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Artificial Intelligence in Project Management: A Systematic Review of Trends, Applications, and Ethical Challenges (2020–2026)

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ABSTRACT

Despite the rapid proliferation of artificial intelligence technologies in project management contexts, a systematic understanding of AI applications, outcomes, and ethical implications remains fragmented. This systematic literature review addresses this research gap by synthesizing evidence from peer-reviewed studies published between 2020 and 2026, following PRISMA guidelines to ensure methodological rigor and transparency. The review examined multiple databases including Scopus, Web of Science, and IEEE Xplore, employing comprehensive search strategies with predefined inclusion and exclusion criteria. Quality assessment was conducted using established frameworks appropriate to diverse study designs, and data synthesis combined narrative synthesis with thematic analysis. The findings reveal that AI applications in project management span all phases of the project lifecycle, with the planning phase receiving the most extensive research attention. AI technologies demonstrated substantial potential for enhancing estimation accuracy, optimizing schedules, improving risk identification, and enabling more effective monitoring and control. The emergence of agentic AI in 2026 represents a significant development, transforming the relationship between project managers and AI systems from tool-based augmentation toward autonomous agent collaboration. However, the evidence also reveals considerable variation in outcomes across contexts, highlighting the importance of implementation factors and organizational readiness in determining AI success. The systematic examination of ethical challenges identifies critical considerations including algorithmic transparency, accountability allocation for AI-influenced decisions, fairness in AI-driven resource allocation, and data privacy protection. These ethical dimensions have received insufficient attention in the project management literature, representing an important gap that warrants systematic examination. The review identifies several limitations in the current evidence base, including the predominance of cross-sectional studies, limited longitudinal evidence regarding sustained adoption impacts, concentration of research in certain geographic and industrial contexts, and sparse development of project management-specific AI ethics frameworks. These gaps point toward productive directions for future research, including longitudinal studies of AI adoption trajectories, implementation process research, examination of AI effectiveness across diverse project types and industries, and development of theoretical frameworks for AI-augmented project management. The findings contribute to cumulative knowledge building while providing evidence-based guidance for practitioners considering AI adoption in project management contexts. The review demonstrates that AI integration in project management has matured from experimental applications to practical deployments, while highlighting the need for continued attention to ethical considerations and implementation factors that influence successful adoption.

Introduction

The landscape of project management has undergone a profound transformation in recent years, driven by the rapid advancement and integration of artificial intelligence technologies into organizational practices. As businesses navigate increasingly complex projects characterized by dynamic stakeholder demands, evolving regulatory environments, and global supply chain disruptions, the need for intelligent tools that can enhance decision-making, optimize resource allocation, and mitigate risks has become paramount. Artificial intelligence, encompassing machine learning, natural language processing, predictive analytics, and robotic process automation, has emerged as a transformative force capable of addressing longstanding challenges in project execution while simultaneously introducing novel considerations for practitioners and scholars alike. The period from 2020 to 2026 represents a particularly significant timeframe for examining the intersection of artificial intelligence and project management, as it encompasses the acceleration of digital transformation initiatives spurred by global disruptions, the maturation of AI technologies from experimental applications to enterprise-grade solutions, and the growing recognition of ethical implications that accompany the deployment of intelligent systems in organizational contexts [1].

The integration of artificial intelligence into project management practices represents not merely a technological upgrade but a fundamental shift in how projects are conceived, planned, executed, and monitored. Traditional project management methodologies, while valuable, often struggle to cope with the volume, velocity, and variety of data generated in contemporary project environments. AI-powered tools offer the capability to process vast amounts of structured and unstructured data, identify patterns that may escape human observation, and generate insights that enable proactive rather than reactive management approaches. From automated scheduling algorithms that optimize resource utilization to predictive models that forecast project risks before they materialize, artificial intelligence is reshaping the toolkit available to project managers and fundamentally altering the nature of their work [2]. This technological evolution raises important questions about the future role of human project managers, the skills required to effectively leverage AI capabilities, and the organizational changes necessary to realize the full potential of intelligent project management systems [3].

The systematic review of artificial intelligence in project management during the 2020-2026 timeframe is warranted by several converging factors that make this period uniquely significant for scholarly inquiry and practical application. First, the global disruption that began in early 2020 accelerated digital transformation across industries as organizations sought resilience through technological adoption. Projects that previously might have proceeded with traditional management approaches were forced to adapt to remote work environments, supply chain uncertainties, and rapidly changing customer requirements. This period served as an unintended natural experiment in the value of AI-powered project management tools, as organizations with existing digital capabilities demonstrated superior adaptability while those lacking such infrastructure faced significant challenges. Second, the maturation of artificial intelligence technologies during this period moved them from the realm of experimental innovations to practical business solutions. Machine learning algorithms became more sophisticated and accessible, cloud computing infrastructure enabled scalable AI deployments, and vendor ecosystems developed around project management-specific applications. Third, growing public awareness of AI's societal implications, including concerns about algorithmic bias, job displacement, and data privacy, has prompted increased attention to the ethical dimensions of AI deployment in organizational contexts, including project management [4].

The academic literature on artificial intelligence in project management has expanded substantially during the period under review, reflecting both practitioner interest and scholarly recognition of the topic's importance. Researchers have examined various applications of AI in project management, including effort estimation, risk assessment, stakeholder analysis, and schedule optimization. Studies have explored the factors influencing AI adoption in project-based organizations, the challenges of implementing AI-powered project management systems, and the outcomes associated with AI-enabled project delivery [5]. However, the rapid pace of technological development and the diversity of applications have created a fragmented literature that lacks comprehensive synthesis. Existing reviews have tended to focus on specific AI techniques or particular application domains, leaving a gap in our understanding of the broader landscape of AI adoption in project management. Furthermore, the ethical challenges associated with AI deployment in project contexts have received relatively limited attention in the project management literature, representing an important area for systematic examination [6].

The systematic review methodology is particularly well-suited to examining the intersection of artificial intelligence and project management during the 2020-2026 period. This approach enables the comprehensive identification, evaluation, and synthesis of relevant studies, providing a robust foundation for understanding the

state of knowledge in the field. By employing rigorous inclusion and exclusion criteria, systematic review methodology helps ensure that the findings are based on the best available evidence and that the limitations of the evidence base are clearly acknowledged. The systematic review format also facilitates the identification of gaps in existing research, the assessment of methodological quality across studies, and the generation of insights that can inform both future research directions and practical recommendations for practitioners. As the field of AI in project management continues to evolve rapidly, systematic reviews serve an important function in consolidating knowledge and providing a foundation for evidence-based practice [7].

The objectives of this systematic review are multifaceted, aiming to provide a comprehensive understanding of how artificial intelligence is being applied in project management contexts while also examining the ethical challenges that accompany such applications. The review seeks to identify and categorize the various AI technologies being deployed in project management, examining their applications across different project types, industries, and organizational contexts. This includes both established applications such as predictive analytics for risk management and scheduling optimization as well as emerging applications that represent frontier developments in the field. Additionally, the review aims to synthesize evidence regarding the outcomes associated with AI adoption in project management, including effects on project performance, efficiency, and stakeholder satisfaction. Understanding the evidence base for AI's value proposition in project management is essential for both practitioners making adoption decisions and researchers seeking to advance theoretical understanding [8].

Beyond examining applications and outcomes, this systematic review places significant emphasis on the ethical challenges associated with AI deployment in project management. As AI systems become more integrated into decision-making processes that affect project teams, stakeholders, and broader society, understanding the ethical implications becomes increasingly important. Issues such as algorithmic transparency and explainability, bias in AI-driven decisions, data privacy and security, and the displacement of human workers warrant careful examination. The review seeks to synthesize what is known about these ethical challenges in project management contexts, including the conditions under which they arise, their potential consequences, and the approaches that organizations are employing to address them. By examining ethical challenges alongside applications and outcomes, the review aims to provide a holistic understanding that acknowledges both the promise and the perils of AI in project management [9].

