

Transforming Project Management with Artificial Intelligence: Bibliometric Analysis and Systematic Literature Review

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Abstract

Despite the growing importance of project management to ensure organization success, the rate of project failures remains high, which indicates the need to apply modern methods. Latest innovations in Artificial Intelligence (AI) have been used to address challenges in the field. This study aims to conduct Bibliometric Analysis and Systematic Literature Review (SLR) to investigate the implementation of AI in project management, challenges faced, and the impact of the results. The study identifies four major trends where AI is applied within project management: prediction and monitoring, work automation, interaction and collaboration through immersive technologies, and knowledge management enhancement. The study encountered several challenges, including high implementation costs, a lack of senior management commitment, cultural resistance, limited access to real-time data, strategy misalignment, and data privacy concerns, all of which posed barriers to the study. On the other hand, the results show that the use of AI has various impacts, including increased productivity, better decision-making, and higher project success rates. This study covers AI in project management over the past recent five years as a novelty, offers a comprehensive classification of application, challenges and impacts, and fills the research gap left by the previous study. By bringing these insights together, this study contributes to deeper understanding of how AI is transforming project management and provides guidance for future implementations.

Keywords: Artificial Intelligence, Project Management, Bibliometric Analysis, Systematic Literature Review, Implementation.

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1. Introduction

Project management has been evolving and gaining momentum within various industry sectors to gain strategic business competency and discipline [1]. However, organizations often overemphasize the use of technology, leading to numerous mistakes in project management, such as excessive investments, inefficiencies [2], and project termination. With the emergence of Artificial Intelligence (AI), project management is undergoing a significant transformation, enabling the automation of routine tasks [3], enhancing decision-making [4], and enabling real-time insights [5]. AI has been demonstrated to have an impact in fields such as healthcare [6], finance [7], international security [8] and cybersecurity [9], highlighting its growing relevance.

Nevertheless, project failures remain concerning.

Figure 1 illustrates data from the 2020 Standish Group Chaos Report, which shows that only 31% of IT projects were considered successful, 50% exceeded budget and schedule, and 19% canceled projects [10]. To address this problem, modern approaches like AI adoption are critical. This study aims to do a Bibliometric Analysis and Systematic Literature Review (SLR). Bibliometric analysis is conducted to contextualize the selected literature, enhancing the understanding of the results and their significance, while SLR is conducted to investigate the application and benefits of AI in project management. The findings

provide valuable insights into AI implementation trends, strategic approaches, and their effectiveness in enhancing project outcomes, which contributes to a better understanding of AI implementation in project management. Next IT Project Success Rates in 2020 on Figure 1.

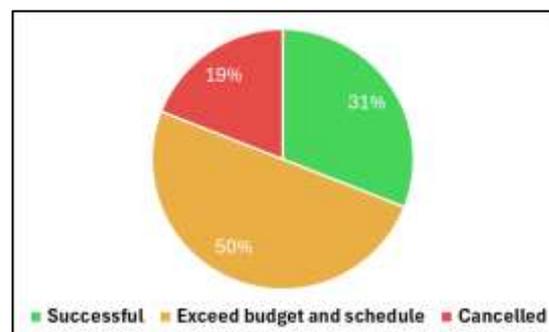


Figure 1. IT Project Success Rates in 2020 (adapted from [10])

This combination of bibliometric and SLR approaches to studying AI in project management over the past five years represents a novel contribution to project management research. It offers a comprehensive classification of applications, challenges, and impacts, addressing the research gap left by the previous study. This review advances the literature in three ways: consolidates fragmented evidence on AI implementations in project management from 2021-2025; maps adoption challenges across organizational, technical, and governance layers; and quantifies and

thematically classifies reported impacts to inform managerial playbooks and research agendas. Accordingly, this study investigates three research questions (RQ): (RQ1) How is AI implemented in project management? (RQ2) What challenges hinder adoption? (RQ3) What impacts are reported on efficiency, decision quality, and project outcomes? By bringing these insights together, this study contributes to understanding how AI transforms project management and provides guidance for future implementations.

For comparative purposes, a prior SLR study on the use of AI in project management was selected [14]. Several limitations were identified. First, the articles that were collected were outdated, covering 2016 to 2021. Prior study only used two databases and applied narrow inclusion criteria, which might have restricted the breadth of the reviewed literature. The quality assessment method was also not clearly defined within the study. Second, the study's focus area was limited to a general overview of AI use in project management. This study improves upon the previous one by collecting articles from the last five years, specifically from 2021 to 2025. It also uses eight databases and applies more refined inclusion criteria to ensure better relevancy and quality. The focus is narrowed to several key aspects of AI in project management: implementation, challenges, and impacts. This study also adopts a different SLR framework for quality assessment. Comparison of the prior SLR with this study is summarized in Table 1.

