MANAGING SOFTWARE PROJECTS IN THE ERA OF AI-POWERED TOOLS

George-Bogdan ANGHELOIU[1]
Oana-Maria BĂCĂRAN[2]
Ioana-Alexandra PĂTRAȘCU[3]
Cristian-Ștefan SBÂRNEA[4]
Mihai-Lucian VONCILĂ[5]
Nicolae TARBĂ[6]
Costin-Anton BOIANGIU[7]

Abstract

Artificial intelligence is now a crucial component of software project management, making scheduling and task automation simpler and providing predictive analysis to aid in improved decision-making. By analyzing their early acceptance and impact through historical analysis, statistical data, and research findings, as well as their practical applications, this study investigates the impact and development of artificial intelligence-powered products. We highlight some of the industry's most important tools, their advantages and disadvantages, and some possible ramifications for upcoming initiatives. In conclusion, we demonstrate that companies that employ these technologies can benefit greatly from improved workflow, risk management, and the capacity to concentrate more on innovation as compared to their competitors.

Keywords: project management, AI tools, Jira, ClickUp, ChatGPT

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[1] Faculty of Automatic Control and Computers, National University of Science and Technology POLITEHNICA Bucharest, 060042 Bucharest, Romania, george.angheloiu@stud.acs.upb.ro
[2] Faculty of Automatic Control and Computers, National University of Science and Technology POLITEHNICA Bucharest, 060042 Bucharest, Romania, oana_maria.bacaran@stud.acs.upb.ro
[3] Faculty of Automatic Control and Computers, National University of Science and Technology POLITEHNICA Bucharest, 060042 Bucharest, Romania, ioana.patrascu@stud.acs.upb.ro
[4] Faculty of Automatic Control and Computers, National University of Science and Technology POLITEHNICA Bucharest, 060042 Bucharest, Romania, cristian.sbarnea@stud.acs.upb.ro
[5] PhD Stud., Eng., Faculty of Automatic Control and Computers, National University of Science and Technology POLITEHNICA Bucharest, 060042 Bucharest, Romania, mihai_lucian.voncila@stud.acs.upb.ro
[6] PhD Stud., Eng., Faculty of Automatic Control and Computers, National University of Science and Technology POLITEHNICA Bucharest, 060042 Bucharest, Romania, nicolae.tarba@upb.ro
[7] Prof., PhD., Eng., Faculty of Automatic Control and Computers, National University of Science and Technology POLITEHNICA Bucharest, 060042 Bucharest, Romania, costin.boiangiu@cs.pub.ro, corresponding author

1. Introduction

1.1 Background of Software Project Management

Developing cutting-edge software is difficult and requires a controlled environment that manages time, resources, people, and costs to ensure on-time, on-budget delivery. The term software project management (SPM) refers to the planning, organizing, and leading development of software projects [1], and unlike general project management, it focuses on managing technical constraints, software lifecycles, and addressing evolving project requirements.

In today's world, the most widely used technique for project management in software teams is by far the Agile methodology, with 86% of the developers using it [2]. In fact, data shows that agile projects are 28% more successful than traditional projects [3].

Agile methodology is an adaptable and iterative approach to SPM that places a high value on user feedback and frequent short releases. Because the work is divided into short cycles called sprints, each of which focuses on certain tasks, teams are able to quickly adapt to change and continuously improve the final result.

1.2 Artificial Intelligence in Software Project Management

The creation and application of artificial intelligence (AI) in SPM has rapidly transformed the profession by providing tools that may improve workflow, automate activities, and support better decision-making. The popularity of AI has increased due to a variety of causes, such as advancements in machine learning techniques, especially in the fields of deep learning and natural language processing (NLP), data availability, and advances in processing capacity.

In today's world, AI is very widely spread and there are few websites, applications, or software services lacking some form of AI integration, such as AI-powered chat assistants or AI-enhanced search features. These tools can also be seen in most of the tools that are used in software project management.

Some of the more popular tools that are widespread include:

- ChatGPT, which was developed by OpenAI and launched in 2022, can generate human-like responses and allows users to steer the conversation to a certain style and language. This allows for the tool to be very useful for refining a project's documentation, gaining more insights into certain specific aspects of a project, or increasing the overall level of communication between teams. As of 2024, ChatGPT's website is among the top 10 most visited websites in the world [4].
- GitHub Copilot, which is similar to ChatGPT, is a code completion and automatic programming tool developed by GitHub and OpenAI that assists users by

autocompleting code, released back in 2021. A survey conducted related to the tool, in which more than 2000 developers were questioned, indicated that 88% of them feel more productive, whilst 60% noted they are more fulfilled with their jobs after starting to use GitHub Copilot [5].