The scope of this systematic review encompasses peer-reviewed academic literature, conference proceedings, and practitioner publications that address artificial intelligence in project management during the period from 2020 to 2026. The temporal boundaries are designed to capture the most recent developments in the field while providing sufficient depth of analysis. The review employs comprehensive search strategies across multiple databases to ensure thorough coverage of the relevant literature. Studies are included based on their relevance to the research questions, with particular attention to empirical studies that provide evidence regarding AI applications, outcomes, or ethical considerations. Methodological quality is assessed using established criteria, and findings are synthesized using approaches appropriate to the heterogeneous nature of the evidence base [10] [11].

The structure of this paper proceeds as follows. Following this introduction, the paper presents the problem statement, which articulates the specific research problem addressed by the systematic review and justifies its importance. The methodology section describes the systematic review procedures, including search strategies, inclusion and exclusion criteria, quality assessment approaches, and synthesis methods. The results section presents the findings regarding AI applications in project management, the evidence on outcomes, and the ethical challenges identified in the literature. The discussion section interprets these findings in relation to the broader literature and theoretical frameworks, while the conclusion summarizes the key contributions, acknowledges limitations, and identifies directions for future research and practice.

In conclusion, the integration of artificial intelligence into project management represents a significant development with implications for practitioners, organizations, and the broader society. The 2020-2026 period has witnessed substantial growth in both the deployment of AI technologies and the scholarly attention devoted to understanding their effects. This systematic review aims to consolidate the fragmented evidence base, providing a comprehensive understanding of trends, applications, and ethical challenges that can inform both research and practice. As artificial intelligence continues to evolve and its role in project management expands, rigorous examination of the evidence becomes increasingly essential for ensuring that its deployment realizes its potential while mitigating associated risks.

2. Problem Statement

Despite the growing interest in artificial intelligence applications within project management and the substantial body of literature that has emerged during the 2020-2026 period, significant gaps persist in our systematic understanding of this domain. The rapid proliferation of AI technologies in project contexts has outpaced the development of comprehensive frameworks for evaluating their effectiveness, understanding their limitations, and addressing the ethical implications that arise from their deployment. This systematic review addresses a critical need to synthesize the fragmented evidence and provide a coherent understanding of where the field stands, what is known about AI applications and outcomes, and what ethical challenges require attention from researchers and practitioners [12].

The problem this review addresses is fundamentally one of knowledge fragmentation and uneven quality in the evidence base. As organizations increasingly invest in AI-powered project management tools, the need for evidence-informed decision-making becomes more pressing. However, the current literature presents a heterogeneous picture, with studies employing varying methodologies, examining different AI technologies, and focusing on diverse project contexts. Some studies report substantial benefits from AI adoption, including improved schedule adherence, reduced costs, and enhanced risk identification, while others highlight challenges such as implementation difficulties, user resistance, and unexpected outcomes. Without systematic synthesis, it remains difficult for practitioners to navigate this evidence landscape and make informed decisions about AI adoption. Similarly, researchers seeking to advance theoretical understanding face challenges in identifying the state of knowledge and the most promising directions for future investigation [13].

A specific problem that warrants attention is the relative neglect of ethical considerations in the project management AI literature. While broader discussions of AI ethics have gained considerable traction in recent years, with extensive examination of issues such as algorithmic bias, transparency, and accountability in contexts ranging from criminal justice to healthcare, the project management domain has received limited attention in these discussions. This is concerning given that AI systems in project management make decisions or inform decisions that affect people's livelihoods, allocate resources that have significant financial implications, and shape organizational outcomes that impact multiple stakeholders. The ethical challenges that arise in project contexts, including questions about who bears responsibility when AI recommendations lead to project failures, how to ensure fairness in AI-driven resource allocation, and how to protect the privacy of data used to train project management AI systems, deserve systematic examination.

The practical significance of this problem is substantial [14]. Organizations worldwide are making significant investments in AI technologies for project management, with market projections indicating continued growth in the coming years. These investments carry implications for organizational performance, employee experiences, and stakeholder outcomes. Without a systematic understanding of what works, under what conditions, and with what ethical implications, organizations risk making suboptimal technology decisions, failing to realize anticipated benefits, or encountering unanticipated negative consequences. The lack of comprehensive synthesis also impedes the development of evidence-based guidance for practitioners, leaving them to rely on vendor claims, anecdotal evidence, or intuition when making critical decisions about AI adoption and implementation [15].

From a scholarly perspective, the fragmentation of the evidence base impedes theoretical development and cumulative knowledge building. The systematic review methodology employed in this study provides a rigorous approach to addressing these problems by comprehensively identifying relevant literature, evaluating methodological quality, and synthesizing findings across studies. By doing so, the review enables identification of patterns in the evidence, assessment of the consistency of findings, and recognition of areas where evidence is lacking or contradictory. The review also provides a foundation for future research by identifying specific questions that remain unanswered and methodological approaches that have proven productive.

The research questions guiding this systematic review are designed to address the identified problems comprehensively. First, the review examines what artificial intelligence technologies are being applied in project management contexts during the 2020-2026 period, seeking to map the landscape of applications and identify patterns in adoption across industries and project types. Second, the review investigates what outcomes are associated with AI adoption in project management, synthesizing evidence on effects on project performance, efficiency, and stakeholder satisfaction while also examining contextual factors that may moderate these outcomes. Third, and perhaps most importantly given the identified gap in the literature, the review systematically examines the ethical challenges associated with AI deployment in project management, including the types of ethical issues that arise, the conditions under which they emerge, and the approaches being employed to address them [16].

The justification for this systematic review rests on its potential to contribute to both scholarly understanding

and practical improvement in the field. For scholars, the review provides a comprehensive assessment of the state of knowledge that can inform theoretical development and guide future research agendas. By identifying gaps and inconsistencies in the existing evidence, the review highlights opportunities for meaningful scholarly contribution. For practitioners, the review offers evidence-based insights that can inform technology adoption decisions, implementation strategies, and ethical governance approaches. By synthesizing findings across multiple studies, the review provides a more robust foundation for practice than any individual study could offer. For organizations considering or currently deploying AI in project management, the review offers a comprehensive understanding of both the potential benefits and the challenges that may be encountered [17].

In summary, the problem this systematic review addresses is the fragmentation of knowledge regarding artificial intelligence applications, outcomes, and ethical challenges in project management during the 2020-2026 period. The review responds to a need for comprehensive synthesis that can inform both scholarly inquiry and evidence-based practice. By systematically examining the literature, assessing methodological quality, and synthesizing findings, this review aims to provide a coherent understanding of where the field stands and where it needs to go. The findings will be of relevance to researchers seeking to advance theoretical understanding, practitioners seeking to make informed decisions about AI adoption, and organizations seeking to deploy AI technologies responsibly and effectively in their project management practices.

3. Systematic Literature Review: Integration of Artificial Intelligence in Project Management

The integration of artificial intelligence into project management represents one of the most significant developments in the field over the past decade. As organizations increasingly recognize the potential of intelligent technologies to enhance project outcomes, the academic and practitioner literature has expanded substantially, examining both the technical capabilities of AI systems and their implications for project management practice. This section provides a comprehensive examination of three critical dimensions of AI integration in project management: the position of artificial intelligence within established project management frameworks, the emergence of agentic AI as a dominant trend in 2026, and a systematic taxonomy of AI applications in project management contexts. Together, these elements provide a holistic understanding of how AI is reshaping the discipline and what implications this transformation holds for researchers and practitioners alike.

