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RESEARCH ARTICLE

Artificial intelligence in agile IT project management: A SWOT analysis

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Abstract

Artificial intelligence (AI) is reshaping agile Information Technology project management by introducing automation and intelligent decision support. This study explores the strategic implications of AI adoption within agile frameworks using a SWOT analysis approach. A systematic literature review of 48 peer-reviewed studies was conducted to identify strengths, weaknesses, opportunities, and threats associated with AI integration in agile environments. The findings reveal that AI significantly enhances sprint planning, backlog prioritization, effort estimation, and software testing; resulting in faster development cycles, improved code quality, and better decision-making. However, these benefits require substantial workflow restructuring, investment in technology, as well as workforce upskilling. Weaknesses and threats are identified, but opportunities for scalable automation and hybrid human-AI collaboration look promising for organizations that adopt AI strategically. The study emphasized the importance of Project Management Technology Quotient (PMTQ) as a critical competency for practitioners navigating AI-augmented workflows. By aligning AI capabilities with agile principles alongside robust governance models, organizations can optimize AI for sustained competitive advantage in the digital project economy.

Keywords

artificial intelligence; agile project management; swot analysis; project management technology quotient; human-AI collaboration.

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1. Introduction

Artificial intelligence (AI) is set to transform project management practice in various aspects, including automation of basic administrative tasks, delivering analytics-driven risk predictions and estimation, facilitating project planning, and making actionable recommendations. In the era of Industry 4.0, companies can take advantage of the efficiencies and transformative power of AI to increase project success rates (Brandas et al., 2023; Fridgeirsson et al., 2023). Because AI-based tools are able to process massive amounts of data from software projects, harvest useful insights, and train to perform complex management tasks, the use of AI can significantly increase the effectiveness of using agile approaches in project management, particularly in the field of information technology (IT) (Taboada et al., 2023). While some might argue that project management and AI are not compatible due to the complexities involved in automating a wide variety of unique projects, new applications are being explored in the field where some aspects can be automated while others will be augmented (Raisch & Krakowski, 2021; Auth et al., 2019). More than sixty percent of project management practitioners believe that they need to learn AI-related skills so they can excel in their positions (Tilo, 2023). Building an organization's Technology Quotient (TQ) alongside the unique nature of the Project Economy is going to be a fundamental shift in the role of the project manager (PMI, 2020). In the project management community, a leader's TQ is their ability to adapt and integrate technological advancements into the needs of their organization or project (PMI, 2019). According to project management professionals, the Project Management Technology Quotient (PMTQ) is the key to an organization's digital sustainability (Taboada et al., 2023). Innovation from project leaders is most likely to stem from those who have higher levels of PMTQ. The types of AI in this systematic review include a range of commonly used AI tools in project management such as Generative AI (i.e., ChatGPT, Copilot, Tabnine), Natural Language Processing (NLP), Machine Learning (ML), Deep Learning (DL), as well as AI-powered chatbots (i.e., Alfred). The choice to include a wide range of AI tools was made to collectively illustrate how both automation and augmentation can enhance agile project management outcomes.

As a framework, Agile project management emphasizes iterative and and incremental development and is now the most used methodology in project management (Krehbiel et al., 2017; Cruz et al., 2020, Kanbur et al., 2023). Contemporary project management practices using agile methodologies seem to produce better quality products and increased productivity (Kassab et al., 2018). The agile approach to project management is gaining traction because of its speedy value delivery and lower risk of project failure (Kanbur et al., 2023). This is attractive to software development teams because agile approaches such as Scrum are grounded on dynamic and iterative environments involving product backlogs, bug fixes, and user stories.

The confluence of AI and agile project management has attracted increasing attention in recent years, especially in the IT sector. While numerous studies have looked at individual benefits of AI in project management (Brandas et al., 2023; Fridgeirsson et al., 2023; Dam et al., 2019) and the effectiveness of agile methodologies in dynamic environments (Cruz et al., 2020; Krehbiel et al., 2017), a research gap in the literature is still notable particularly in their intentional integration. For example, contemporary research focus on technical implementation of AI tools (Choetkiertikul et al., 2019; Esposito et al., 2024; Younisse & Azzeh, 2023) without comprehensively evaluating how these tools influence IT best practices in agile project management. Additionaly, previous SWOT analyses (Brandas et al., 2023) did not tackle characteristics distinct to agile project management as well as the IT industry's unique challenges (Domingues da Silva & Vasconcelos, 2020; Komal et al., 2020).

This study addresses the abovementioned gap in literature by linking technical capabilities and strategic planning, thereby adding to the discourse on AI-augmented agile project management in the IT industry. Specifically, this study aims to (1) assess how AI tools influence agile processes; (2) identify the strengths, weaknesses, opportunities, and threats (SWOT) related to AI adoption in agile IT project environments, and (3) provide practical insights for practitioners and organizations adapting AI into their agile project environments.

2. Related Literature

2.1. Agile project management in information technology

Agile project management relies on iterative and incremental development, as evolving customer requirements and proposed solutions are evaluated and focuses on early software releases and reliance on its software development values of internal and external productive interactions, software delivery, and addressing change (Krehbiel et al., 2017). It is an umbrella term denoting management practices including Scrum, Kanban, and XP, among others (Sankhe et al., 2022). Created in 2001, the Agile Manifesto (Beck et al., 2001) was established to enable software development teams to excel as teams. Agile is now the most used methodology in project management (Cruz et al., 2020). Agile methodology benefits include prioritizing customer requirements, maximizing business value, and a time-boxed approach to software delivery (Holgeid & Jørgensen, 2020).

It has become the cornerstone of IT project management due to its iterative nature, adaptability, and emphasis on collaboration. Among executives, practitioners, and consultants, Agile remains the most common project management approach, with 95% reporting that they utilize Agile development practices and 51% saying that more than half of their teams are Agile (VersionOne, 2020). Agile seems to fare better than traditional methods in terms of benefits (Ameta et al., 2022), but the transition and implementation have been more challenging for project managers (Koi-Akrofi et al., 2019; Locke, 2021). Studies highlight that Agile practices such as Scrum, Kanban, and Extreme Programming (XP) significantly improve operational efficiency, reduce costs, and enhance responsiveness to changing requirements (Reddy, 2025; Appoh et al., 2022).