Table 1. Comparison of Prior SLR with This Study

| Aspect | Prior SLR | This Study |
|-------------------------------|----------------------------------|--|
| Publication Timeframe | 2016–2021 | 2021–2025 |
| Number of Databases Used | 2 | 8 |
| Inclusion/ Exclusion Criteria | Narrow criteria | Broader or refined for relevance and quality |
| Focus Areas | General AI in project management | AI implementation, challenges, and impacts in project management |
| SLR Method | PRISMA | Kitchenham |
| Analysis | Bibliometric | Bibliometric |
| Methodology | analysis, Thematic Clustering | analysis, Thematic Clustering |

2. Research Method

This study uses bibliometric analysis and SLR methodology. The purpose of this study is to select, collect, and analyze a collection of relevant studies in recent years related to this research topic. This study ran the final search on 10 August 2025. The study covered publications dated 1 June 2021–10 August 2025 across eight databases. The research stages follow the established SLR guidelines [15]. Figure 2 illustrates the research steps, which are divided into three phases: planning, data collection, and data analysis.

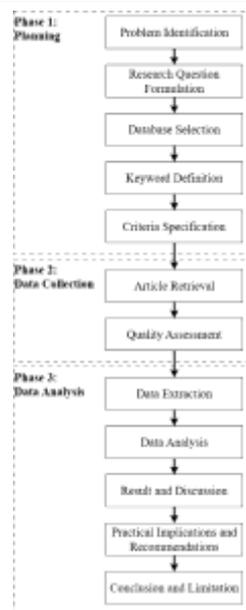


Figure 2. Research Steps

First, the need to conduct an SLR is identified. Next, specific RQ are formulated to guide the review. Then, research databases and relevant keywords are selected appropriately for the literature search. The selection criteria for inclusion and exclusion parameters are established to make sure the studies are relevant and of high quality. Based on these criteria, relevant articles are identified and retrieved. The quality of the selected articles is assessed, and data are extracted from them. The extracted data are used to address the RQ. Finally, the findings are analyzed to provide a comprehensive overview of the results. Data collection follows the stages of the SLR process. The databases used in this SLR are ACM Digital Library, IEEE Xplore, JSTOR, Sage Journals, ScienceDirect, Scopus, Emerald, and Taylor & Francis. The keywords used are *Artificial Intelligence AND Project Management AND (Implementation OR Application) AND Challenges AND Impact*. Mendeley and Bibliometrix were used for deduplication and reference management.

This study applies specific inclusion criteria to determine the eligibility of publications for the literature review. The inclusion criteria consist of the following: the publication focuses on AI in project management, the study falls within the fields of computer science or business management, the publication appears in an international journal or conference proceeding, the publication is written in English, and the study was published between 2021 and 2025. In addition, exclusion criteria are defined to filter out irrelevant materials. These include duplicate publications, inaccessible publications, and (3) publications not written in English. After completing the literature search, the results are filtered based on the titles and abstracts of the identified publications.

The study selection followed three phases. First, initial search results were retrieved from selected database sources. Second, screening was performed on the results from the first phase based on titles and abstracts. Third, a full-text assessment was performed on the

second phase's results to make sure the studies have high quality and relevant. Table 2 presents the outcomes of the selection process from each database source. Next literature selection results on Table 2.

Table 2. Literature Selection Results

| Source | Phase 1 (Based on search results) | Phase 2 (Titles and abstracts selection) | Phase 3 (Full text quality selection) |
|---------------------|--------------------------------------|---|--|
| ACM Digital Library | 63 | 2 | 2 |
| IEEE Xplore | 14 | 14 | 5 |
| JSTOR | 32 | 5 | 1 |
| Sage Journals | 74 | 5 | 3 |
| ScienceDirect | 1131 | 10 | 5 |
| Scopus | 10 | 2 | 1 |
| Emerald | 1821 | 0 | 0 |
| Taylor & Francis | 271 | 12 | 4 |
| Total | 3416 (3415 without duplicates) | 50 (49 without duplicates) | 21 |

Based on the selection process, we identified 3,416 records in Phase 1 (3,415 after deduplication). Phase 2 retained 50 records (49 after deduplication), and Phase 3 included 21 studies. The Emerald search retrieved n=1,821 records; after deduplication and screening, 0 met the inclusion criteria for full-text synthesis. Data extraction was performed using the Population, Intervention, Comparison, Outcome, and Context (PICOC) framework to align selected articles with RQ. Based on the PICOC analysis, the study formulates the three RQs previously mentioned to guide the SLR. PICOC analysis is summarized in

Table 3.

Table 3. PICOC Analysis

| Criteria | Description |
|--------------|---|
| Population | Project management |
| Intervention | AI usage |
| Comparison | AI strategies and approaches in project management |
| Outcome | Applications, challenges, impacts |
| Context | Technology-based project management in the private and government sectors |

The quality of the candidate research titles is assessed for inclusion in the literature review. The following QA procedures are applied to all candidates to evaluate the quality of the identified studies: (QA1) Does the study explain the implementation of AI in project management? (QA2) Does the study explain the results of the implementation of AI on project management? (QA3) Do the studies recommend implementing AI in project management?. Each criterion was scored with 1 (Yes) or 0 (No). The total score was calculated, and the inclusion criteria considered studies with $QA \geq 2$. Table 4 presents the results of the quality assessment for each article. Quality Assessment Results on Table 4.