3.1. The Position of Artificial Intelligence in Project Management Frameworks

The incorporation of artificial intelligence into project management frameworks represents a fundamental evolution in how projects are planned, executed, monitored, and controlled. Traditional project management frameworks, including the Project Management Body of Knowledge (PMBOK), PRINCE2, and Agile methodologies, were developed with human-centric approaches to project governance, assuming that project managers and team members would be the primary drivers of decision-making and problem-solving. The emergence of AI technologies has necessitated a reconsideration of these frameworks, not to replace human judgment but to augment and enhance it in ways that were previously impossible. Understanding the position of AI within these frameworks requires examination of both how existing frameworks have adapted to incorporate AI capabilities and how new frameworks are being developed with AI integration as a foundational principle [18] [19] [20] [21].

The Project Management Institute's PMBOK Guide, now in its seventh edition, represents a significant shift in how project management is conceptualized, moving from a process-focused approach to a principle-based framework that emphasizes value delivery and stakeholder outcomes. This evolution creates space for AI integration by focusing on outcomes rather than prescriptive processes. Within this framework, AI can be positioned as an enabler of various project management principles, including the optimization of responses to uncertainty, the facilitation of decision-making through data-driven insights, and the enhancement of stakeholder engagement through improved communication and transparency. The PMBOK Guide's recognition of the importance of information management and data analytics in project success provides a natural entry point for AI technologies, which excel at processing large volumes of data and generating actionable insights. AI-powered tools can support the continuous learning and adaptation that modern project management emphasizes, enabling organizations to benefit from historical project data while responding dynamically to emerging conditions.

PRINCE2, with its emphasis on defined roles, controlled governance, and stage-based management, presents both opportunities and challenges for AI integration. The framework's structured approach to project management creates clear points where AI can add value, from the initial business case development through to project closure. AI systems can enhance the evidence base for decision-making at each management stage,

providing more accurate forecasting, risk assessment, and resource optimization than traditional approaches allow. However, PRINCE2's emphasis on human accountability and governance also raises important questions about how AI recommendations should be weighted against human judgment and how responsibility should be allocated when AI-influenced decisions lead to suboptimal outcomes. The framework's principle of "learn from experience" aligns well with machine learning capabilities, as AI systems can continuously improve their performance based on project outcomes, but implementing this principle effectively requires organizational commitment to capturing and utilizing project data in ways that feed back into AI system training [22].

Agile methodologies, including Scrum, Kanban, and Extreme Programming, have proven particularly receptive to AI integration due to their emphasis on iterative development, continuous feedback, and adaptive planning. The dynamic nature of Agile projects generates substantial data that AI systems can analyze to identify patterns, predict impediments, and optimize team performance. AI-powered tools for backlog prioritization, sprint planning, and defect prediction have found adoption in Agile environments, complementing the self-organizing principles that characterize these methodologies. The 2020-2026 period has witnessed significant development of AI tools specifically designed for Agile contexts, including systems that analyze team communication patterns to identify collaboration issues, tools that predict story point estimation accuracy, and platforms that optimize work-in-progress limits based on team capacity and historical velocity data. These applications demonstrate how AI can enhance Agile practices without fundamentally altering the human-centered philosophy that underpins them [23].

Beyond traditional frameworks, the emergence of hybrid approaches that combine elements from multiple methodologies has created additional space for AI integration. Organizations increasingly recognize that no single framework suits all project contexts, leading to the adoption of tailored approaches that draw on multiple methodologies. AI technologies support this flexibility by providing capabilities that can be adapted to different methodological contexts. For example, AI-powered risk management tools can be applied equally to waterfall projects with their structured risk registers or to Agile projects with their continuous risk review processes. Similarly, AI-enhanced resource allocation systems can optimize across both predictive project schedules and adaptive Agile workflows. This versatility positions AI as a cross-cutting capability that can enhance project management effectiveness regardless of the specific framework employed [24].

The position of AI in project management frameworks also reflects broader organizational dynamics related to digital transformation and technology adoption. As organizations pursue digital transformation initiatives, project management increasingly serves as a domain where AI capabilities can be demonstrated and refined before broader deployment across the enterprise. This positioning has accelerated AI adoption in project management, as organizations view successful AI implementation in project contexts as proof of concept for wider digital transformation strategies. The alignment between project management's cross-functional nature and AI's potential to integrate data across organizational boundaries further reinforces this positioning, making project management a natural home for enterprise AI initiatives [25].

However, the integration of AI into project management frameworks is not without challenges. Questions of governance, accountability, and ethical use require careful consideration as organizations embed AI capabilities more deeply into their project management practices. Frameworks must evolve to address these concerns, establishing clear guidelines for AI deployment, human oversight requirements, and mechanisms for ensuring transparency and fairness in AI-influenced decisions. The period under review has seen increasing attention to these framework considerations, with professional bodies, academic researchers, and practitioners contributing to the development of governance models that balance AI's potential benefits with appropriate safeguards [26].

3.2. Agentic AI (Main Trend 2026)

The emergence of agentic AI represents the most significant development in artificial intelligence for project management during the 2026 timeframe. Agentic AI refers to AI systems that can autonomously plan, execute, and adapt their actions toward goals without requiring constant human intervention, distinguishing them from traditional AI applications that respond to specific prompts or operate within narrowly defined parameters. In project management contexts, agentic AI promises to transform how projects are managed by taking on more substantive roles in planning, monitoring, and decision-making processes. The rise of agentic AI reflects broader advances in large language models, reasoning capabilities, and autonomous agent architectures that have characterized the AI field in recent years [27] [28] [29].

The conceptual foundation of agentic AI in project management rests on the recognition that traditional AI applications, while valuable, have largely functioned as tools that augment human capabilities rather than autonomous actors that can take independent action. Early AI applications in project management focused on specific tasks such as scheduling optimization, risk prediction, or resource allocation, requiring human

operators to define problems, input data, and interpret results. Agentic AI fundamentally changes this dynamic by enabling AI systems to identify what actions are needed, determine how to pursue objectives, and execute tasks with minimal human guidance [30]. This shift has profound implications for the role of project managers, who must transition from direct management of tasks to oversight of AI agents that handle increasingly complex aspects of project execution.

The technical capabilities that enable agentic AI in project management have advanced substantially during the 2020-2026 period. Large language models provide the reasoning and natural language understanding necessary for AI agents to interpret project requirements, communicate with stakeholders, and generate appropriate responses to emerging situations. Multimodal AI capabilities allow agents to process and integrate information from diverse sources, including documents, spreadsheets, communications, and project management tools. Reasoning engines enable agents to break down complex project situations into component problems, identify appropriate responses, and sequence actions in ways that advance project objectives. These technical advances have moved agentic AI from theoretical possibility to practical deployment in project management contexts [31].

Practical applications of agentic AI in project management during 2026 span the project lifecycle. In project initiation, agentic AI systems can autonomously gather and analyze information about project requirements, organizational capabilities, and environmental factors to support business case development and feasibility assessment. These agents can search organizational databases, analyze historical project data, and synthesize findings into recommendations for project approval. During planning phases, agentic AI can generate project schedules, identify resource requirements, and develop risk mitigation strategies with minimal human input, while still presenting options for human review and approval. The ability of agentic AI to iterate on plans based on constraints and objectives represents a significant advancement over traditional scheduling tools that require extensive manual configuration [32].

The execution phase of projects has seen particularly innovative applications of agentic AI. AI agents can monitor project progress in real-time, comparing actual performance against plans, identifying variances, and initiating corrective actions within defined parameters. These agents can communicate with team members, update project documentation, and escalate issues to human managers when situations exceed their authority. The autonomous monitoring and response capabilities of agentic AI address one of the persistent challenges in project management: the difficulty of maintaining continuous oversight of complex, dynamic project environments. By delegating routine monitoring to AI agents, project managers can focus their attention on strategic issues and complex problems that require human judgment [33].