In a recent study on agile project management approaches and company competitiveness, the significant role of agile leadership and work environment were emphasized as key to successful project implementation (Tominc et al., 2023). Management scholars suggest that an agile project management approach meets the demands of today's market that is characterized by faster product development while allowing quick testing of multiple ideas and responding to real-time feedback from users. When organizations employ an agile approach, they are able to achieve reduced time-to-market and costs and improve user satisfaction with continuous improvements and product updates to improve product-market fit (Paliwal et al., 2024). In software development, agile methodologies allow organizations to quickly deliver a reliable and cost-efficient product (e.g., software). Because it solves the problems posed by the rigidity of a traditional project management approach (i.e., Waterfall), agile software development allows the inclusion of technological changes or customer requirements even in the later stages of development because the product is developed incrementally and iteratively (Ameta et al., 2022). The agile approach has become a staple among software development teams because its methodologies can handle the fast-paced environment of the software development life cycle (Dhruva et al., 2024). Agile frameworks also support cross-functional collaboration and continuous delivery, making them suitable for dynamic IT environments (Al-Herani et al., 2025). Hybrid approaches combining Agile with traditional methods are also becoming more prevalent in large-scale projects challenges (Aničć& Bušelić, 2025).

2.2. Artificial intelligence in agile IT project management

The integration of AI into Agile processes is transforming IT project management. There is a consensus among management scholars that AI, when applied to project management, can increase efficiency and improve success rates (Brandas et al., 2023; Fridgeirsson et al., 2023; Taboada et al., 2023). AI-powered tools such as GitHub Copilot, DeepCode, and generative AI assistants enhance code generation, defect detection, and backlog prioritization, leading to reduced development time and improved code quality (Parvatha, 2023). Large Language Models (LLMs) and multi-agent systems automate sprint planning, user story creation, and testing, while predictive analytics improve risk forecasting and resource allocation (Almalki, 2025). AI also supports decision-making through real-time dashboards, sentiment analysis in retrospectives, and adaptive planning (Elumalai, 2025; Gupta, 2025).

There are significant expectations regarding AI's potential and its application, leading to ongoing debates about whether project managers could be replaced by AI due to its perceived efficiency (Barcaui & Monat, 2023; English, 2023). The rapid integration of AI into project management and software development is reshaping workforce dynamics. Tilo (2023) reports that while up to half of professionals in the field worry that AI adoption within organizations might render their roles obsolete, over 60% recognize the necessity of acquiring AI-related skills to remain competitive and view AI integration as part of broader company reskilling initiatives. In fact, automation and agile project management approaches have been adopted by more than 70% of organizations, in part due to their ability to handle intricacies, hasten the allocation of resources, and make decisions that are backed by data (Saxena & Totaro, 2023). The Project Management Institute (2020) emphasizes that strengthening an organization's ability to adapt to continuous technological advancements (e.g., technology quotient) will be crucial in reshaping the role of project managers within the evolving project economy. Some of the common AI tools used in agile project management are: Aconex, Automated Insights, CA Clarity, Jira, Prometheus, Rally, SpiraPlan, and Workfront (Kanbur et al., 2023). While these technologies enhance efficiency and reduce costs, they also raise concerns about workforce reduction and role redundancy. Studies emphasize that although AI can replace routine and repetitive tasks, human oversight remains critical for strategic decision-making, ethical governance, and creativity (Gupta, 2025).

The market now demands responsiveness (i.e., quick turnaround time) and flexibility. In this sense, organizations need to leverage emerging technologies such as AI and management approaches to prevent current issues in project management from hindering their success in this competitive market (Dhruva et al., 2024). For instance, Generative AI (GenAI) is increasingly becoming a valuable tool particularly among agile project managers as it has the potential to handle common agile pain points by maximizing resource allocations, analyzing large datasets, enhancing collaboration, and automating testing (Bahi et al., 2024). These can provide innovative solutions for complex and dynamic agile environments with iterative development processes. In 2024, a report from Gartner Research estimated that the number of engineering teams that will implement AI-augmented software development will increase by anywhere between 5% to 40% by the year 2027 (Bhat et al., 2024). Other creative AI tools commonly used in agile project managers are ChatBots for daily stand-up, sprint planning, and backlog management; Machine Learning (ML) for work breakdown, risk management, and issue tracking; Natural Language Processing (NLP) for requirements gathering, user feedback, and documentation; Computer Vision for quality assurance, testing, and user experience design; and Collaborative AI for teamwork, communication, and decision-making (Kanbur et al., 2023).

Agile project management approaches can deal with unpredictability and multiple changes that come with software project requirements (Younisse & Azzeh, 2023). Software development is an area that can benefit greatly from the collaboration between AI tools and human creativity and talent, especially during requirements development (Ramasamy et al., 2024). With automation as its greatest strength, project managers can more efficiently break up complex projects with AI tools taking care of documentation and scheduling (e.g., Notion, Motion) as well as summarizing conversations, translating messages in real-time, and encouraging efficient communication (e.g., Slack, Microsoft Teams) (Saxena & Totaro, 2024). The use of AI in software quality assurance has also helped companies cut the time and cost that come with defect discovery and resolution with its ability to help with locating defects, sequence learning, and code cloning among many others (Esposito et al., 2024). Management scholars propose that the future of software development will be shaped by an agile copilot (Hoda et al., 2023), where an AI-based agile team member will leverage machine learning capabilities to provide assistance in project management functions such as project health and effort estimations, decomposition, task breakdown, dependencies refinement, improving backlog grooming, and optimizing test cases. In a recent study on factors affecting successful project implementation, agile leadership, the adoption of AI technologies, and using AI solutions in a project have a significantly positive effect on successful project implementation (Tominc et al., 2023).