Table 4. Quality Assessment Results

| Study | Included | | | | Study | Excluded | | | |
|-------|----------|-----|-----|-----|-------|----------|-----|-----|-----|
| | QA1 | QA2 | QA3 | Sum | | QA1 | QA2 | QA3 | Sum |
| [5] | 1 | 1 | 0 | 2 | [16] | 0 | 0 | 1 | 1 |
| [3] | 1 | 1 | 1 | 3 | [17] | 0 | 0 | 0 | 0 |
| [4] | 1 | 1 | 1 | 3 | [18] | 0 | 0 | 0 | 0 |
| [19] | 1 | 1 | 1 | 3 | [20] | 0 | 0 | 1 | 1 |
| [21] | 1 | 1 | 1 | 3 | [22] | 0 | 0 | 1 | 1 |
| [23] | 1 | 1 | 1 | 3 | [24] | 0 | 0 | 1 | 1 |
| [25] | 1 | 1 | 1 | 3 | [26] | 0 | 0 | 0 | 0 |
| [27] | 1 | 0 | 1 | 2 | [28] | 0 | 0 | 0 | 0 |
| [29] | 1 | 1 | 1 | 3 | [30] | 0 | 0 | 1 | 1 |
| [31] | 1 | 0 | 1 | 2 | [32] | 0 | 0 | 1 | 1 |
| [33] | 1 | 1 | 1 | 3 | [34] | 0 | 0 | 1 | 1 |
| [35] | 1 | 0 | 1 | 2 | [36] | 0 | 0 | 1 | 1 |
| [37] | 1 | 1 | 1 | 3 | [38] | 0 | 0 | 1 | 1 |
| [39] | 0 | 1 | 1 | 2 | [40] | 0 | 0 | 0 | 0 |
| [41] | 1 | 1 | 0 | 2 | [42] | 0 | 0 | 0 | 0 |
| [43] | 1 | 1 | 0 | 2 | [44] | 0 | 0 | 0 | 0 |
| [45] | 1 | 1 | 0 | 2 | [46] | 0 | 0 | 0 | 0 |
| [47] | 1 | 1 | 1 | 3 | [48] | 0 | 0 | 1 | 1 |
| [49] | 1 | 1 | 0 | 2 | [50] | 0 | 0 | 0 | 0 |
| [51] | 1 | 1 | 0 | 2 | [52] | 0 | 0 | 1 | 1 |
| [53] | 1 | 1 | 1 | 3 | [54] | 0 | 0 | 0 | 0 |
| | | | | | [55] | 0 | 0 | 0 | 0 |

Data analysis proceeds via bibliometric techniques and targeted review of the retrieved articles to address the research questions (RQ). The bibliometric component uses Bibliometrix (R v5.0) to profile publication venues, author productivity, and keyword trends. Units of analysis include authors, keywords, sources, and database-level metadata. Time-slicing targets publications from 2021 to 2025. The synthesis then compares and integrates article-level answers to the RQ to derive study conclusions. The workflow adopts full counting; keyword plots select the top-k terms by overall frequency (k specified in each figure), remove stopwords, and retain original word forms (stemming disabled).

After the bibliometric analysis was visualized, a synthesis was performed to answer each formulated RQ resulting from the study. The synthesis is done by systematically comparing and connecting findings from the selected studies. The results were categorized and summarized using a thematic clustering table, which organized the findings into key themes aligned with the main research objectives. To ensure the research objectives and the analytical procedures were aligned, each RQ was explicitly mapped to the corresponding methods used in the study. The relationship between each RQ and the applied methods is summarized in Table 5.

Table 5. RQ-Methods Mapping

| Research Question | Methods |
|--|--|
| RQ1: How is AI implemented in project management? | Data extraction; thematic coding of implementation mechanisms. |
| RQ2: What are the challenges faced in AI adoption for project management? | Data Extraction, Thematic Clustering |
| RQ3: What impacts does AI have on project management performance and outcomes? | Data Extraction, Vote Counting (effect direction), Narrative Synthesis |

It is important to note that bibliometric analysis is used only for contextualization (sources, authors, or keywords), not for evaluating impacts. The overall process of identifying, screening, and selecting relevant

studies is illustrated in Figure 3. The diagram outlines each stage of the systematic review, starting from records identified from selected databases, followed by removal of duplicates, screening based on titles and abstracts, and full-text assessment for eligibility. The final set of studies was then included in the analysis. Next study selection flow diagram on Figure 3.