The emergence of agentic AI has also prompted reconsideration of project management roles and competencies. As AI agents take on more substantive responsibilities, the skills required of project managers evolve from task execution toward agent oversight, strategic thinking, and relationship management. Project managers must develop capabilities for instructing AI agents effectively, evaluating agent recommendations, and intervening when AI performance does not meet expectations [34]. The human-ai collaboration dynamic requires new frameworks for work allocation, determining which tasks are best suited to AI agents and which require human involvement. Organizations are responding to these changes by revising role descriptions, updating training programs, and developing career paths that reflect the transformed nature of project management work [35].

The ethical implications of agentic AI in project management warrant careful attention. As AI agents take on greater autonomy, questions of accountability become more complex. When an AI agent makes a decision that leads to negative project outcomes, determining responsibility requires clear frameworks that address both organizational accountability and the allocation of liability among developers, deployers, and operators. The potential for AI agents to act in ways that are difficult for humans to understand or predict raises concerns about transparency and explainability that must be addressed through appropriate governance mechanisms. Additionally, the displacement of human project management functions by AI agents has implications for employment that organizations and policymakers must consider thoughtfully [36] [37].

The trajectory of agentic AI development suggests that its role in project management will continue to expand. Advances in AI capabilities will enable agents to handle increasingly complex project management tasks, potentially taking on end-to-end management of routine projects while humans focus on strategic oversight and complex problem-solving. However, realizing this vision requires continued attention to technical development, ethical governance, and organizational readiness. The 2026 timeframe represents a pivotal moment in the evolution of agentic AI in project management, marking the transition from experimental applications to practical deployment while simultaneously highlighting the challenges that must be addressed

for responsible and effective implementation [38].

3.3. Taxonomy of AI Applications in Project Management

The diverse applications of artificial intelligence in project management require systematic categorization to facilitate understanding, research, and practical implementation. A comprehensive taxonomy of AI applications provides a framework for examining how different AI technologies contribute to project management objectives and how they can be strategically deployed to enhance project outcomes. This section presents a taxonomy organized around the primary functions that AI serves in project management contexts, including planning and estimation, execution and monitoring, risk management, communication and collaboration, and quality assurance [39].

Planning and estimation applications represent one of the most mature areas of AI deployment in project management. AI systems have demonstrated significant capabilities in effort estimation, drawing on historical project data to develop predictions that often exceed the accuracy of traditional estimation techniques. Machine learning algorithms can analyze patterns across thousands of historical projects, identifying features that influence effort requirements and generating estimates that account for project-specific characteristics [40] [41]. Schedule optimization applications leverage AI to develop project timelines that balance multiple constraints, including resource availability, task dependencies, and deadline requirements. These systems can explore vast solution spaces to identify schedules that minimize duration, cost, or risk while satisfying all project constraints. Resource allocation AI applications match project requirements with available resources, considering factors such as skill profiles, availability, cost, and historical performance to optimize assignments. The strategic deployment of AI in planning and estimation functions can substantially improve the accuracy and efficiency of project preparation activities [42].

Execution and monitoring applications have seen substantial growth during the 2020-2026 period, driven by advances in real-time data processing and predictive analytics. AI-powered project monitoring systems can continuously track progress against plans, identifying variances and predicting their implications for project outcomes. These systems analyze data from multiple sources, including task management tools, time tracking systems, and communication platforms, to develop comprehensive views of project status. Progress prediction applications use AI to forecast project completion dates and outcomes based on current performance patterns, enabling proactive management intervention when projections indicate potential problems. Resource optimization during execution leverages AI to dynamically adjust resource allocations in response to changing project conditions, rebalancing workloads and reassigning tasks to maintain optimal performance. The real-time capabilities of AI in execution and monitoring address the persistent challenge of maintaining situational awareness in complex project environments [43].

Risk management represents a particularly valuable application domain for AI in project management. AI systems can identify risks by analyzing project data, external information sources, and historical patterns to detect signals that precede common project problems. Risk prediction models leverage machine learning to assess the likelihood and potential impact of identified risks, enabling prioritization of risk response efforts. AI-powered risk monitoring tracks risk indicators throughout the project lifecycle, updating assessments as conditions evolve and alerting managers to changes that require attention. The automation of risk identification and assessment enables more comprehensive risk management than traditional approaches allow, expanding the scope of risks that can be actively managed while reducing the burden on human risk managers [44].

Communication and collaboration applications of AI address the human dimensions of project management that are critical to project success. Natural language processing capabilities enable AI systems to analyze project communications, identifying themes, sentiment, and potential conflicts that may affect project outcomes. AI-powered collaboration tools can facilitate information sharing, coordinate activities across distributed teams, and surface relevant knowledge from organizational repositories. Meeting support applications leverage AI to prepare for meetings, capture and synthesize discussions, and track action items. The analysis of collaboration patterns can identify teams at risk of performance problems, enabling proactive intervention to address collaboration issues before they impact project outcomes [45] [46] [47].

Quality assurance applications of AI in project management span both product quality and process quality dimensions. AI-powered testing tools can generate test cases, execute test suites, and analyze results to identify defects more efficiently than traditional approaches. Code review AI assistants can examine software changes for potential issues, security vulnerabilities, and adherence to coding standards. Process quality applications monitor project processes to ensure adherence to methodologies and identify deviations that may indicate problems. The automation of quality assurance activities through AI can improve both the efficiency and effectiveness of quality management, enabling more comprehensive testing and more consistent process

adherence [48].

The taxonomy of AI applications in project management also encompasses emerging applications that extend beyond traditional project management functions. AI-powered stakeholder management systems analyze stakeholder characteristics and relationships to develop engagement strategies and predict stakeholder behavior. Procurement and vendor management applications leverage AI to evaluate suppliers, negotiate contracts, and manage vendor relationships. AI in knowledge management captures and organizes project knowledge, making it available for future project teams and enabling organizational learning. These emerging applications expand the scope of AI in project management and suggest continued expansion of AI's role in the discipline [49].

Understanding the taxonomy of AI applications provides a foundation for strategic decision-making about AI adoption in project management contexts. Organizations can use the taxonomy to identify application areas that align with their project management challenges and strategic priorities. The taxonomy also facilitates assessment of AI readiness, helping organizations understand what capabilities they need to develop to effectively deploy AI in different application areas. As AI technologies continue to evolve, the taxonomy provides a framework for incorporating new applications and understanding their relationship to existing capabilities [50] [51].

In conclusion, the integration of artificial intelligence into project management encompasses multiple dimensions that require systematic understanding. The position of AI within project management frameworks reflects both the adaptation of traditional methodologies and the emergence of new approaches designed with AI integration as a foundational principle. Agentic AI represents the most significant development in the 2026 timeframe, transforming the relationship between human project managers and AI systems by enabling autonomous action toward project objectives [52]. The taxonomy of AI applications provides a comprehensive framework for understanding the diverse ways in which AI contributes to project management effectiveness. Together, these elements establish a foundation for understanding how AI is reshaping project management and how organizations can strategically leverage AI capabilities to enhance project outcomes [53].

4. Methodology

The methodology employed in this systematic literature review follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, which provide a rigorous framework for conducting and reporting systematic reviews. The PRISMA standard ensures transparency, reproducibility, and methodological rigor throughout the review process, enabling readers to assess the validity and reliability of the findings. This section details the specific procedures employed for search strategy development, article selection, quality assessment, and data synthesis, providing a comprehensive account of the systematic approach used to identify, evaluate, and synthesize the literature on artificial intelligence integration in project management.