Because AI tools can automate many repetitive tasks and generate reports (Barcaui & Monat, 2023), the IT project manager can then focus on strategic decision-making, stakeholder engagement, and resolving critical issues. Just within the framework of Scrum, AI can be used in sprint planning (i.e., prioritization, estimation), daily stand-ups (i.e., AI-assisted

tracking and monitoring), epic breakdowns, work breakdown (i.e., dependencies), backlog, and product leadership (i.e., decision-making regarding roadmaps, features, and user experience) (Kanbur et al., 2023). Despite these advancements, challenges persist, including data quality issues, ethical concerns, and resistance to organizational change (Gao et al., 2025; Gupta, 2025). Critics have pointed out that a successful agile execution is questionable because its predictive techniques may not match the scale of large projects that use in-process leading indicators (Ebrahim et al., 2023). While the use of AI particularly in IT project management has plenty of documented advantages, a misunderstanding of what project management entails as well as what AI actually is can lead to project failure (English, 2023). Most project managers tend to "think too big" without a full understanding of what AI can do and how (Schlegel et al., 2023). This can often lead to over-reliance on the technology which consequently creates more risks and vulnerabilities such as when it does not have the attention to detail that comes with a project schedule (Brandas et al., 2023; Barcaui & Monat, 2023).

2.3. SWOT analyses in project management

A SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis provides a strategic lens for understanding AI adoption in Agile environments. Successful organizations see the value of strategic management in order to remain competitive. To do this, organizations need to implement strategic management processes. Organizations employ internal and external analyses to build their organizational and competitive strategies. By doing so, organizations can focus on their internal strengths and weaknesses and at the same time identify opportunities and address external threats. As a strategic planning tool, the SWOT analysis is used in various management processes to evaluate how internal and external factors affect an organization's performance. It is one of the oldest and most widely used management strategy and planning tools in the world with its roots in the 1960s during the rise of long-range planning in business (Puyt et al., 2023). Conceptualized in the Stanford Research Institute, the original SWOT analysis commonly referred to as the SOFT approach focused on identifying and discussing what needs to be done to protect the strengths of the organization, pursue new opportunities, fix issues (e.g., faults) within the current operations, and identify and avert future threats (Stewart et al., 1965).

Management scholars have used SWOT analysis to assess how the current trends on AI in project management influence project and management outcomes. Strengths identified through SWOT allow teams to capitalize on existing advantages such as enhanced productivity, automation of repetitive tasks, and improved decision-making enabled by AI-driven analytics (Lourens et al., 2022; Khan et al., 2025). A study on the use of AI tools in project management report that project managers can benefit from AI tools when used specifically for budgeting, information management, project planning, and risk management (Brandas et al., 2023). AI can also be widely implemented to strengthen forecasting and generalizing reports for use in problem-solving (Serban et al., 2020). A survey of project management practitioners similarly indicated that the use of AI has a positive effect on the schedule management plan and scope baseline, cost management estimates, and estimations of resources based on market conditions, resource cost rates, exchange rates, inflation, probability and impact matrix, development of risk management plan, and setting of risk thresholds (Fridgeirsson et al., 2023). Recognizing these strengths allow organizations to align AI capabilities with Agile principles such as accelerated delivery and customer satisfaction. Alternatively, identifying weaknesses such as dependency on high-quality data and integration complexity enables proactive mitigation strategies, such as investing in data governance and upskilling teams (Ricca et al., 2025; Gao et al., 2025).

Organizations that utilize a SWOT analysis can identify areas where AI can extend Agile practices beyond their traditional scope. For instance, leveraging predictive analytics for risk forecasting and fostering hybrid human-AI collaboration for scaling Agile across enterprise environments (Hoda et al., 2023; Bahi et al., 2024) can advance organizational agility and stimulate innovation. Conversely, threats identified through a SWOT analysis can mobilize organizations to develop ethical AI practices and change management strategies. External risks such as security vulnerabilities and workforce displacement can undermine AI adoption efforts (Niederman, 2021; Baidya & Hallur, 2022). When these risks are addressed through strategic governance frameworks, stakeholder trust and compliance increase.

A SWOT analysis can be a powerful tool for evaluating internal strengths and weaknesses alongside external opportunities and threats. It provides a holistic approach to evaluating AI adoption within Agile environments. By systematically assessing strengths, weaknesses, opportunities, and threats, organizations can develop strategies that maximize benefits while minimizing risks, and ensuring that technological innovation aligns with strategic objectives.

3. Methodology

This research is an exploratory effort similar to Brandas et al. (2023), in that it discusses the role of AI in project management. However, unlike the previous study, the aim of this research was to explore how the use of AI particularly in agile project management impacts the success of projects specifically in the field of information technology. No human subjects (e.g., project managers) were directly involved in this research.

3.1. Review protocol

Relevant peer-reviewed papers and conference proceedings within the last five years were reviewed and analyzed using the Systematic Literature Review (SLR) framework. Inclusion criteria focused on peer-reviewed articles published between 2020 and 2025 that addressed AI technologies within Agile frameworks. Data extraction was then conducted to capture project management domains, Agile elements, AI tool used, and SWOT dimensions. Insights from the literature review were then used to assess the strategic strengths, weaknesses, opportunities, and threats of AI adoption in agile IT project management.

3.2. Search strategy and study selection

A comprehensive analysis was conducted using a diverse range of credible data sources including peer-reviewed journal articles, conference papers, and reputable industry reports published from 2020 through 2025. Only materials published in English were included in the review. Articles published in a language other than English were considered only if it has a readily available English version. To be considered for review, articles need to have focused on AI applications in IT project management (i.e., software development, technology administration). Articles that did not directly address these criteria, as well as blogs and opinion pieces, were excluded from consideration.