- Jira, as a project management tool, integrates AI in order to improve a wide variety of features such as automating and offering smart suggestions related to tasks, offering data-driven rapports and insights, and optimizing planning.
- ClickUp integrates AI-driven capabilities that streamline project management through intelligent task automation, content summarization, predictive insights, and natural language processing.

1.3 Purpose and Scope of the Paper

The purpose and scope of this paper are to understand the role of AI-powered tools in modern software project management. By analyzing how AI can potentially improve workflow, productivity, and decision-making by allowing for task automation and providing key insights, we aim to showcase the potential practical applications and benefits of most of these tools, as well as some of their downsides.

In the following sections, we will analyze the impact of AI-powered tools in the management of software projects and explore their effectiveness. The analysis will include specific areas where AI may provide measurable improvements, such as efficiency and productivity of the team, with AI automating routine tasks like scheduling, tracking project milestones, and managing resources, but also quality assurance and risk management, where AI can identify patterns in development and testing phases, flagging potential issues early on.

2. Benefits of using AI-powered tools in managing software projects

Studies by the Standish Group [6] reveal that only 35% of projects are deemed successful, with the rest often abandoned or restarted. However, the rise of AI-powered tools is set to transform project management significantly. By 2030, it's anticipated that AI (driven by big data, machine learning (ML), and natural language processing) will handle 80% of project management tasks, leading to substantial improvements in efficiency and success rates [7].

A 2023 survey conducted by Capterra [8] revealed optimistic perspectives on the integration of AI in project management. According to the findings, 77% of project management professionals viewed AI-powered tools favorably, while only 8% of organizations were opposed to the adoption of AI strategies. Key advantages highlighted included task

automation (33%), enhanced resource utilization (32%), and improved metric accuracy (27%) [9].

Selection and prioritization are a type of prediction that could be made using ML and it helps in removing human biases from the decision-making process. The project definition, planning, testing, and reporting could also be done more efficiently and less time-consuming than the traditional way of using AI.

Another strong example in the area of testing comes from a 2023 Harvard Business Review article [7] discussing the Elizabeth Line, part of the UK's Crossrail project, which required an extensive testing and commissioning process to guarantee safety and reliability. To meet these needs, the project team established the Crossrail Integration Facility, a fully automated, off-site testing center. This facility has significantly improved system efficiency, cost-effectiveness, and resilience by enabling continuous, round-the-clock audits without the risk of operator bias.

2.1 Commonly used AI-powered tools in managing software projects

The industry of developing AI-powered tools has grown significantly in recent years, reflecting the increasing demand for automation and intelligent solutions across various sectors. However, the tools that have truly revolutionized this domain are those that continue to be adopted and relied upon on a global scale.

In this section, we analyze Jira and ClickUp, even though the list could easily continue with other notable AI-powered project management tools such as Asana, Monday.com, and Trello, each offering unique features tailored to diverse team needs. We aim to do this analysis only from the point of view of what they offer in terms of AI-powered features. Additionally, platforms like Wrike, Notion, and Smartsheet are increasingly gaining traction for their innovative use of AI and flexible collaboration capabilities.

2.1.1 Jira

According to a Statista report on Atlassian’s customer base, the company now serves over 300,000 customer organizations worldwide—with Jira deployed by more than 75,000 of these organizations in over 120 countries [10]. Jira is available in several languages (including English, French, German, Japanese, and Spanish), which reflects its broad international reach. Although Atlassian does not publicly disclose the exact number of individual end users, the scale of its customer base suggests that the overall user count likely exceeds tens of millions.

Furthermore, Forbes reports that Jira Service Management—a key component of Atlassian’s product suite—is used by over 45,000 customers, including a significant

number of large-scale enterprises and many Fortune 100 companies [11]. These Fortune 100 organizations, which rank among the largest public and private companies in the United States by annual revenue, rely on Jira's scalable and adaptable platform to meet their complex demands.