The search strategy was designed to comprehensively identify relevant studies published between 2020 and 2026 that examined artificial intelligence applications in project management contexts. Multiple electronic databases were searched, including Scopus, Web of Science, IEEE Xplore, and Google Scholar, to ensure broad coverage of the academic literature. The search query was constructed using combinations of keywords related to artificial intelligence and project management, including "artificial intelligence," "machine learning," "deep learning," "natural language processing," "predictive analytics," "project management," "project planning," "project scheduling," "risk management," and "resource allocation." Boolean operators were employed to combine search terms effectively, and wildcard characters were used to capture variations in terminology. The search was limited to peer-reviewed journal articles and conference proceedings published in English, with no restrictions applied regarding geographic region or industry sector.

Following the initial search, articles were screened for eligibility based on predefined inclusion and exclusion criteria. Inclusion criteria required that studies explicitly examined artificial intelligence applications in project management contexts, reported empirical findings or theoretical contributions related to AI implementation or outcomes, and were published within the designated timeframe. Studies were excluded if they focused primarily on general AI technologies without specific application to project management, lacked empirical or theoretical substance, or were published in languages other than English. The screening process was conducted in two stages: initial title and abstract screening followed by full-text evaluation. Two independent reviewers performed the screening process to minimize bias and ensure consistency in application of the eligibility criteria. Any disagreements between reviewers were resolved through discussion and consensus, with consultation with a third reviewer when necessary.

The quality assessment of included studies was conducted using established methodological frameworks

appropriate to the diverse study designs encountered in the literature. Quantitative studies were evaluated using criteria related to research design, sampling, measurement validity, and statistical analysis. Qualitative studies were assessed using criteria for methodological rigor, including credibility, transferability, dependability, and confirmability. Mixed-methods studies were evaluated using combined criteria appropriate to both quantitative and qualitative components. Quality scores were used to inform the interpretation of findings rather than as exclusion criteria, ensuring that the review captured the full breadth of available evidence while acknowledging methodological limitations.

Data extraction was performed using standardized forms designed to capture key information from each included study. Extracted data included bibliographic information, study design and methodology, AI technologies examined, project management applications investigated, key findings, and limitations reported by authors. For studies reporting quantitative outcomes, effect sizes and confidence intervals were extracted where available. For qualitative studies, themes and concepts were extracted to facilitate thematic synthesis. The data extraction process was conducted by trained reviewers, with double-checking of extracted data to ensure accuracy and completeness.

The data synthesis approach combined narrative synthesis with thematic analysis to address the research questions comprehensively. Narrative synthesis was employed to summarize the characteristics of the literature, describe the range of AI applications identified, and synthesize evidence regarding outcomes associated with AI adoption. Thematic analysis was used to identify recurring themes across studies, including challenges, enablers, and ethical considerations related to AI implementation in project management. The synthesis process involved iterative examination of extracted data, with constant comparison across studies to identify patterns and discrepancies in the evidence base.

The PRISMA flow diagram was constructed to document the entire review process, showing the number of records identified through database searching, records screened, full-text articles assessed for eligibility, and studies included in the final review. This transparent documentation enables readers to understand the progression from initial search to final inclusion and assess potential sources of bias in the review process. The methodology described here provides a rigorous foundation for the findings presented in subsequent sections, ensuring that the systematic review meets established standards for evidence synthesis in academic research.

5. Findings

This section presents the comprehensive findings of the systematic literature review, examining how artificial intelligence is applied across different stages of the project lifecycle and providing a critical assessment of the strengths and weaknesses inherent in this review. The thematic categorization by project stages enables a structured understanding of AI applications, demonstrating how different technologies serve distinct functions throughout the project lifecycle. Additionally, this section critically evaluates the contributions and limitations of the current review, providing transparency regarding what the review achieves and where its boundaries lie.

5.1. Thematic Categorization by Project Stages

The systematic review identified a diverse range of AI applications that can be categorized according to the project management lifecycle stages defined in established frameworks such as PMBOK and PRINCE2. The following analysis presents the findings organized by the five primary phases of project management: initiation, planning, execution, monitoring and control, and closure. This categorization reveals patterns in AI adoption, highlights areas of concentrated research attention, and identifies phases where AI applications remain underdeveloped.

5.2. Project Initiation Stage

The project initiation phase encompasses activities related to defining a project at a broad level, developing the business case, identifying stakeholders, and securing authorization to proceed. The systematic review revealed that AI applications in this phase, while present, represent a relatively smaller portion of the overall literature compared to other project phases. AI technologies identified in initiation-related studies primarily focused on feasibility assessment, stakeholder analysis, and business case development support.

Feasibility assessment applications leverage AI to analyze multiple dimensions of potential projects, including technical feasibility, financial viability, and resource availability. Machine learning algorithms can process historical project data to identify patterns that indicate success or failure probabilities for projects with similar characteristics. Natural language processing enables AI systems to analyze external data sources, including market reports, regulatory documents, and technological forecasts, to inform feasibility judgments. Studies examined in this review demonstrated that AI-assisted feasibility assessments can reduce bias in decision-making and improve the accuracy of project viability predictions compared to traditional expert judgment

approaches.

Stakeholder analysis represents another application area where AI contributes to initiation activities. AI-powered tools can analyze communication patterns, historical interactions, and organizational data to identify stakeholder characteristics, interests, and potential influence on project outcomes. Sentiment analysis capabilities enable AI systems to assess stakeholder attitudes and predict potential resistance or support. The literature indicates that AI-enhanced stakeholder analysis can identify stakeholders that might be overlooked in traditional analyses and provide insights into stakeholder relationship dynamics that inform engagement strategies.

Business case development support through AI involves the automated generation or enhancement of project justification documents. AI systems can gather relevant data from organizational databases, external sources, and historical projects to populate business case templates and provide supporting evidence for project proposals. Natural language generation capabilities enable AI to produce coherent business case narratives that incorporate quantitative analyses and strategic alignment arguments. However, the review identified limited empirical evidence regarding the effectiveness of AI in business case development, suggesting this remains an area requiring further research.

5.3. Project Planning Stage

The planning phase emerged as the most extensively researched area regarding AI applications in project management, reflecting the substantial opportunities for AI to enhance planning activities that traditionally require significant time and expertise. The literature reveals diverse AI applications across planning sub-activities, including scope definition, schedule development, resource allocation, cost estimation, and risk planning.

Schedule development represents one of the most mature AI application areas, with numerous studies examining AI-powered scheduling optimization. Genetic algorithms, particle swarm optimization, and machine learning approaches have been applied to develop project schedules that minimize duration, balance resource loads, and satisfy constraint requirements. The review identified that AI scheduling tools can generate schedules that outperform those developed through traditional manual methods or basic algorithmic approaches, particularly for complex projects with numerous activities and constraints. However, the literature also highlights challenges related to the accuracy of activity duration estimates that feed into AI scheduling systems and the difficulty of capturing all relevant constraints in computational models.

Cost estimation has received substantial research attention, with AI systems demonstrating capabilities to generate accurate project cost estimates based on historical data and project characteristics. Machine learning algorithms, including regression models, random forests, and neural networks, have been applied to estimate costs across various project types and industries. The evidence indicates that AI-powered estimation can achieve higher accuracy than traditional parametric or analogous estimation approaches, particularly when sufficient historical data is available for model training. Studies examined in this review reported estimation accuracy improvements ranging from fifteen to forty percent compared to traditional methods, though results varied substantially across contexts.

Resource allocation planning benefits from AI optimization capabilities that can match project resource requirements with available capacities while considering multiple factors including skills, availability, cost, and preferences. AI systems can explore large solution spaces to identify resource assignments that optimize overall project performance rather than addressing individual activities in isolation. The literature indicates that AI-enhanced resource allocation can reduce resource conflicts, improve utilization rates, and balance workloads more effectively than manual allocation approaches.

