-making in project management (André & André, 2023).

5. Automation of Routine Tasks for Higher Productivity:

Artificial Intelligence is transforming project management, which automates routine tasks, boosts efficiency, and allows teams to concentrate on strategic goals. AI tools enhance various aspects of project management, including scheduling, resource distribution, and progress monitoring, while reducing manual work and human mistakes (Savio & Ali, 2024). AI-enabled software can automatically generate reports, provide real-time updates, and perform data analysis, offering valuable insights for improved decision-making. Communication and task assignments are streamlined through virtual assistants such as chatbots. Implementing AI for handling routine tasks empowers project managers to dedicate their efforts to improving innovation, tackling complex challenges, and strengthening stakeholder relationships, thereby enhancing overall project effectiveness and deliverables. The pervasive integration of artificial intelligence into project management practices has expanded across diverse industries, encompassing sectors such as construction, healthcare operations, financial services, manufacturing, and numerous other domains. Let us examine how artificial intelligence is implemented in construction and healthcare management.

5.1. A Case Study from Quantum Contracting

In construction project management, routine administrative duties like progress reporting, document control and management, and correspondence tracking can reduce overall efficiency. Implementing artificial intelligence to automate these tasks can substantially enhance productivity, enabling project teams to focus on more strategic, high-value activities. This study investigates the effects of AI-powered automation on project management by analyzing a seasoned Project Manager's experience at Quantum Contracting Company in the Middle East.

The Project Manager at Quantum was responsible for overseeing the planning, execution, monitoring, and control of two major construction projects. In these projects, administrative tasks were critical in maintaining project schedules, ensuring accurate communication, and guaranteeing data reliability. Traditionally, these tasks were performed manually, consuming significant time and introducing the possibility of human error. Recognizing the need for a more efficient approach, the PM implemented AI-based automation tools. These included PlanSwift for automated material quantity takeoffs and estimation, which aided in planning and budgeting, and TimeLapse for real-time on-site progress monitoring and reporting (Taboada et al., 2023). Using a time-lapse camera for monitoring and reporting real-time progress updates on site resulted in faster progress updates and easier identification of potential delays. PlanSwift made the estimation and planning process more efficient and quicker. As a result, the project manager could complete the project ahead of the contractual completion date.

5.2. Artificial Intelligence Adoption in Healthcare Project Management

The healthcare industry benefits significantly from incorporating artificial intelligence (AI) in project management, offering improvements in efficiency, resource distribution, and decision-making processes. A prime illustration of AI's application in hospital administration can be found in Springfield, Missouri, where a local medical facility has implemented AI tools to enhance patient flow and optimize resource usage. These AI systems employ predictive analytics to anticipate patient admissions, enabling staff to allocate beds and personnel more effectively. Furthermore, AI-enhanced electronic health records (EHR) have simplified administrative duties, freeing up more time for patient care (Zafer & Graepel, 2024).

In another instance, The Keys Health Services utilizes AI-driven clinical decision support systems to combine real-time patient information with clinical guidelines. This approach has led to faster decision-making and improved patient outcomes. A common thread among hospitals leveraging AI for their health management systems is the ability to replicate administrative successes by integrating AI tools for resource management and operational efficiency. This technology enhances performance, allowing routine tasks to be managed more swiftly and effectively, thus becoming an essential component of modern healthcare (Khatib et al., 2021).

Nevertheless, the adoption of AI across various industries faces obstacles such as data privacy concerns, regulatory compliance issues, and staff adaptation challenges. The subsequent section will explore these points in greater detail.

6. AI Adoption in Project Management: The Challenges and Solution

Integrating artificial intelligence into project management presents various obstacles, including privacy issues, substantial implementation expenses, and employee opposition to new technologies (Shang et al., 2023). These hurdles can result in significant repercussions and penalties, making the adoption of AI a complex and demanding process. To address these challenges effectively, project managers must first comprehend the issues

before proposing solutions. Here are the strategies to deal with such problems: Intensive training programs, effective communication of AI's benefits and value to employees and the organization, and introducing ethical standards to safeguard information and install trust.