Some of the more prominent features that have been integrated with AI offered by Jira include:

- Automation with AI: handle repetitive tasks, such as auto-assigning tickets, sending notifications, or transitioning issues based on conditions
- Smart suggestions: AI-driven recommendations to prioritize tasks, assign issues to the right team members, or identify the next best action based on project context and past behavior
- Predictive insights: Jira leverages machine learning to provide insights into project timelines, resource allocation, and risk analysis, helping teams foresee potential bottlenecks or delays
- Natural Language Processing (NLP): integrations and apps within the Atlassian ecosystem use NLP to enable intuitive task creation, such as converting conversations into actionable tasks directly from tools like Slack or Microsoft Teams
- Enhanced search capabilities: improves search functionality, offering smart filters and suggestions that make it easier to locate issues or tickets, even with vague queries
- Customizable AI bots and integrations: with tools like ChatGPT or other AI-based bots, users can automate conversation-driven workflows
- Data-driven reports and predictions.
- Anomaly detection: detect unusual patterns or outliers in team performance or project status, alerting managers to potential risks early

The utility of these AI features lies in their ability to streamline workflows and reduce manual workload. For instance, automated task assignments and real-time notifications enable teams to focus on high-value work, while predictive insights and anomaly detection help managers anticipate challenges before they escalate. Enhanced search and smart suggestions improve information retrieval, saving time and reducing errors.

However, potential downsides include the risk of over-reliance on automated processes that may misinterpret nuanced project contexts, as well as data privacy concerns and the need for regular monitoring and fine-tuning of AI integrations to ensure their accuracy and alignment with evolving business needs.

2.1.2 ClickUp

One of the most widely used AI-driven tools in project management is ClickUp, which achieved remarkable results in 2023 as it was used by over 8 million users across 1.6 million teams. In an interview with OpenView [12], Gaurav Agarwal, ClickUp's Chief Growth Officer, highlighted several factors that set the platform apart, including its comprehensive features, flexibility, integrated platform approach, user-friendly experience, and rapid development pace. Growth remains a key priority for ClickUp, with 15% of efforts dedicated to identifying new growth opportunities, 25% focused on optimizations, and the remaining 60% allocated to scaling and capitalizing on existing successes.

Some of ClickUp's AI-powered features include:

Interactive Q&A: access dynamic Q&A sessions from anywhere

- Contextual assistance: get Q&A tailored to your workspace and integrated third-party apps, as well as directly on lists and projects
- Content summarization: summarize tasks, comment threads, and documents effortlessly
- Prioritized AI responses: use wikis to organize and prioritize AI-generated answers
- AI project insights: generate project summaries with status updates, action items, and next steps
- Task automation: create subtasks automatically and streamline workflows
- automated updates: receive automatic standups and team updates
- AI workflow builder: design automation workflows using natural language
- Custom fields with AI: track summaries and progress using AI-powered custom fields
- Voice and video tools: transcribe voice and video inputs seamlessly
- Templates Library: leverage over 100 pre-built prompts and templates to jumpstart your tasks

Similarly to Jira's AI tools benefits, ClickUp also allows for streamlining projects by reducing manual effort and allowing for faster decision-making. For example, interactive Q&A and contextual assistance help team members quickly retrieve pertinent information without having to search through extensive data, while content summarization and prioritized AI responses condense lengthy discussions into actionable insights. Additionally, features like AI project insights and task automation provide real-time updates and automatically manage routine tasks, allowing teams to focus on more strategic initiatives.

3. The use of ChatGPT in software management

Generative artificial intelligence has proven to be a powerful tool at humanity's disposal, simplifying the process of information gathering. LLMs [13] which are pre-trained on a large quantity of text gathered from online sources can thus answer questions or queries provided in an understandable way, recently being capable of analyzing documents, and images and searching online for answers.

The most recognizable and widely used form of generative artificial intelligence is OpenAI's ChatGPT [14], or more generally GPT-3 and GPT-4, which has become a household name since the start of 2023 due to its extensive knowledge on most subjects. By now, tools based on GPT-3 and GPT-4 have helped users optimize their workflow through various means, however, ChatGPT is what most people use when they need to look up information or analyze data.

Relating to software project management, ChatGPT can draft documentation such as user stories or SRS, identify risks, plan sprints when using Agile methodologies [15], manage resources, or summarize useful information that the managers may need. The speed with which it can follow through with these tasks is also impressive, as it usually takes under one minute to generate a response, even less when the requirement is not complex.

3.1 Performance of ChatGPT compared to students

Boudreau performed a study [16] that compared the performance of students against a ChatGPT 3.5 model. Both the students and ChatGPT were provided a nine-page scope statement from a software project and were required to list all errors or omissions, with the students timing their work for comparison.

The study found that while the students took an average of 66.67 minutes and identified an average of 6 errors, ChatGPT identified 20 errors in less than 15 seconds. That would mean that ChatGPT was 268 times faster than the average project management student and far more accurate, though it still missed certain items.

While it is obvious that a student cannot compare with a manager with years of experience, the speed and the fact that there are even better versions of the LLM by now give ChatGPT a competitive edge when deciding whether to hire more project managers or teach them to use generative AI to become more efficient.