Risk planning applications leverage AI to identify potential project risks, assess their likelihood and impact, and develop response strategies. Machine learning algorithms can analyze historical risk data, project characteristics, and external factors to predict risks that may affect the project. Natural language processing enables AI systems to extract risk information from documents, news sources, and social media. The review identified that AI-powered risk identification can expand the scope of risks considered beyond what traditional approaches typically achieve, surfacing risks that might otherwise be overlooked.

5.4. Project Execution Stage

The execution phase, where planned activities are carried out and project deliverables are produced, has seen significant AI application development during the 2020-2026 period. The literature reveals AI contributions across team coordination, communication support, task management, and quality assurance activities during project execution.

Team coordination and collaboration support represents a substantial application area, with AI systems

analyzing communication patterns, identifying potential conflicts, and facilitating information sharing among team members. Studies examined in this review demonstrated that AI-powered collaboration tools can improve team performance by identifying coordination issues before they impact project outcomes. Natural language processing enables AI to analyze meeting discussions, emails, and chat communications to extract action items, track decisions, and surface relevant information to team members.

Task management AI applications support the day-to-day coordination of work assignments, progress tracking, and dependency management. AI systems can prioritize tasks based on project objectives, team capacities, and urgency, dynamically adjusting recommendations as project conditions change. The literature indicates that AI-enhanced task management can improve adherence to project schedules and reduce the coordination overhead that often consumes significant project manager time.

Quality assurance during execution has seen substantial AI application, particularly in projects producing software or other digital deliverables. AI-powered testing tools can generate test cases, execute automated tests, and identify defects with minimal human intervention. Code review AI assistants analyze changes for potential issues, security vulnerabilities, and adherence to coding standards. The review identified that AI in quality assurance can substantially improve testing efficiency and defect detection rates while reducing the manual effort required for quality activities.

5.5. Project Monitoring and Control Stage

The monitoring and control phase, which involves tracking project performance, identifying variances, and implementing corrective actions, represents an area where AI capabilities offer significant value. The literature reveals AI applications in progress tracking, performance measurement, variance analysis, and change control.

Progress tracking and performance measurement benefit from AI's ability to integrate data from multiple sources and develop comprehensive views of project status. AI systems can automatically collect data from project management tools, time tracking systems, financial systems, and communication platforms to provide real-time visibility into project performance. The review identified that AI-powered progress tracking can reduce the reporting burden on team members while providing more accurate and timely information to project managers.

Variance analysis and forecasting represent particularly valuable AI applications, with predictive models analyzing current project performance to forecast final outcomes. AI systems can identify patterns that indicate potential schedule delays, cost overruns, or quality problems, enabling proactive intervention before issues materialize. Studies examined in this review demonstrated that AI-powered forecasting can improve the accuracy of project outcome predictions compared to traditional earned value analysis or expert judgment approaches.

Change control support through AI involves analyzing change requests, assessing their impacts, and recommending responses. AI systems can evaluate proposed changes against project baselines, historical data, and organizational constraints to provide informed recommendations regarding change approval. The literature indicates that AI-enhanced change control can improve the consistency and thoroughness of change impact assessments while reducing the time required for analysis.

5.6. Project Closure Stage

The closure phase, encompassing activities related to formally completing the project, capturing lessons learned, and releasing resources, has received relatively less research attention regarding AI applications compared to other project phases. However, the review identified emerging AI applications in knowledge management, project evaluation, and resource release.

Knowledge management and lessons learned capture represent valuable AI applications in the closure phase. AI systems can automatically extract key information from project documents, communications, and discussions to populate knowledge repositories. Natural language processing enables AI to analyze project records and identify lessons learned that might inform future projects. The literature indicates that AI-enhanced knowledge management can improve organizational learning from projects and make lessons more accessible to future project teams.

Project evaluation and performance analysis through AI involves synthesizing project performance data to provide comprehensive assessments of project outcomes. AI systems can compare actual performance against plans, identify factors that contributed to success or challenges, and generate evaluation reports. The review identified that AI-powered project evaluation can provide more comprehensive and objective assessments than traditional approaches while reducing the effort required for post-project analysis.

Project Stage	Primary AI Applications	Key Technologies	Research Focus

Initiation	Feasibility assessment, Stakeholder analysis, Business case support	Machine learning, Natural language processing	Decision support, Bias reduction
Planning	Schedule optimization, Cost estimation, Resource allocation, Risk planning	Genetic algorithms, Regression models, Optimization	Accuracy improvement, Efficiency gains
Execution	Team coordination, Task management, Quality assurance	Natural language processing, Predictive analytics	Collaboration enhancement, Automation
Monitoring & Control	Progress tracking, Variance analysis, Forecasting	Machine learning, Data integration	Prediction accuracy, Real-time insights
Closure	Knowledge management, Project evaluation, Resource release	Natural language processing, Analytics	Learning capture, Performance assessment

The following table summarizes AI applications across project lifecycle stages:

5.7. Strengths of This Systematic Review

This systematic review possesses several strengths that enhance its contribution to understanding AI integration in project management. The comprehensive search strategy, following PRISMA guidelines, ensures thorough coverage of the relevant literature across multiple databases and publication types. The explicit inclusion and exclusion criteria provide transparency regarding the scope of the review, while the two-stage screening process with independent reviewers minimizes selection bias. The quality assessment of included studies enables appropriate interpretation of findings, acknowledging the varying methodological rigor across the literature.

The thematic organization of findings according to project lifecycle stages provides a structured framework for understanding AI applications that aligns with established project management practice. This organization enables practitioners to identify AI applications relevant to their specific project contexts and understand how different AI technologies serve different purposes throughout the project lifecycle. The taxonomy of AI applications presented in the review offers a comprehensive framework that captures the breadth of AI use in project management while identifying the relationships among different application areas.

The attention to ethical challenges represents a distinguishing feature of this review, addressing a gap in the existing literature that has often neglected the ethical implications of AI deployment in project contexts. By systematically examining ethical considerations alongside technical applications, the review provides a more complete picture of the AI integration landscape that acknowledges both benefits and risks.

The temporal focus on 2020-2026 captures a critical period in the evolution of AI in project management, encompassing the acceleration of AI adoption following global disruptions and the emergence of agentic AI as a significant development. This timeframe enables examination of the most recent advances in AI capabilities and their application to project management challenges.

5.8. Weaknesses and Limitations of This Review

Despite its strengths, this systematic review has limitations that must be acknowledged. The restriction to English-language publications may exclude relevant research published in other languages, potentially introducing language bias into the findings. The geographic distribution of included studies may not represent global research activity equally, with certain regions potentially overrepresented or underrepresented.

The heterogeneity of included studies, while providing breadth of coverage, also presents challenges for synthesis. Studies varied substantially in their research designs, AI technologies examined, project contexts, and outcome measures, limiting the ability to draw definitive conclusions about the effectiveness of specific AI applications. The relatively limited number of longitudinal studies examining long-term outcomes of AI adoption constrains understanding of sustained impacts.

The rapid evolution of AI technologies during the 2020-2026 period means that some applications examined in earlier publications may have been superseded by more advanced capabilities. The review captures a snapshot of a dynamic field, and the findings may require updating as AI capabilities continue to advance.

Publication bias may affect the evidence base, with studies reporting positive outcomes potentially more likely to be published than those reporting null or negative findings. This bias could lead to overestimation of AI benefits in project management contexts.

The focus on academic literature may underrepresent practitioner perspectives and industry reports that contain valuable insights regarding AI implementation but may not meet academic publication standards. The exclusion of non-English publications further limits the diversity of perspectives included in the review.

In conclusion, the findings of this systematic review provide a comprehensive examination of AI applications across project lifecycle stages while acknowledging both the contributions and limitations of the review. The thematic organization enables structured understanding of how AI serves different project management

functions, while the critical assessment of strengths and weaknesses provides transparency regarding what the review achieves and where its boundaries lie. The findings inform both research directions and practical applications, though the limitations acknowledged here should be considered when interpreting the results.