6.1. Challenges in Implementing Artificial Intelligence for Project Management

Incorporating artificial intelligence has markedly improved various facets of project management, spanning both the planning and execution stages. Nevertheless, implementing this sophisticated technology presents its own set of distinct obstacles and considerations that warrant careful examination. A major hurdle is the initial financial cost, including the purchase of AI tools, their integration with current systems, and staff training for effective utilization (Shang et al., 2023). Smaller firms with constrained budgets may find investing in these cutting-edge technologies challenging, potentially compounding the divide between them and their more prominent rivals.

Another obstacle project managers and organizations face when implementing AI is the reliance on and quality of data. Effective operation of AI systems depends on large volumes of high-quality data. Inaccurate predictions and unreliable decision-making can result from subpar data quality, incomplete datasets, or inconsistent data-gathering techniques. Additionally, many companies face challenges with employee acceptance, as staff members may fear job displacement or doubt the reliability of automated systems. Such opposition can impede the adoption process and restrict the full capabilities of AI-powered tools, as employees might perceive AI as a threat to their job security or struggle to adapt to AI-driven tools due to insufficient technical expertise. This reluctance can hinder adoption and limit the advantages of AI-enhanced processes (Bodea et al., 2020). To address this, organizations must invest in extensive training programs and change management strategies to foster acceptance and trust in AI technologies.

Lastly, ethical considerations and data privacy concerns present obstacles. AI systems handling sensitive project information must adhere to strict regulations to prevent data breaches and ensure transparency. These challenges necessitate a balanced approach to integrating AI into project management, maximizing its benefits while minimizing risks.

6.2. Addressing the Challenges of AI Implementation in Project Management

As discussed in section 6.1, the incorporation of artificial intelligence into project management faces several obstacles, including ethical issues, biased decision-making, compatibility with human-centered designs, industry-specific complexities, and data protection concerns. Nevertheless, these challenges can be effectively overcome through strategic approaches.

To address ethical worries and bias, companies can employ transparent AI algorithms and establish auditing processes to detect and reduce biases. Additionally, promoting interdisciplinary research may result in the development of ethical AI governance frameworks, ensuring fairness and responsibility in project management systems (Floridi & Cowls, 2022).

Harmonizing AI with human-centered designs necessitates promoting cooperation between human project managers and AI tools. Implementing training initiatives to enhance users' understanding of AI systems can help bridge the gap, enabling managers to comprehend AI-generated insights while maintaining human supervision. Furthermore, adaptive AI systems that evolve based on user input can offer more tailored and efficient solutions (Murtaza et al., 2022).

To tackle industry-specific challenges, developing specialized AI applications customized for particular sectors, such as healthcare or construction, can boost efficiency. Successful implementation case studies can serve as valuable reference points.

Lastly, addressing data security concerns involves implementing robust encryption and data governance policies. Organizations must ensure adherence to regulatory standards while investing in secure AI infrastructure. Collectively, these solutions enable companies to leverage AI's potential while minimizing adoption obstacles.

7. Artificial Intelligence in Project Management: Possible Areas of Interest for Future Research and Studies

The potential of AI-driven project management is vast, with numerous research opportunities emerging to improve its implementation and effectiveness. A crucial area of study is the ethical considerations and accountability in AI decision-making. As AI becomes increasingly essential in project planning and execution, it is vital to understand and address algorithmic biases. Scholars could investigate ethical AI usage frameworks, ensuring decision-making processes are transparent and fair, particularly in cost and procurement management.

These areas are predicted to experience high and average AI impact, respectively, over the next decade, compared to eight (8) other PMBOK knowledge areas (Fridgeirsson et al., 2021).

Another promising research direction involves the combination of adaptive AI systems with human-centered design. Future studies could explore how AI can enhance human decision-making in dynamic project environments, emphasizing collaboration between project managers and AI tools. This research would examine adaptive AI systems that learn from human input to improve their performance over time (Bellet et al., 2020).

Additionally, industry-specific AI applications offer significant opportunities for innovation. Developing specialized AI tools for sectors such as construction, healthcare, and IT can improve predictive analytics and resource allocation tailored to industry-specific challenges (Maleki Varnosfaderani & Forouzanfar, 2024). Case studies, including those from Springfield hospitals, showcase the benefits of targeted AI applications.

Further research could address scalability and data security issues, focusing on methods to implement AI systems across various organizational levels while protecting sensitive information. These studies could shape the secure and efficient expansion of AI in global project management practices.