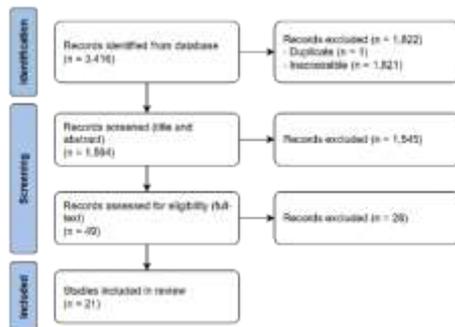


Figure 3. Study Selection Flow Diagram

3. Results and Discussion

Before interpreting the results, it is important to contextualize the selected literature to better understand its significance. The contextualization is done through bibliometric analysis based on the initial search sources. Then, the study examines each selected publication to determine how it responds to the RQ and presents the findings accordingly. As a result of the literature selection, a total of 1,594 articles were selected from the period of 2021 to 2025. Bibliometric statistics (Figs. 4–9) describe the initial deduplicated corpus (n=1,594) and should not be interpreted as effect sizes of outcomes; SLR synthesis relies on the final included set (n=21). Figure 4 illustrates the growth of literature in the field based on the initial deduplicated corpus (n=1,594) across eight databases from 1 January 2021 to 10 August 2025. Processed with Bibliometrix (R v5.0). The number of literatures has grown since 2021, increasing from 188 to 221, 260, 490, and 426 documents in the subsequent years. The apparent decline in 2025 reflects partial-year coverage up to 10 August 2025 rather than a true decrease in output. Next annual publication counts on Figure 4.

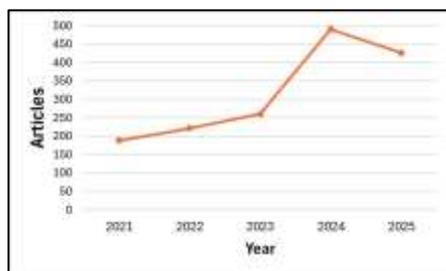


Figure 4. Annual Publication Counts (2021-2025)

Figure 4 shows the annual distribution of documents from the top 5 sources. The most relevant source is *Procedia Computer Science*, which shows steady growth in the number of documents, peaking at 86 in 2025, with a total of 285 documents published over the period. In contrast, the other four sources contribute significantly fewer publications, with each source

having fewer than 30 documents per year between 2021 and 2025. These sources are *Technological Forecasting and Social Change* (n = 100), *Journal of Business Research* (n = 54), *Engineering Applications of Artificial Intelligence* (n = 42), and *Production & Manufacturing Research* (n = 36).

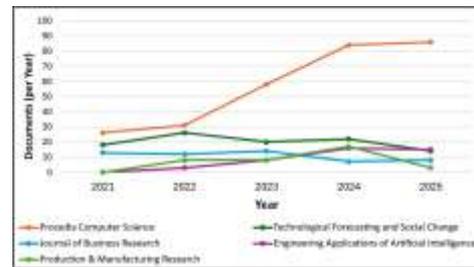


Figure 5. Documents Per Year by Source (Top-5 Outlets, 2021–2025)

Figure 6 shows the keyword co-occurrence drawn as a network. Artificial intelligence is shown to be the most occurring keyword and is clustered along with other computer science fields such as machine learning, data science, and deep learning. It is also connected to digital transformation and Industry 4.0, two of the largest nodes that form a distinct cluster. The cluster is closely related to business and management, as evidenced by the presence of keywords such as project management, innovation, and information systems.

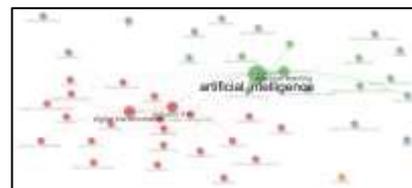


Figure 6 Keyword Co-occurrence Network

Figure 7 shows the top 15 author keywords by document frequency. The keyword analysis shows that artificial intelligence is the most frequently used keyword, with 170 occurrences, proving its central role in current research. Below that, with over 50 occurrences each, digital transformation, machine learning, and Industry 4.0 follow, with 95, 81, and 80 occurrences, respectively. Keywords with 30 to 50 occurrences include project management, sustainability, digitalization, innovation, blockchain, and deep learning, with 50, 46, 45, 42, 40, and 37 occurrences, respectively. Keywords with 30 occurrences or fewer include systematic literature review, AI, big data, COVID-19, and literature review, with 30, 29, 27, 26, and 26 occurrences, respectively.

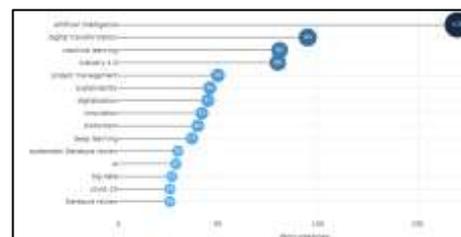


Figure 7. Top 15 Author Keywords by Frequency

As shown in Figure 8, keyword frequencies reveal

patterns of research interest from 2021 to 2025. Artificial intelligence has maintained the highest frequency over the years, with the largest increase in 2024. Below that, digital transformation and machine learning follow a similar trajectory with relatively close frequencies, while industry 4.0 and project management follow at slightly lower frequencies. It is important to note that all keywords declined in 2025 since the collected studies covered only up to August.