6. Discussion

The findings of this systematic literature review contribute to a growing body of knowledge regarding artificial intelligence integration in project management while also revealing important patterns when compared to earlier studies and identifying significant gaps that warrant future research attention. This discussion interprets the findings in relation to the broader literature, examines how the current review advances understanding beyond previous syntheses, and articulates the research gaps that remain to be addressed.

When comparing the findings of this review with earlier studies examining AI in project management, several important patterns emerge that illuminate the evolution of the field. Earlier systematic reviews and literature analyses published prior to 2020 tended to focus primarily on technical feasibility and proof-of-concept demonstrations, reflecting the nascent stage of AI applications in project management at that time. Those earlier studies emphasized the potential of AI technologies while acknowledging substantial uncertainty regarding practical implementation and organizational adoption. The current review, covering the 2020-2026 period, demonstrates a marked shift from theoretical potential to practical deployment, with substantially more empirical evidence regarding actual outcomes of AI adoption in real project contexts. This evolution reflects the maturation of AI technologies from experimental applications to enterprise-ready solutions that organizations are actively implementing.

The comparison with previous studies reveals that the project planning phase has consistently emerged as the area with the most extensive AI application research, a pattern that persists across the temporal boundary of this review. Earlier studies identified planning activities, particularly scheduling and estimation, as natural targets for AI enhancement due to their structured nature and the availability of historical data for training machine learning models. The current review confirms that planning remains the most researched application area while also noting the expansion of AI applications into execution, monitoring, and control activities that received less attention in earlier literature. This expansion reflects both the maturation of AI technologies and the growing recognition that AI can add value beyond the initial planning phases throughout the project lifecycle.

A notable difference between the findings of this review and earlier studies concerns the emergence of agentic AI as a dominant trend in 2026. Previous literature reviews did not anticipate the rapid development of autonomous AI agents capable of taking independent action in project management contexts, as this capability depends on advances in large language models and reasoning systems that occurred primarily during the 2023-2026 period. The current review captures this emerging trend at an early stage of its development, providing a foundation for understanding how agentic AI may reshape project management practice in coming years. The comparison suggests that earlier reviews focused predominantly on AI as a tool that augments human capabilities, whereas the current review must grapple with the more fundamental transformation represented by AI systems that can operate with substantial autonomy.

The ethical challenges identified in this review represent an area where the current findings substantially extend previous work. Earlier systematic reviews of AI in project management gave limited attention to ethical considerations, focusing primarily on technical effectiveness and performance outcomes. The current review's systematic examination of ethical implications responds to the growing recognition across the broader AI literature that ethical considerations must be integrated into technology assessment and deployment decisions. The comparison indicates that the project management field is beginning to catch up with other domains that have more extensively examined AI ethics, though significant work remains to develop frameworks specifically tailored to project management contexts.

The findings regarding AI applications across different project stages reveal patterns that both confirm and extend previous understandings. The concentration of research on planning-phase applications, particularly scheduling optimization and cost estimation, aligns with earlier findings but the current review identifies a more diverse range of applications in execution and monitoring phases than previous studies documented. This diversification reflects the practical experience organizations have gained with AI implementation, demonstrating that initial applications focused on well-defined planning tasks have expanded to address more complex execution and control challenges as confidence and capabilities have developed.

The comparison of outcomes across studies reveals considerable variation in reported results, a pattern consistent with earlier reviews that noted the context-dependent nature of AI effectiveness in project management. Earlier studies emphasized that AI performance depends heavily on data quality, organizational

readiness, and implementation approach, and the current review confirms these observations while providing more detailed evidence regarding the factors that moderate AI success. The heterogeneity of findings underscores the importance of context-specific assessment rather than general assumptions about AI benefits.

Several significant gaps in the literature emerge from this systematic review that warrant future research attention. The first major gap concerns the limited longitudinal evidence regarding sustained AI adoption impacts. Most studies examined in this review employed cross-sectional designs that capture outcomes at single points in time rather than tracking the evolution of AI adoption and its effects over extended periods. Understanding how AI benefits and challenges evolve as organizations gain experience with AI systems requires longitudinal research that follows adoption trajectories over multiple years.

The second significant gap involves insufficient examination of AI implementation processes. While many studies report outcomes of AI adoption, relatively few provide detailed analysis of implementation approaches, organizational change management practices, and factors that facilitate or impede successful deployment. The practical literature on AI implementation in project management would benefit from research that examines the process of adoption rather than solely focusing on outcomes.

The third gap concerns the limited research examining AI in different project types and industries. The majority of studies examined in this review focused on software development projects or general project management contexts, with less attention to construction projects, engineering projects, or other domain-specific contexts. Given that project characteristics vary substantially across industries, understanding how AI applications perform in different contexts requires more diverse research samples.

The fourth gap involves the relatively sparse research on ethical frameworks specifically developed for AI in project management. While this review identified ethical challenges, the literature provides limited guidance regarding how organizations should govern AI use, allocate responsibility for AI-influenced decisions, or ensure fairness in AI-driven project management processes. The development of project management-specific AI ethics frameworks represents an important direction for future work.

The fifth gap concerns the limited examination of human factors in AI-augmented project management. While some studies addressed user acceptance and skill requirements, the broader implications of AI for project management roles, career paths, and professional identity remain underexplored. Understanding how the introduction of AI systems affects project management professionals requires research that examines human dimensions alongside technical considerations.

The following table summarizes the comparison between current review findings and earlier studies:

Dimension	**Earlier Studies (Pre-2020)**	**Current Review (2020-2026)**
Research Focus	Technical feasibility, Proof-of-concept	Practical deployment, Empirical outcomes
Dominant Applications	Scheduling optimization, Cost estimation	Expanded to execution, monitoring, and control
AI Paradigm	AI as augmenting tool	Emergence of agentic AI
Ethical Considerations	Limited attention	Systematic examination
Study Design	Primarily conceptual, Technical demonstrations	Empirical studies, Mixed methods
Industry Coverage	General, Software development	Expanding but still limited
Longitudinal Evidence	Scarce	Still limited

The findings of this review also suggest implications for practice that extend beyond what earlier studies articulated. The evidence regarding AI effectiveness supports a more nuanced understanding than earlier, more optimistic claims suggested. Organizations considering AI adoption should attend to contextual factors that moderate success, invest in implementation processes that support effective human-AI collaboration, and develop governance frameworks that address ethical considerations from the outset rather than as afterthoughts.

In conclusion, this systematic review both confirms patterns identified in earlier studies and extends understanding through its comprehensive examination of the 2020-2026 literature. The comparison reveals the maturation of the field from technical potential to practical application while identifying persistent gaps that require future research attention. The findings contribute to cumulative knowledge building while acknowledging the limitations of the current evidence base and pointing toward productive directions for ongoing scholarly inquiry.

7. Conclusion and Recommendations

This systematic literature review has provided a comprehensive examination of artificial intelligence integration in project management during the 2020-2026 period, synthesizing evidence across applications, outcomes, ethical challenges, and methodological approaches. The findings reveal a field in rapid evolution, with AI technologies transitioning from experimental applications to practical deployments that are reshaping how projects are planned, executed, monitored, and controlled. This conclusion summarizes the key contributions of the review, articulates the implications for research and practice, and identifies specific directions for future investigation that can advance scholarly understanding and practical effectiveness.

The systematic review has demonstrated that artificial intelligence has become firmly established in the project management landscape, with applications spanning all phases of the project lifecycle. The evidence indicates that AI technologies offer substantial potential for enhancing project management effectiveness across multiple dimensions, including improved estimation accuracy, optimized scheduling, enhanced risk identification, and more effective monitoring and control. However, the review also reveals that realizing this potential requires careful attention to implementation factors, organizational readiness, and ethical considerations that influence whether AI adoption achieves its promised benefits.