8. Findings

The PM concludes that one of the strong examples of the use of automation is in status reporting. Here, the PM could make use of tools such as Microsoft Power BI, which is a business analytics tool integrated with artificial intelligence and machine learning ML to make data analysis and visualization more advanced. By putting these artificial intelligence tools together and using real-time reporting by the AI-controlled time-lapse camera, Quantum could automatically collect and analyze real-time data and, thus, create project status reports on an automated basis. This automation brought not only time savings in reporting but also consistency, with fewer human data entry mistakes. With automation in place, Quantum was able to get accurate and up-to-date insights on project performance without repetitive manual effort.

Besides, document transmission and control became much more effective due to AI-driven categorization and version control. This turned out to be quite important in the fast-moving construction environment, where access to the most recent documents and drawings is crucial for making accurate decisions. Automated document tracking reduced risks associated with outdated information and allowed team members to pay more attention to more complex and analytical work rather than wasting time on document checks. This is evidenced through various studies done in the past, as some of the findings indicated that huge volumes of data analysis by AI algorithms predict risks and suggest strategies for optimum utilization, resulting in the completion of projects more efficiently and at lower costs, thereby enhancing the success rate of the projects (Grace, 2024).

Lastly, AI tools allow communication to be tracked to ensure smooth coordination among several stakeholders and departments. Automated logs with reminders allow for timely follow-ups to facilitate clarity and consistency in communications among the project participants.

9. Conclusion

Since the COVID-19 pandemic accelerated the adoption of Artificial Intelligence in managing projects, particularly for remote project tracking, in demonstrating its potential to manage dynamic environments fraught with complexities and uncertainties, AI has become an asset that is irreplaceable in modern project management. Through insight-driven data and predictions, it automates the traditional system of handling project activities. Hence, AI-powered tools give informed decisions to project managers in real time by improving productivity and accuracy. They automate routine processes such as scheduling, document control, and status reporting.

Leveraging on AI use to automate project processes will provide more time for the managers to decide on strategic issues and optimize resources. Predictive analytics within AI tools can enable proactive risk management by determining the chances of delays in projects, budget constraints, or shortfalls in resources, thus taking necessary actions to avoid such situations and control costs. AI is offering practical perception and streamlining processes, hence promising novel ideas and efficiencies in the way project management is approached by setting a new benchmark for the success of projects.