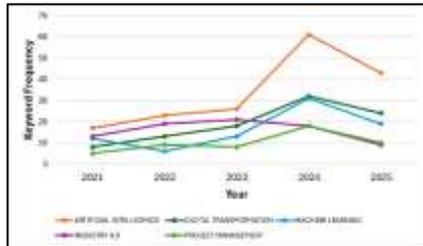


Figure 8. Yearly Frequency Trends of Selected Author Keywords (2021–2025)

Figure 9 shows the keyword trend over the years in a timeline format. The timeline reveals a shift in research focus in five years. In 2021, topics focused on technology, big data, COVID-19, capabilities, decision support, and business models, reflecting the impact of the global pandemic and the growing reliance on data-centered research. From 2022 onwards, attention expanded to project management, Industry 4.0, digitalization, data science, and the maturity model, which indicates a broader emphasis on strategic technological innovation. In 2023, the focus shifted toward utilizing data, covering topics such as artificial intelligence, digital transformation, machine learning, and sustainability. By 2024, up into 2025, the focus shifted further toward emerging technologies, including large language models, generative AI, Industry 5.0, and federated learning, while maintaining interest in artificial intelligence and sustainability. Values for 2025 reflect partial-year data up to 10 August 2025 and should not be interpreted as a downturn. Terms such as large language models and generative AI have emerged late due to post-2023 publications. This progression highlights the transition from pandemic to foundational data, the emergence of artificial intelligence, and the innovation and industrial transformation driven by advanced AI.

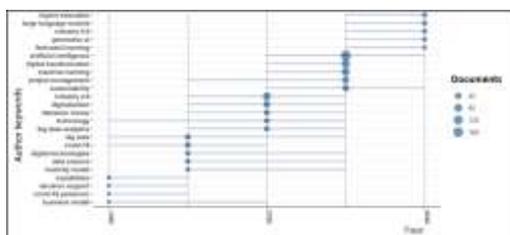


Figure 9 Timeline of Author-Keyword Usage and Frequency (2021–2025)

Table 6 summarizes the response to the first research question on implementing AI in project management.

Table 6. AI Implementation in Project Management

| Literature | Findings |
|------------|---|
| [5] | Predictive analytics with integrated AI, real-time monitoring with IoT devices, intelligent resource allocation, and as an automated regulatory compliance fulfillment tool. |
| [3] | Automate routine work, scheduling, resource allocation, and progress tracking. |
| [4] | Facilitate knowledge sharing to align goals with organizational goals; using Artificial Neural Network (ANN) to recognize IT governance processes, project activities, and management reports. |
| [19] | Create and optimize project plans and Gantt charts, monitor progress, identify delays, track projects, and optimize project selection in the portfolio. |
| [21] | Track project status and identify delays effectively, accelerate project completion, leverage ANN and SVM to predict work duration, and reduce delays and overcosts. |
| [23] | Bridging collaboration between humans and robots in industrial environments, coordinating the provision of healthcare services to patients, and adapting educational content to the needs of students. |
| [25] | Integrating AI with VR, AR, and MR technologies to facilitate data-driven decision-making. |
| [46] | Implementation of AI in knowledge management processes encourages knowledge creation for sustainable development. |
| [27] | Provides an analytics system to mitigate product alignment issues in construction projects, assists the designing process in enhancing productivity and quality in project management tasks, improves collaboration by facilitating new team members' engagement, and promotes the benefits of design improvements to stakeholders. |
| [50] | Knowledge management, automating processes, assistants and agents of conversation, analytics for prediction, detecting fraud and threats, allocating resources, and expert support tools. |
| [31] | This process facilitates collective sensemaking, addressing ambiguities and uncertainties in project development. |
| [33] | Supporting tools for project selection, planning, and reporting. |
| [35] | Integrates AI into film workflows, focusing on resource management, task coordination, and intelligent editing to streamline post-production and project delivery. |
| [37] | AI-powered reminders assist task and commitment management within collaborations. |
| [39] | Risk identification, management, and mitigation |
| [41] | AI is applied to cognitive assistance systems, process monitoring, and optimization. |
| [43] | Unified management platform, urban problems detection, and robotic process automation. |
| [45] | Chatbots identify problems, opportunities, and threats; streamline workflows; generate code; perform predictive analysis; anticipate risks proactively; and facilitate real-time collaboration. |
| [47] | Automating simple and repetitive tasks and strategic management decisions. |
| [49] | Analyze customer and sales insights, handle inquiries, and automate manual tasks. |
| [51] | This system integrates generative AI to enhance and automate risk scenario generation and monitoring. |
| [53] | Cost management using machine learning, data mining, and intelligent algorithms provides real-time risk warnings and optimization solutions. |