To identify relevant literature, a comprehensive search across major academic databases (i.e., ProQuest, EBSCO, IEEE Digital Library, AIS Digital Library, ACM Digital Library, Sage, Elsevier, ScienceDirect), as well as through Google Scholar was conducted. A combination of keywords and Boolean phrases were utilized to generate results that included a wide range of studies on AI in IT project management. Some of the search keywords and phrases used included “Artificial Intelligence” and “Project Management,” “AI tools” and “Agile methodology” and “IT projects,” “AI” and “agile” and “software,” “AI” and “risk management” AND “decision-making,” “technology” and “agile” and “project management,” “AI” and “project management” and “SWOT analysis,” “AI efficiency” or “automation” and “Agile development,” and “AI adoption” and “Agile projects” combined with “strengths,” “weaknesses,” “opportunities,” or “threats.”

3.3. Data extraction and synthesis

Titles and abstracts were reviewed for relevance, and full-text articles were assessed to make sure they meet the inclusion requirements. A sample of the AI-Agile coding matrix is presented in Table 1.

Key information from each selected article were extracted, including; publication details, study context, AI technologies utilized, project management domains addressed, and specific SWOT elements included in each study. This coding framework was utilized to ensure a consistent and systematic review for the findings related to each of the four SWOT elements. This coding framework was the foundation for a comprehensive SWOT matrix that was used to assess each

study's relevance, which ensured that the final set of included articles were contextually appropriate for the analysis. Table 2 presents a summary of AI technology used in each study included in the analysis.

Table 1. A sampling of the AI-Agile coding matrix

ID	PM Domain	Agile Elements	AI Technology Used	Strength	Weakness	Opportunity	Threat
2	Execution Monitoring Controlling	Behavior-Driven Development (BDD)	GenAI, ML, DL, NLP	Automates repetitive tasks	False positives/ negatives	Enhancing exploratory testing with AI guidance	Privacy risks
3	Execution Monitoring	Agile (general)	NLP, ML	Faster feature development real-time error detection	Setup and integration effort	Integration with CI/CD pipelines, scalable	Resistance to change from team members

Table 2. A sampling of the AI-Agile coding matrix

AI Technology	Referenced Studies
Machine Learning (ML)	Ricca et al., 2025; Parvatha, 2023; Appoh et al., 2022; Pothukuchi et al., 2023; Khan et al., 2025; Lourens et al., 2022; Alam et al., 2025; Gill et al., 2025; Elumalai, 2025; Almalki, 2025; Gupta, 2025; Dhruva et al., 2024; Ramasamy et al., 2024; Ebrahim et al., 2023; Bahi et al., 2024; Baidya & Hallur, 2022; Tominc et al., 2023; Pavličet al., 2024; Velikov & Ivanova, 2025; Hoda et al., 2023; Akpomedaye et al., 2025; Sandoval-Alfaro & Quintero-Meza, 2021; Kruk & Zhukovska, 2025; Al-Herani et al., 2025; Jain & Butler, 2025; Purcarea, 2024; Niederman, 2021; Ranesh et al., 2022; Reddy, 2025; Shahriary et al., 2025; Jayaram et al., 2024; Cinkusz et al., 2025; Zuizuin & Petrenko, 2025; Morozov et al., 2025; Mishra et al., 2023; Nejad et al., 2025; Das et al., 2025; van der Aalst, 2021; Yoshikuni et al., 2024
Deep Learning (DL)	Gao et al., 2025; Ricca et al., 2025; Gill et al., 2025; Ebrahim et al., 2023; Zhao et al., 2025; Hoda et al., 2023; Sandoval-Alfaro & Quintero-Meza, 2021; Kruk & Zhukovska, 2025; Niederman, 2021; Ranesh et al., 2022; Das et al., 2024; Zuizuin & Petrenko, 2025; Varzaru, 2022; Mishra et al., 2023; Nejad et al., 2025; Zaidouni et al., 2024; van der Aalst, 2021; Yoshikuni et al., 2024
Natural Language Processing (NLP)	Gao et al., 2025; Ricca et al., 2025; Parvatha, 2023; Nettur et al., 2025; Pothukuchi et al., 2023; Gill et al., 2025; Elumalai, 2025; Hamza et al., 2025; Almalki, 2025; Gupta, 2025; Dhruva et al., 2024; Ramasamy et al., 2024; Ebrahim et al., 2023; Bahi et al., 2024; Velikov & Ivanova, 2025; Hoda et al., 2023; Kruk & Zhukovska, 2025; Niederman, 2021; Reddy, 2025; Shahriary et a., 2025; Jayaram et al., 2024; Das et al., 2025; Atolagbe-Olaoye, 2025
Generative AI (GenAI)	Ricca et al., 2025; Pothukuchi et al., 2023; Gill et al., 2025; Hamza et al., 2025; Dhruva et al., 2024; Ramasamy et al., 2024; Bahi et al., 2024; Baidya & Hallur, 2022; Tominc et al., 2023; Pavličet al., 2024; Akpomedaye et al., 2025; Kruk & Zhukovska, 2025; Aničić & Bušelić, 2025; Purcarea, 2024; Shahriary et a., 2025; Jayaram et al., 2024; Das et al., 2024; Cinkusz et al., 2025; Morozov et al., 2025
Chatbot	Appoh et al., 2022; Khan et al., 2025; Lourens et al., 2022; Almalki, 2025; Aničić & Bušelić, 2025; Reddy, 2025; Jayaram et al., 2024; Varzaru, 2022; Mishra et al., 2023; Atolagbe-Olaoye, 2025

3.4. SWOT analysis

One of the aims of this research was to identify the strengths, weaknesses, opportunities, and threats related to AI adoption in agile IT project environments. To address this, the study utilized the SWOT analysis method (Stewart et al., 1965), a well-established, intuitive, and repeatable strategic planning tool. Since the SWOT analysis is a straightforward, repeatable, and instinctive method for exploring the strengths, weaknesses, opportunities, and threats of AI on agile project management (Brandas et al., 2023), using it was a useful strategy to systematically examine the strengths, weaknesses, opportunities, and threats associated with AI integration in agile environments.

As mentioned above, insights from the systematic literature review were used to conduct the SWOT analysis on AI adoption in agile IT project management. Articles that met the inclusion criteria were thematically synthesized and key findings were extracted and coded (see Table 1) into categories aligned with the SWOT framework.