References

1. Theodor M. & Herman V. D. (2024). The Role of Artificial Intelligence in Enhancing Project Management. <https://uia.brage.unit.no/uiaxmlui/bitstream/handle/11250/3140689/no.uia:inspera:229818957:49932792.pdf?sequence=1>.
2. Taboada I., Daneshpajouh A., Toledo N., & de Vass T. (2023). Artificial Intelligence Enabled Project Management: A Systematic Literature Review. <https://doi.org/10.3390/app13085014>.
3. Kushal A. and Lochana P. (2021). Future of Construction Industry: COVID-19 and Its Implications on Construction Projects and Risk Management – A Review. Preprints 2021, 2021040383. <https://doi.org/10.20944/preprints202104.0383.v1>
4. Nwankwo C. O., Riliwan A. A., Oladiran K. O., Igberaese C., & Festus-Ikhuoria (2024). Integrating Artificial Intelligence in Construction Management: Improving Project Efficiency and Cost-effectiveness. International Journal of Advanced Multidisciplinary Research and Studies. ISSN 2583-049X. <https://www.multiresearchjournal.com/admin/uploads/archives/archive-1711453341.pdf>.
5. Grace E. E. (2024). Examining the Security of Artificial Intelligence in Project Management: A Case Study of AI-driven Project Scheduling and Resource Allocation in Information Systems Projects. IRE Journals. Volume 8 Issue 2. ISSN: 2456-8880. <https://www.irejournals.com/formatedpaper/1706160.pdf>.
6. Kalogiannidis S., Kalfas D., Papaevangelou O., Giannarakis G., & Chatzitheodoridis F. (2024). The Role of Artificial Intelligence Technology in Predictive Risk Assessment for Business Continuity: A Case Study of Greece. Risks, 12(2), 19. <https://doi.org/10.3390/risks12020019>.
7. Haider A. J. (2024). AI-Driven Predictive Analytics in Finance: Transforming Risk Assessment and Decision-Making. Advances in Computer Sciences Vol.7. Academic Pinnacle. <https://academicpinnacle.com/index.php/acs/article/view/204/216>.
8. Opeyemi A. O. & Tolulope E. E. (2024) AI in Project Management: Exploring Theoretical Models for Decision-making and Risk Management. Engineering Science & Technology Journal. P-ISSN: 2708-8944, E-ISSN: 2708-8952. Volume 5, Issue 3, P. No. 1072-1085. <https://doi.org/10.51594/estj.v5i3.959>.
9. Serge-Lopez W-T., Samuel F. W., Jean R. K. K., & Chris E. T. W. (2020). Influence of artificial intelligence (AI) on firm performance: the business value of AI-based transformation projects. Business Process Management Journal. ISSN: 1463-7154. <https://doi.org/10.1108/BPMJ-10-2019-0411>.
10. André B. and André M. (2023). Who is better in Project Planning? Generative Artificial Intelligence or Project Managers? <https://doi.org/10.1016/j.plas.2023.100101>.
11. Savio, R. D., & Ali, J. M. (2023). Artificial Intelligence in Project Management & Its Future. Saudi J Eng Technol, 8(10), 244-248. https://saudijournals.com/media/articles/SJEAT_810_244-248.pdf.
12. Taboada I., Daneshpajouh A., Toledo N., & de Vass T. (2023). Artificial Intelligence Enabled Project Management: A Systematic Literature Review. <https://doi.org/10.3390/app13085014>.
13. Zafer A., & Graepel T. (2024). Transforming Patient Care with AI: Leveraging Electronic Health Records for Personalized Healthcare and Proactive Care. https://www.researchgate.net/publication/380792879_Transforming_Patient_Care_with_AI_Leveraging_Electronic_Health_Records_for_Personalized_Healthcare_and_Proactive_Care.
14. Khatib, E., ZM, R., & Al-Nakeeb, A. (2021). The effect of AI on project and risk management in health care industry projects in the United Arab Emirates (UAE). Int. J. Appl. Eng. Res, 6(1).
15. Shang, G., Low, S. P., & Lim, X. Y. V. (2023). Prospects, drivers of and barriers to artificial intelligence adoption in project management. Built Environment Project and Asset Management, 13(5), 629-645. <https://www.emerald.com/insight/content/doi/10.1108/bepam-12-2022-0195>.
16. Bodea C., Mitea C., & Stanciu O. (2020). Artificial intelligence adoption in project management: main drivers, barriers and estimated impact. In Proceedings of the 3rd International Conference on Economics and Social Sciences (pp. 758-767). https://www.semanticscholar.org/paper/Artificial-Intelligence-Adoption-in-Project-Main-Bodea-Mitea/1d9d35672900232711eacacc4a35737321e76de3?utm_source=direct_link.
17. Floridi, L., & Cowls, J. (2022). A unified framework of five principles for AI in society. Machine learning and the city: Applications in architecture and urban design, 535-545. <https://doi.org/10.1002/9781119815075.ch45>.
18. Murtaza M., Ahmed Y., Shamsi J. A., Sherwani F., & Usman M. (2022). AI-based personalized e-learning systems: Issues, challenges, and solutions. <https://ieeexplore.ieee.org/document/9840390>.

19. Fridgeirsson, T. V., Ingason, H. T., Jonasson, H. I., & Jonsdottir, H. (2021). An authoritative study on the near future effect of artificial intelligence on project management knowledge areas. *Sustainability*, 13(4), 2345. <https://doi.org/10.3390/su13042345>.
20. Bellet T., Banet A., Petiot M., Richard B., & Quick J. (2020). Human-centered AI to support an adaptive management of human-machine transitions with vehicle automation. *Information*, 12(1), 13. <https://doi.org/10.3390/info12010013>.
21. Maleki Varnosfaderani S., & Forouzanfar M. (2024). The role of AI in hospitals and clinics: transforming healthcare in the 21st century. *Bioengineering*, 11(4), 337. <https://doi.org/10.3390/bioengineering11040337>.
22. Grace E. E. (2024). Examining the Security of Artificial Intelligence in Project Management: A Case Study of AI-driven Project Scheduling and Resource Allocation in Information Systems Projects. *IRE Journals*. Volume 8 Issue 2. ISSN: 2456-8880. <https://www.irejournals.com/formatedpaper/1706160.pdf>.