From this literature, several patterns emerge regarding the implementation of AI in project management. Several studies emphasize the use of AI to make predictions, such as estimating work duration and delays through real-time monitoring [5] [19] [21] [41] [45] [51]. Implementing AI within healthcare systems benefits from real-time monitoring through IoT devices, enhancing project efficiency, improving patient care, and reducing costs [5] [39]. In contrast, implementing AI in project management for small and medium-sized enterprises (SMEs) shows that project teams utilize AI to monitor progress, generate and optimize project plans and Gantt charts, and identify potential delays [19]. In construction projects, AI has minimized delays, one of the primary factors contributing to cost and time overruns [21]. AI has been shown to automate scheduling and resource

allocation in projects [3] [5] [35]. It is also integrated with VR, AR, and MR technologies [25], and is expected to bridge the collaboration between humans and robots in the industry [23] [43]. Several studies explain how AI facilitates knowledge management through sharing and collaboration [4] [31] [37] [46].

AI has been integrated with the Balanced Scorecard (BSC) framework to evaluate performance, enhance knowledge sharing, and facilitate achievement of strategic objectives [4]. It also transforms knowledge management by facilitating knowledge sharing, creation, and transfer through chatbot systems, thereby enhancing organizational performance [46]. Furthermore, an AI tool prototype has been designed to facilitate collective sensemaking and enhance teams' complex decision-making processes [31]. The second research question, which focuses on the challenges of implementing AI in project management, is addressed in Table 7.

Table 7. Challenges of Implementing AI in Project Management

| Literature | Findings |
|------------|---|
| [5] | Facing the complexity of resource allocation, regulatory requirements, and the need for real-time cross-departmental data integration. |
| [3] | Hallucinations on AI that can generate inaccurate or misleading information, comprehensively understand the datasets used, optimize the application of technology, and consider bias in AI systems. |
| [4] | Lack of commitment from top management, improper solution placement, limited real-time data due to specific governance patterns across organizations, poor financing and scheduling, and resistance to change. |
| [19] | Low trust and adoption of MSMEs in AI, limited senior management commitment, cybersecurity, and ethical risks. |
| [21] | Cultural differences, high maintenance costs, and the absence of similar input parameters between projects make it challenging to implement AI effectively. |
| [23] | Ensure AI systems function effectively and are aligned with user expectations. |
| [25] | Complexity in AI drives the need for training programs. High implementation costs drive the need for affordable options and institutional support. |
| [46] | Complexity in effectively integrating AI, building trust, addressing ethical issues, ensuring data privacy, and secure interaction using AI systems, as well as limited identification of practical solutions. |
| [27] | Resource constraints hinder solution adoption, while a fragmented industry structure complicates decision-making processes for AI implementation, leading to inconsistent model data content and discrepancies in personnel training. Bureaucratic inertia in large software companies slows the transition to AI opportunities. |
| [50] | Lack of technical staffs which introduces and assesses AI technologies, along with rigid budgeting processes, restricts innovative and spontaneous AI projects and poses security risks and privacy concerns related to AI usage. Ethical considerations, data sharing concerns, and insufficient data understanding are key to ensuring transparency in AI usage. |
| [31] | The disengagement of AI developers from collective sensemaking affects project alignment and progress, leading to a lack of necessary information that delays implementation. |
| [33] | Lack of understanding of algorithm complexity among managers, overestimation of AI capabilities by stakeholders, concerns about AI reliability and decision-making capabilities among organizations and governments, a defined strategy for successful AI integration within organizations, and the requirement for structured data often scattered across supply chains. |
| [35] | Developing AI algorithms capable of producing truly unique, emotionally impactful content; ethical concerns over potential job displacement, creation of new roles, and ownership issues with AI-generated content; over-reliance on AI, which may lead to homogenized work, algorithmic bias, and high processing power, which requires high implementation costs. |
| [37] | Organized users may find less benefit from the AI-powered system. |
| [39] | There is a need for greater transparency and high-quality data, addressing potential biases in AI systems, complying with evolving regulations and ethical guidelines, and ensuring careful risk management during implementation. |
| [41] | Defining objectives and selecting proper AI to use, acquiring high-quality datasets, ensuring interpretation and verification are done properly, risk of discrimination in workforce selection; lack of informed digitalization strategies, the evolving nature of AI systems, which introduces uncertainty of their capabilities, and the ethical implications of their use. |
| [43] | Lack of resources to keep up with evolving technologies is causing policy gaps or under-regulation. |
| [45] | Managing AI adoption and innovation involves complexity, requiring experimentation and flexibility. |
| [47] | Adaptability and change management, the need for well-defined |

[49] commercial problems, and the lack of data across the retail landscape are key challenges.
 Data privacy concerns include preventing direct data source references to employees, output bias, and recognizing that the system functions as a recommendation tool.
 [51] Data privacy concerns, model interpretability, and human-computer collaboration are key issues.