4. Results

A comprehensive search across major academic databases using the abovementioned keywords and phrases resulted in 442 peer-reviewed articles. Each abstract was thoroughly reviewed for relevance, and a total of 165 full-text versions were further reviewed to make sure literature reviews, meta-analyses, studies that did not explicitly look at agile IT project management and an AI implementation were excluded. Fourty-eight studies were included in the final analysis. Figures 1, 2, and 3 show graphical visualizations of all the studies included.

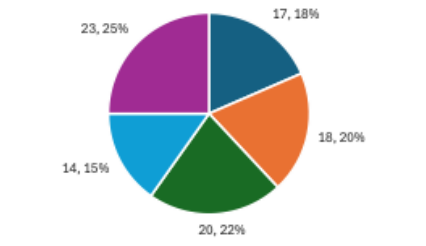

Fig. 1. Distribution of project management domains

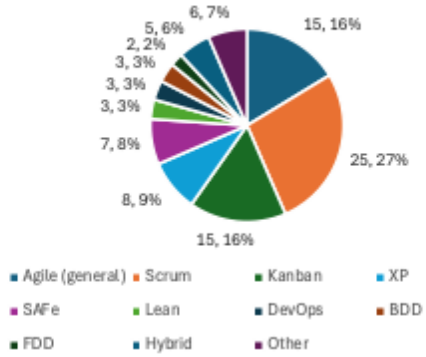

Fig. 2. Distribution of Agile frameworks employed

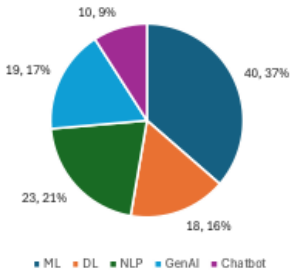

Fig.3. Distribution of AI Technologies utilized

4.1. AI use in Agile project management

Thematic analyses of the peer-reviewed articles included in this study show that IT project managers heavily utilize AI. Some practitioners utilize AI tools throughout the project lifecyle, while some use it only for specific purposes related to a particular project management domain.

The heatmap in Figure 4 presents the proportional relationship between project management domains and AI technologies. It shows how AI adoption is not uniform across domains and that organizations prioritize AI in domains that are heavy in automation and require predictive insights.

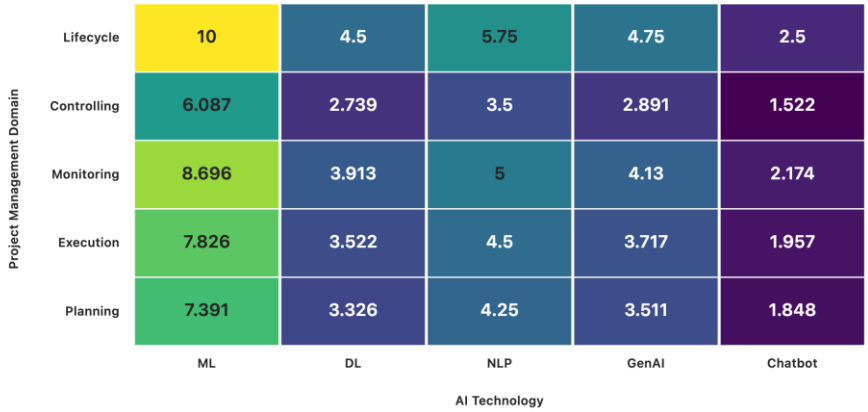

Fig. 4. Heatmap showing project management domains mapped to AI technologies

Machine Learning (ML) is widely used by practitioners during the planning and monitoring phases (Khan et al., 2025; Almalki, 2025). With ML's capabilities for processing historical data and optimization, IT project managers are able to optimize the use of AI in areas such as predictive analytics, resource forecasting, and risk identification.

Natural Language Processing (NLP) and Generative AI (GenAI) are widely popular in the execution phase of IT project management due to their capabilities for automating backlog refinement and generating user stories (Elumalai, 2025; Ramasamy et al., 2024). They are also very efficient in facilitating real-time communication (Ebrahim et al., 2023), and is primarily optimized for continuous communication and support throughout the project.

While not as popular as the other AI tools, project managers have been tapping Deep Learning (DL) in the planning and monitoring phases (Hamza et al., 2023). DL appears to be favored for cost estimation and predictive modeling. Overall, there is low emphasis on Controlling, indicating a gap in AI adoption for compliance and oversight (Tominc et al., 2023; Bahi et al., 2024).

The results of the literature review also showed how project managers adopt AI in various Agile frameworks. The heatmap in Figure 5 illustrates the co-occurrence between Agile frameworks and AI technologies across the studies included in this review.

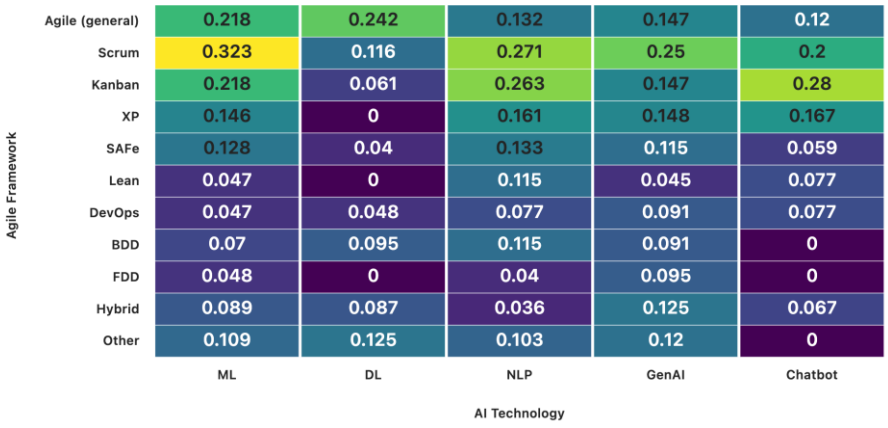

Fig. 5. Heatmap showing Agile frameworks mapped to AI technologies

The heatmap indicates strong integration of Scrum with ML, NLP, and GenAI. Because of Scrum's iterative nature and it's dependence on real-time insights, AI tools integrate well through automating documentation and task breakdown (Pavlič et al., 2024; Purcarea, 2024), as well as improving sprint forecasting, risk prediction, retrospectives, and team sentiment analysis (Elumalai, 2025; Hamza et al., 2025; Shahriary et al., 2025).