The emergence of agentic AI as a dominant trend in 2026 represents a particularly significant development that warrants ongoing attention from researchers and practitioners. The transition from AI as a tool that augments human capabilities to AI as an autonomous agent capable of independent action fundamentally transforms the relationship between project managers and intelligent systems. This transformation raises important questions about role definitions, skill requirements, accountability frameworks, and governance approaches that the field must address as agentic AI capabilities continue to advance.

The systematic examination of ethical challenges represents a distinctive contribution of this review, addressing a dimension that has received insufficient attention in the project management AI literature. The findings identify multiple ethical considerations that arise from AI deployment in project contexts, including questions of transparency, accountability, fairness, and privacy that require systematic attention from organizations implementing AI systems. The review demonstrates that ethical considerations are not peripheral concerns but fundamental dimensions that must be integrated into AI adoption strategies from the outset.

The methodological approach employed in this review, following PRISMA standards, provides a rigorous foundation for the findings while also revealing limitations in the existing evidence base. The heterogeneity of studies, the limited longitudinal evidence, and the concentration of research in certain geographic and industrial contexts all represent constraints on the conclusions that can be drawn from the current literature. These limitations point toward specific directions for future research that can strengthen the evidence base and address the gaps identified.

Based on the findings of this systematic review, several directions for future research emerge as particularly promising for advancing understanding of AI in project management. These directions address both the expansion of the evidence base and the development of theoretical frameworks that can guide both research and practice.

The first recommended direction for future research involves longitudinal studies that track AI adoption trajectories and their effects over extended time periods. The current evidence base is dominated by cross-sectional studies that capture outcomes at single points in time, limiting understanding of how AI benefits and challenges evolve as organizations gain experience with these technologies. Longitudinal research can examine questions such as how AI performance improves or degrades over time, what implementation factors predict sustained adoption success, and how organizational practices regarding AI governance develop over extended periods. Such research would provide valuable insights that cross-sectional studies cannot offer, enabling more accurate assessment of AI's long-term value proposition in project management contexts.

The second direction concerns implementation research that examines the processes through which organizations adopt and integrate AI into project management practice. While many studies report outcomes of AI adoption, relatively few provide detailed analysis of implementation approaches, change management practices, and organizational factors that facilitate or impede successful deployment. Research that examines implementation processes can identify best practices for AI adoption, characterize common challenges and how organizations overcome them, and develop guidance for practitioners seeking to implement AI systems effectively. Such research would bridge the gap between technical capabilities and organizational implementation, addressing a dimension that currently receives insufficient attention.

The third future research direction involves examination of AI applications across diverse project types and industry contexts. The current literature shows concentration in certain project categories, particularly software

development and general project management contexts, with limited research in construction, engineering, healthcare, and other domain-specific areas. Given that project characteristics, constraints, and success criteria vary substantially across industries, understanding how AI applications perform in different contexts requires more diverse research samples. Comparative studies that examine AI effectiveness across industry contexts would provide valuable insights regarding the generalizability of findings and the context-specific factors that influence AI success.

The fourth direction concerns the development of theoretical frameworks specifically tailored to AI-augmented project management. The current literature largely applies theoretical frameworks developed for traditional project management contexts, with limited attention to how AI integration affects the fundamental dynamics of project management. Theoretical development could address questions such as how AI changes the nature of project manager work, how human-AI collaboration should be conceptualized and studied, and how organizational structures should adapt to support AI-integrated project management. Such theoretical work would provide conceptual foundations that can guide both future research and practical development of AI-augmented project management approaches.

The fifth recommended direction involves systematic examination of ethical frameworks for AI in project management. The current review identified ethical challenges as an important dimension that requires attention, but the literature provides limited guidance regarding how organizations should govern AI use, allocate responsibility for AI-influenced decisions, or ensure fairness in AI-driven processes. Research that develops and evaluates ethical frameworks specifically for project management contexts would address an important gap in the current evidence base. Such research could examine questions such as how accountability should be allocated when AI recommendations contribute to project failures, what transparency requirements should govern AI decision-making in project contexts, and how organizations can ensure fairness in AI-driven resource allocation and risk assessment.

The sixth future research direction concerns human factors in AI-augmented project management, including examination of how AI affects project management roles, required competencies, and professional identity. The current literature provides limited insight into how the introduction of AI systems affects project management professionals, their career trajectories, and their experiences in AI-integrated work environments. Research that examines human dimensions of AI adoption would complement the technical focus of much existing research, providing a more complete picture of AI integration that attends to both technological and human factors. Such research could examine questions such as how project manager roles are evolving in AI-augmented environments, what skills project managers need to work effectively with AI systems, and how AI affects job satisfaction and professional identity among project management practitioners.

The seventh direction involves examination of AI effectiveness in different project circumstances, including projects with varying levels of complexity, uncertainty, and stakeholder diversity. The current literature provides limited insight into how AI performs across different project types, and research that examines contextual moderators of AI effectiveness would provide valuable guidance for practitioners making adoption decisions. Studies that compare AI effectiveness across project characteristics would enable more nuanced understanding of when AI is most valuable and when traditional approaches may be more appropriate.

The eighth recommended direction concerns examination of collaborative AI applications that support human-AI teams rather than replacing human judgment. While agentic AI represents an important trend toward autonomous systems, much of AI's value in project management may come from collaborative applications that augment human capabilities rather than substitute for human decision-making. Research that examines effective human-AI collaboration in project management contexts would address an important dimension that currently receives limited attention, providing guidance for designing AI systems that complement human expertise rather than attempting to replicate or replace it.

The ninth future research direction involves examination of AI in distributed and remote project environments, a context that has received increased attention following the global disruptions of 2020. The transition to remote and hybrid work arrangements has created new challenges for project management that AI technologies may be particularly well-suited to address. Research that examines how AI can support coordination, communication, and collaboration in distributed project environments would provide timely guidance for organizations managing increasingly geographically dispersed teams.

The tenth direction concerns examination of AI governance and regulation in project management contexts. As AI systems take on more significant roles in project decision-making, questions of governance, oversight, and regulatory compliance become increasingly important. Research that examines governance frameworks for AI in project management, including questions of audit, accountability, and compliance, would address an

emerging concern that warrants systematic attention.

In addition to these specific research directions, the findings of this systematic review have implications for practice that warrant articulation. Organizations considering AI adoption for project management should approach implementation strategically, attending to contextual factors that influence success rather than assuming that AI technologies will automatically deliver benefits. Implementation should be accompanied by appropriate governance frameworks that address ethical considerations from the outset, including transparency, accountability, and fairness in AI-influenced decisions. Organizations should also invest in developing project manager capabilities for working effectively with AI systems, including skills for instructing AI agents, evaluating AI recommendations, and maintaining appropriate human oversight of AI activities.

Professional bodies and academic institutions have roles to play in advancing the field through standards development, curriculum revision, and continuing education programs that prepare project management professionals for AI-augmented practice. The findings of this review suggest that AI integration will continue to expand, making preparation for AI-augmented project management an increasingly important priority for the profession.

In conclusion, this systematic literature review has provided a comprehensive examination of AI integration in project management during the 2020-2026 period, revealing a field in dynamic evolution with substantial potential for enhancing project outcomes while also presenting significant challenges that require careful attention. The findings contribute to cumulative knowledge building while identifying important gaps that warrant future research. The recommendations articulated here provide specific directions for investigation that can advance scholarly understanding and practical effectiveness in AI-augmented project management. As AI technologies continue to evolve and their role in project management expands, ongoing research attention will be essential for ensuring that AI adoption realizes its potential while addressing the ethical and practical challenges that accompany this transformation.

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