From the literature, several patterns emerge regarding the challenges of implementing AI in project management. The relatively high cost of AI implementation in project management has been commonly noted [4] [25] [35]. The commitment of senior management is a key challenge and factor in the successful implementation of AI in project management [4] [19]. Several studies suggest that cultural differences lead to low trust, which in turn results in resistance to AI implementation [4] [19] [21]. Resistance to change is recognized as a critical factor of project failure [4], while low trust and weak commitment have contributed to the low adoption of AI applications, particularly within SME management [19]. Some users may find the AI-powered system less beneficial [37].

In the construction sector, cultural barriers are seen as a significant challenge that can greatly impact project implementation and management processes [21]. The importance of real-time data integration across organizations to meet data needs is highlighted [4] [5] [33] [49]. Customized and confidential governance structures across organizations can be a significant limitation within enterprises, resulting in minimal real-time data necessary for end-to-end analysis [4]. In healthcare, real-time data integration across departments is crucial [5] [39]. Collecting structured input data scattered across the supply chain for AI technologies is important within supply chain-related project management [33] [49]. There are also concerns about the improper placement of AI implementation as a solution [4], which emphasizes the need for a defined AI integration strategy [33] [41]. Data privacy concerns have also been highlighted in several studies [46] [50] [51] [53].

Table 8 presents the findings related to the third research question, which examines the impact of AI implementation in project management.

Table 8. Impacts of AI Implementation in Project Management

| Literature | Findings |
|------------|--|
| [5] | Enhance project efficiency and patient care services and reduce costs through automation and predictive analytics. |
| [3] | Simplify project management, enhance outcomes through efficient practices, and minimize human error. |
| [4] | Enhance project success, foster transparency in the decision-making process, increase technical resilience and robustness within the project management system, and reduce organizational costs. |
| [19] | Improved productivity and project efficiency, faster time-to-market, better decision-making. |
| [21] | AI implementation helps reduce the need for human intervention in repetitive tasks, enhances the effectiveness of project and time management, and increases the likelihood of completing projects on time. |
| [23] | Improve collaboration and ensure effective interaction in project management. |
| [25] | Improve predictive modeling and simulation for project construction, management, and operational efficiency. |
| [46] | Improve education, user capabilities, and knowledge sharing. |
| [27] | This approach helps mitigate product alignment issues in construction projects, enhances design and inventory optimization, improves productivity and quality in design work, and reduces structural design time. |
| [50] | This approach allows for public value creation and a more balanced method in research studies. |
| [31] | The uncertainties of the evolving nature of AI complicate project management and decision-making. |
| [33] | Improve manager performance, increase project success rates, reduce risk complexity, and enhance efficiency by eliminating approximately 80% of traditional project management activities. This will improve data analytics and decision-making processes. |
| [35] | Efficiently shortens production schedules. |
| [37] | This tool enhances knowledge workers' productivity in asynchronous collaborations by improving task organization and prioritization. |
| [39] | This approach offers new insights in developing new products, better work process efficiency, and automates repetitive and tasks. |
| [41] | Optimize workflows, improve public service provision, and enable effective collaboration between the government and citizens. |
| [43] | Enhance predictive capabilities, decision-making, risk management, effective human expertise, and workflow integration. |
| [45] | Improve public governance efficiency. |
| [47] | Optimize resource allocation, increase efficiency and productivity, and enhance decision-making to improve overall project outcomes. |
| [49] | Improve personalization, enhance customer service, and reduce costs. |

From the literature, several patterns emerge regarding the impacts of AI implementation in project management. Many studies note that AI improves project efficiency and productivity [3] [5] [11] [12] [19] [21] [25] [27] [33] [35] [37] [41] [47] [49]. AI's role in complex projects is emphasized by balancing regulatory compliance, patient safety, and research objectives [3]. Similarly, AI has also been underlined to optimize efficiency within healthcare and supply chain systems [5] [49]. An increase in productivity and efficiency has been observed among SMEs adopting AI, although adoption rates remain relatively low, particularly among Irish SMEs [19]. In the Indian construction industry, AI-driven software significantly accelerates project completion times [21]. In internship programs, AI enhances student engagement and operational efficiency [25]. AI-assisted design in structural engineering improves both productivity and the quality of design outputs [27]. Supporting these findings, a report states that 62% of surveyed professionals cite increased productivity as the primary reason for adopting AI [33].

Several studies emphasize the benefits of AI implementation, which include decision-making and predictive capabilities [4]. Traditionally, boardroom decisions have been made without factual grounding [4]. To address this, AI has been integrated into governance to enable data-driven decision-making by analyzing organizational patterns and market trends [4]. AI enhances decision quality [19], but surveys reveal that only 10% of SME managers trust AI for critical decision-making [13]. Complementarily, AI-powered forecasting improves cost-effectivity and efficiency while providing insights for decision-making [33] [51]. AI implementation within enterprises has improved IT projects' success rates [4] [33]. Corresponding themes of implementation, challenges, and impacts are collected as thematic clusters, as shown in Table 9.