ML remains a key player in AI integration in Agile (Gao et al., 2025; Zhao et al., 2025), but NLP and GenAI are gaining more popularity among practitioners NLP and GenAI are increasingly being tapped for capabilities related to communication automation and documentation (Gill, 2025; Hamza et al., 2025). Although not as popular, Chatbots are increasingly adopted into Agile environments to provide real-time support and assistance with backlogs (Appoh et al., 2022; Jayaram et al., 2024).

While Scrum dominates the heatmap, general Agile practices optimize AI for dynamic planning and continuous improvement through ML-driven insights and Gen-AI based content generation (Das et al, 2025; Kruk & Zhukovska, 2025). Although Kanban and XP show moderate co-occurrence, their integration with AI tools is strategic.

Both Kanban and XP integrate AI, particularly with ML and NLP, for automated testing and code reviews (Lourens et al., 2022; Ramasamy et al., 2024). These optimize workflow efficiency and enhance quality assurance through predictive analytics. Scaled Agile frameworks (i.e., SAFe, Lean) have low co-occurrence but are adopting AI (i.e., ML, GenAI) in large scale environments. While not widely adopted, AI is strategically employed for planning and risk management (Cinkusz et al., 2025; Atolagbe-Olaoye, 2025).

4.2. SWOT Analysis

Table 3 presents a summary of the present state of AI in IT project management particularly within the framework of agile methodology. The table illustrates the intrinsic value of AI implementation as well as the potential challenges of AI adoption.

Table 3. Strategic SWOT summary for AI in IT project management

Strengths	Weaknesses	Opportunities	Threats
Enhanced productivity for faster development	Data quality dependence and integration complexity	AI-assisted retrospectives	Ethical concerns, bias, and privacy risks
Improved decision-making and risk forecasting	High computational costs and technical skill requirements	Integration with CI/CD pipelines and DevOps	Security vulnerabilities and compliance challenges
Automation of repetitive tasks and backlog prioritization	Hallucinations, false positive/negatives, and interpretability issues	Scalable automation and hybrid human-AI collaboration	Resistance to change and workforce reduction
Real-time error detection and predictive analytics	Over-reliance on automation and lack of human oversight	Predictive feedback loops	Misuse of AI-generated content and lack of trust
Better collaboration and team alignment		Real-time dashboards	

Agile practices combined with AI can deliver significant benefits that improve efficiency and collaboration across teams. It also opens new possibilities for enhancing Agile practices but presents technical and organizational challenges that can discourage widespread adoption.

As seen in Table 4, these benefits and challenges are very specific to and more optimized when integrated with certain agile practices.

Table 4. SWOT elements linked to Agile practices

	Strengths	Weaknesses	Opportunities	Threats
Agile (general)	Increased productivity, improved decision making, enhanced risk forecasting, better collaboration, improved team alignment	Over-reliance on automation, lack of human oversight	Predictive feedback loops, real-time dashboards	Ethical concerns, bias, privacy risks, resistance to changes, workforce reduction
Scrum	Increased productivity, faster development, automation of repetitive tasks, backlog prioritization	Data quality dependency, integration complexity	AI-assisted retrospectives, adaptive planning	Ethical concerns, bias, privacy risks
Kanban			Predictive feedback loops, real-time dashboards	Ethical concerns, bias, privacy risks
XP	Real-time error detection, predictive analytics		AI-assisted retrospectives, adaptive planning, scalable automation, hybrid human-AI collaboration	Ethical concerns, bias, privacy risks, security vulnerabilities, compliance challenges
DevOps	Real-time error detection, predictive analytics	High-computational cost, high technical skills requirement	Integration with CI/CD pipelines	Ethical concerns, bias, privacy risks
SAFe	better collaboration, improved team alignment		Integration with CI/CD pipelines, scalable automation, hybrid human-AI collaboration	Ethical concerns, bias, privacy risks, security vulnerabilities, compliance challenges
BDD		Hallucinations, false positives/negatives, interpretability issues	Scalable automation, adaptive planning	Ethical concerns, bias, privacy risks, resistance to changes, workforce reduction, misuse of AI-generated content, lack of trust

5. Discussion

The results of the SWOT analysis presented in this study suggest a shift in IT project management practices, particularly within the Agile framework. The dominance of strengths in areas such as automation, real-time insights, and enhanced decision making suggests that AI can add a cognitive layer for Agile practices. Because AI adoption in Agile is socio-technical, weaknesses such as data quality issues and interpretability challenges are to be expected. AI adoption is not purely technical and, therefore, organizations need to balance AI-human workflows. Organizations must recognize and act on the demands of AI adoption to remain competitive, as implied in the idea of increasing an organization's PMTQ. AI can increase PMTQ by way of real-time sensing and adaptive planning particularly in volatile Agile environments. Ethical AI

principles and regulatory compliance must be incorporated into a strategic governance model instead of working from a purely operational framework. This is of notable importance, particularly because stakeholder confidence can erode when quality and accountability are left unchecked.

5.1. AI trends and patterns

Agile IT project managers adopt AI in a domain-specific way, driven by the nature of tasks and data requirements. The trends and patterns illustrated in this study highlight specific AI tools are more useful in one domain of project management than others. For instance, ML is highly adopted during the and execution and monitoring phases because its strength lies in predictive analytics and risk forecasting. Using ML in these project management phases enables teams to anticipate bottlenecks, optimize resource allocation, and improve sprint outcomes (Khan et al., 2025; Almalki, 2025). On the other hand, NLP and GenAI are highly utilized in the planning and execution phases because these technologies enhance collaboration and reduce manual effort by transforming unstructured data into actionable insights (Ramasamy et al., 2024; Bahi et al., 2024). Lifecycle and monitoring phases benefit most from AI due to their reliance on continuous feedback and predictive capabilities, whereas testing remains underutilized. This particular gap implies that AI adoption in this project management domain is budding with opportunities for future research and tool development (Esposito et al., 2024; Yadav, 2023). Lastly, the convergence of multiple AI technologies within the entirety of project management lifecycle emphasizes a growing trend toward hybrid AI solutions that combine automation, analytics, and conversational interfaces to enhance agility and decision-making (Tominc et al., 2023).

5.2. AI Strengths

AI adoption in Agile project management presents several strengths that significantly enhance productivity and project outcomes. Because AI capabilities can accelerate delivery cycles and improve decision-making, teams can focus on innovation rather than manual processes. Automation of repetitive tasks and backlog prioritization, particularly within Scrum, accelerates development cycles and frees teams to focus on higher-value activities (Parvatha, 2023). Generative AI tools assist in backlog refinement, dynamic prioritization, and requirement analysis, shortening product life cycles and improving efficiency (Dhruva et al., 2024; Ramasamy et al., 2024; Bahi et al., 2024). This aligns with Agile's emphasis on adaptability (Khan et al., 2025; Almalki, 2025).

In coding, technologies such as ChatGPT-4, CoPilot, and Tabnine accelerate code generation and completion, improving quality and reducing reliance on manual programming (Bahi et al., 2024). Additionally, AI enhances task creation and management through advanced models like PaLM, which support multilingual processing and automated scheduling. Predictive analytics and real-time error detection, commonly applied in XP and DevOps, enhance decision-making and risk forecasting. Moreover, AI-enabled collaboration tools strengthen team alignment across distributed environments, which in turn reinforces transparency and responsiveness (Lourens et al., 2022). These improvements translate onto lower costs and better deliverables.

5.3. AI Weaknesses

Complexities introduced by AI can potentially slow Agile adoption, particularly because data quality issues can undermine the iterative nature of AI. Experts caution against sharing sensitive data with AI systems due to security risks (Pavličet al., 2024; Bahi et al., 2024). Safety and accuracy remains a top concern as AI tools (i.e., GenAI) often produce inaccurate or biased outputs (Dhruva et al., 2024; Ramasamy et al., 2024; Paliwal et al., 2024). Data quality dependency and integration complexity are critical barriers. Pre-trained models inherit biases from their training datasets, which can manifest during different phases in the lifecycle (Bahi et al., 2024; Pavlič et al., 2024). This is particularly problematic in Scrum and Kanban environments since iterative workflows rely on accurate and timely information (Gao et al., 2025). While AI can reduce development time by up to 75%, outputs still require human oversight to ensure accuracy and contextual relevance

(Paliwal et al., 2024; Bahi et al., 2024). The lack of standardized datasets for training NLP models and the absence of robust validation frameworks in software testing increase the risk of biased or inconsistent results (Younisse & Azzeh, 2023; Esposito et al., 2024). Without reliable baselines, multiple validation pathways can introduce untrained data, leading to variability in test outcomes (Yadav, 2023). High computational costs and specialized skill requirements further complicate adoption in scaled frameworks such as SAFe and DevOps (Ricca et al., 2025). Additionally, interpretability issues and hallucinations in AI models pose concerns related to reliability and accountability (Shahriary et al., 2025). Over-reliance on automation risks diminishing human oversight, contradicting Agile's collaborative ethos (Gupta, 2025). This can eventually erode human judgement, contradicting Agile's collaborative nature.

5.4. AI Opportunities

The opportunities identified in this study emphasize AI's potential as a catalyst for organizational agility and innovation. For example, AI-assisted retrospectives and adaptive planning enhance continuous improvement in Scrum and XP. Robust feedback loops can generate more accurate forecasts and creative solutions, particularly in IT project management contexts (Dhruva et al., 2024). Finetuning also supports the development of standardized regression tests and data validation baselines for software testing, improving reliability and consistency (Esposito et al., 2024). For example, Natural Language Processing (NLP) applications such as N-gram models, Bag of Words, and word embeddings enable better analysis of stakeholder needs and contextual understanding, which in turn improves estimation accuracy and backlog refinement (de Morais, 2021; Younisse & Azzeh, 2023).

Human-centric approaches offer a pathway to sustainable AI adoption. For instance, pair programming allows developers to collaborate with AI assistants. This enables efficiencty without sacrificing human judgment (Dam et al., 2019; Saklamaeva & Pavlič, 2024). Chatbots can provide proactive support during release planning while keeping managerial oversight tight (Ebrahim et al., 2023). AI-assisted retrospectives, adaptive planning, and integration with CI/CD pipelines encourage continuous delivery at scale, while predictive feedback loops and real-time dashboards enhance proactive decision-making across Agile frameworks (Hoda et al., 2023; Bahi et al., 2024; Jain & Butler, 2024).

5.5. AI Threats

The overarching concern suggested in this study is that ethical concerns, security vulnerabilities, and compliance issues threaten trust and transparency (Niederman, 2021). Vulnerabilities in frameworks such as XP and SAFe amplify organizational risk, while misuse of AI-generated content and interpretability issues in BDD contexts exacerbate these challenges (Niederman, 2021; Baidya & Hallur, 2022). Skepticism regarding impact remains prevalent among practitioners, citing the opacity of AI decision-making processes and the lack of mature models for critical tasks such as iteration planning (Paliwal et al., 2024; Saxena & Totaro, 2024; Pavlič et al., 2024). Fears of workforce displacement continue to impede a more widespread adoption (Baidya & Hallur, 2022). Ethical and organizational dilemmas related to job displacement are reflected in these change management concerns (Paliwal et al., 2024; Trufinova et al., 2024). Scholars argue that human creativity and judgment remain indispensable, emphasizing the need for symbiotic collaboration rather than substitution (Kanbur et al., 2023).

6. Implications and Recommendations

The results presented in this study have significant implications for both theory and practice in Agile IT project management. In the era if Industry 4.0, organizations are increasingly navigating workflows that integrate AI and agile frameworks. The results from this study highlight the growing need for exisiting frameworks to refine and extend critical areas.