Table 9. Thematic Clustering

| Main Theme | Thematic Cluster | Supporting Studies | Description |
|------------|---------------------------------------|--------------------|--|
| Challenges | Integration with Other Technologies | [23] [2] | AI is integrated with VR/AR/MR and supports human-robot collaboration. |
| | Knowledge Management | [4] [31] [37] [4] | AI enhances knowledge sharing and collaboration among team members. |
| | High Implementation Costs | [4] [25] [35] | AI Implementation requires high investment costs. |
| | Low Commitment from Senior Management | [4] [19] | Lack of top-level support from management. |
| | Cultural Differences and Trust Issues | [4] [19] [21] | Resistance to change caused by differences in organizational culture and low trust in AI. |
| | Limited Data Access and Quality | [4] [5] | Lack of real-time data integration across organizations. |
| | Strategic Issues | [4] [33] | AI strategy is absent or misaligned with real project needs. |
| | Data Privacy Concerns | [46] | Concerns about data privacy, secure interaction, and prevention of direct data source references |

| | | | |
|---------|---|--------------|---|
| Impacts | Increased Efficiency and Productivity | [3] [5] [19] | within AI systems. AI increases project efficiency and enhances productivity. AI improves strategic decisions and forecasting accuracy. AI implementation correlates with better project results and success rates. |
| | Enhanced Decision-making and Prediction | [4] [19] | |
| | Improved Project Outcomes and Success Rates | [4] [33] | |

This study offers several actionable, practical recommendations for practitioners. First, it is to align AI with organizational objectives. Organizations should avoid treating AI as a standalone solution. Instead, AI must be aligned with business goals and project requirements to ensure relevance and achieve the desired outcomes. Establishing a roadmap for AI adoption that links AI projects to strategic goals, business requirements, and governance is essential to ensure investments deliver measurable value and scalability through good governance and integration. Second, ensuring leadership support. The success of AI implementation depends on the support of management leadership. Senior managers must actively participate in decision-making strategies to overcome resistance and allocate resources effectively, including investment, development, training, and integration efforts. They should establish and use IT governance frameworks to define clear accountability and measurable outcomes through Key Performance Indicators (KPIs).

Third, investing in change management and capacity building. Lack of technical knowledge and resistance remain significant barriers. Project-based enterprises should provide workshops, training courses, and communication strategies to increase awareness and build internal competencies. Organizations should establish cross-functional teams comprising project and IT managers to promote the cooperative adoption of AI. Fourth, data quality and infrastructure gaps should be addressed. AI systems require precise and up-to-date data to function effectively. Organizations should invest in and develop robust data infrastructure and effective data governance policies to ensure data availability, quality, and security. This condition includes integrating data silos and adopting cloud-based technology where appropriate.

Fifth, it is important to monitor and evaluate performance regularly. Organizations should conduct regular evaluations to assess performance, identify areas for improvement, ensure alignment with organizational objectives, and adapt to evolving needs. KPIs serve as practical tools for measuring the performance of AI implementation. By following these recommendations, organizations can handle the complexities of adopting AI in project management and derive measurable value from their digital transformation efforts.

4. Conclusion

This study investigates the implementation of AI in project management through bibliometric analysis and SLR, formulating three RQ: (RQ1) How is AI implemented in project management? (RQ2) What challenges are encountered in its implementation?

Furthermore, (RQ3) What are the impacts of AI implementation in project management?. Based on the analysis of selected literature, the study finds several patterns of AI implementation. AI solves project management by enabling predictive analytics, automating schedule and resource allocation, and supporting decision-making and knowledge management (RQ1). Second, multiple challenges arise in the adoption of AI in project management. These include high implementation costs, lack of senior management commitment, cultural resistance, limited access to real-time data, misalignment between AI strategies and organizational goals, and data privacy concerns (RQ2). Third, AI applications have shown positive impacts on project outcomes. These include faster project delivery, better decision-making and predictive capabilities, and increased project success rates (RQ3). This study also has limitations. First, the result from one of the source databases cannot be included due to limitations in accessibility. This may lead to some degree of coverage bias. Future research should anticipate these issues by ensuring database access is obtained before including it in the study. Second, the analysis is based on secondary data from published literature, which may not fully capture the current, real-time developments in AI implementation for project management. Future research could enhance these findings by incorporating validation through case studies, surveys, or interviews with industry practitioners to gather more in-depth insights into the role of AI in project management. This study makes an academic contribution by synthesizing studies on AI adoption in project management from the past five years. This study structures the findings into thematic clusters: implementation, challenges, and impacts. Using mixed-methods approaches is encouraged to understand better AI's interaction with organizational culture, leadership commitment, and project governance. This review lays the groundwork for addressing AI implementation's ethical, regulatory, and strategic aspects in project management environments.

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