6.1. Theoretical implications

The use of a systematic literature review combined with SWOT analysis exemplifies methodological innovation by bridging qualitative synthesis with strategic evaluation. It demonstrates the potential for replicable, cross-domain applications of AI-enhanced project evaluation. This study highlights the shift to human-AI collaboration from traditional human-centric models. The strengths and advantages of adopting AI tools in various project management domains and agile frameworks emphasize the role of the project manager as strategic leaders supported by AI-driven decision-making processes (Almalki, 2025; Mishra et al., 2025). AI introduces a paradigm shift in Agile communication models, supporting theories of socio-technical systems where human and machine collaboration co-create value (Ramasamy et al., 2024; Bahi et al., 2024).

The vital competency that the concept of PMTQ brings into the fast evolving landscape of information technology suggests that Agile theory must evolve to incorporate data-driven decision-making as a core principle, rather than a supplementary practice. This aligns with emerging perspectives on hybrid intelligence, which emphasize the complementarity of human creativity and machine efficiency (Wilson & Daugherty, 2018). The growing trend toward hybrid AI solutions point to the need for theoretical models that account for multi-modal AI environments. The convergence of multiple AI tools with project management domains calls for a more comprehensive theory of AI-enabled agility (Tominc et al., 2023).

The use of SWOT also introduces strategic anticipation into agile environments. Ethical concerns such as job displacement and trust in AI systems prompt theoretical inquiry into change management and technology acceptance (Gill, 2025; Al-Herani et al., 2025). This theoretical gap in governance and ethics within Agile frameworks necessitates an extension of Agile theory to include ethical AI principles and governance structures (Gao et al., 2025; Niederman, 2021) to strengthen adaptability in environments where automation and compliance intersect.

6.2. Practical implications and industry recommendations

The findings of this study suggest that AI integration into agile IT project management is strategically advantageous. The results imply that AI facilitates agile IT efficiency and innovation. AI is capable of supporting faster development cycles, improved code quality, more informed decision-making, better software quality, and increased deployment efficiency. This, however, comes with significant workflow restructuring, investment in technology, and considerable upskilling. As AI augments core agile practices, project managers are to shift from operational roles to a more strategic leadership capacity. This shift aligns with the evolving expectations of PMTQ, or the ability to integrate and adapt to emerging technologies in project environments (PMI, 2020; Mishra et al., 2025).

With the industry-specific challenges highlighted in this study, it is imperative for organizations to invest in ethical AI and cost-effective infrastructure to counter bias, data validation challenges, and fears of displacement amongst the workforce. Organizations need to be strategic in investing in robust governance frameworks and change management strategies (Gao et al., 2025; Gill, 2025). Instead of replacing human roles with insightful deliberation, AI should augment IT professionals' capabilities. Organizations that prioritize PMTQ development (i.e., reskilling initiatives) and implement transparent adoption policies will be better positioned to leverage AI for continuous improvement and competitive advantage in the digital project economy (Tominc et al., 2023; Bahi et al., 2024).

These practical implications can lead to actionable strategies that organizations can implement. The results of the study consistently highlight the need to begin prioritizing PMTQ development by way of reskilling initiatives (i.e., training programs). For instance, companies can sponsor AI literacy workshops and certifications for project managers so that they can be effective when using tools like GitHub, Copilot and Jira. Organizations should also consider adopting AI strategically across agile phases, focusing on phases where a specific AI technology can be most impactful (i.e., NLP for backlog refinement and user story generation). Additionally, companies should establish compliance frameworks to implement ethical AI governance. For example, deploying explainable AI dashboards (i..e, decision paths) to monitor algorithmic decisions can address bias and privacy risks. It is also important for organizations to promote AI-human

collaboration rather than push for full automation. Pairing developers with AI assitants during code reviews is an excellent example of under-reliance to AI while ensuring appropriate human oversight. Lastly, business need to invest in cost-effective infrastructure and powerful data validation systems (i.e., AWS, Azure) to provide secure environments for AI-driven pipelines. Using cloud-based platforms reduce integration complexity while still maintaining security.

7. Limitations, Future Directions, and Conclusion

This study's SWOT framework provides a general overview of AI adoption in Agile IT project management. While a SWOT analysis is a powerful strategic planning tool, it does not quantify the impact of each factor. When factors are treated as equally significant in their impact, the results can lead to a strategic misalignment. For example, task automation might be labeled as a top priority because of its high-value, low-risk nature. However, task automation might not be the best tool to implement if the scenario calls for stakeholder and relationship management (i.e., client relationship building, mediating conflicts). Additionally, a SWOT analysis' static perspective in a rapidly evolving digital environment limits it long-term relevance. As AI technologies mature, what are identified as weaknesses and threats now might diminish while new risks arise. External industry factors and interdependencies were not included in this study, limiting the scope of its generalizability.

These limitations can be addressed in future research by utilizing a weighted SWOT matrix. This assigns numerical values based on impact and feasibility. Another future direction would be to integrate SWOT with PESTEL analysis. This will allow scholars and practitioners to account for external factors and contingencies (i.e., economic conditions, IT regulations) that influence AI adoption. Additionally, a TOWS matrix can be used to link external factors with external opportunities and threats, which in turn creates an adaptive decision-making framework for practitioners. Lastly, empirical studies and longitudinal research can provide more insight in terms impact validation on areas such as project success metrics and team dynamics.

This study provides critical insights into the strengths, weaknesses, opportunities, and threats of AI integration in agile IT project management. The findings underscore AI's ability to enhance effort estimation, task automation, and software testing, among others. While these domains can significantly enhance project efficiency and responsiveness, challenges require strategic mitigation techniques. Mitigation efforts through governance and oversight can address bias and accuracy issues, as well as confront high computational costs. Opportunities directed towards increased PMTQ and hybrid human-AI collaboration are promising, but threats such as job displacement and compliance risks must be strategically and proactively managed. In this digital economy, organizations can forge ahead and move beyond traditional agile workflows using evidence-based strategies that optimize AI.

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