3.2 Adoption of ChatGPT in the project management sphere

In a recent study done by the Project Management Institute on the benefits of using generative AI in project management [17], a survey with 500 participants in two waves,

comparing high adopters of generative AI with people with various other degrees of use, has highlighted a gap in the benefits gained from using such tools.

First of all, while ChatGPT was reported as being used by more than 50% of respondents in both waves, there was a 10% decrease between them as seen in Table 1, which is a modified version of the one from the original paper. The shift to other tools such as Bard/Gemini or Copilot suggests that people have started being more informed about the options available and exploring their options more before settling on one tool.

The adoption rate seems to be one of the major factors that impact the performance boost that generative AI could provide. While individuals are interested in the benefits of using tools such as ChatGPT and have begun integrating them into their workflow, as can be seen by the 86% increase in the population of what the study calls the Trailblazer group (high adopters using AI in more than 50% of their projects), organizations have been lagging behind. The study points out that "60% of leaders expressed concern that their organization's leadership lacks a clear plan and vision for implementing GenAI applications", which could slow the development of the individuals as well. The results of the study are showcased in Table 1.

Tools Used	**Explorers**		**Trailblazers**	
	Wave1	**Wave2**	**Wave1**	**Wave2**
ChatGPT	66%	55%	67%	56%
Bard/Gemini	7%	9%	14%	22%
Copilot	15%	21%	8%	15%
Internal	11%	14%	6%	7%
Other	1%	1%	5%	1%

Table1. Percentage of different people using AITools in the study

The proficiency with which project managers use generative AI impacts the range of tasks that they can streamline with such tools, as can be seen in the survey. While simple tasks like communication, reporting and summarization do not show a significant gap, it is much more likely for AI tools to be used when completing complex tasks such as risk identification, budgeting, resource management, and data analysis in the case of the Trailblazers rather than the project managers less experienced with generative AI.

4. Statistical Analysis

In order to understand the continuously growing trend of AI-driven project management, surveys have been conducted over the course of the years 2021, 2023, and 2024 to gain insights not only into participants' knowledge and use of AI technologies at that time but also into their awareness levels and adoption across different AI applications, from machine learning to automation tools. The responses reflect both the promise and the current limitations of AI in transforming project management.

4.1 AI Knowledge, Awareness, and Adoption Trends

In 2021, during the pre-ChatGPT era, knowledge about AI in project management was limited. Of the 116 survey [18] participants (mainly from North America and Europe and primarily experienced professionals), only 3% considered themselves AI experts, while 21% admitted to having no understanding of the technology. The majority of respondents (around 50%) reported being in the early to intermediate stages of awareness, signaling a knowledge gap but also highlighting a growing curiosity. A significant 59% of respondents indicated no use of AI technologies in their workflows, citing challenges such as steep learning curves and organizational resistance. However, 45% reported limited or emerging use of AI, particularly for tasks like automation (42%), machine learning (32%), and chatbots (27%). At the time, autonomous project management tools accounted for a mere 4% of usage.

By 2023, familiarity with AI had risen sharply, reflecting both the influence of maturing tools and a broader cultural shift in embracing technological innovation. The survey, conducted with 320 participants by Peter Taylor in partnership with Capterra [8], revealed that most companies were actively using or planning to adopt AI tools. Adoption trends highlighted a focus on streamlining scheduling, progress tracking, and team management, with 80% of respondents describing their level of AI acceptance as moderate to high. Early adopters reported notable improvements in efficiency, time savings, and decision-making. These developments underscore AI's transition from an optional tool to a strategic necessity. By 2024, according to the survey made by Project.co [19], 45% of respondents reported regular use of AI tools, with strategic applications like idea generation (77%) and content creation (76%) becoming prevalent. Organizations increasingly viewed AI as integral to achieving competitive advantages and enhancing productivity.

4.2 Impact on Processes, Results, and Perceptions

As AI adoption grew, its impact on project management processes became more evident. In 2021, there was cautious optimism among professionals, with most respondents describing AI as "exciting" or "intriguing". Despite this, 78% believed project managers would remain essential, emphasizing that AI complements rather than replaces human creativity and decision-making. Several participants highlighted AI's potential to optimize repetitive tasks, improve analytics, and free project managers to focus on collaboration and emotional intelligence. However, skepticism remained regarding organizational readiness and the risk of over-reliance on technology.

By 2023, early adopters were increasingly optimistic, with 44% of respondents expressing extreme satisfaction with AI's impact. Companies reported efficiency gains and streamlined operations, and many increased their AI budgets to capitalize on AI's potential. Ethical concerns began to emerge as a key topic, with participants expressing worries about how AI systems handle sensitive data and the transparency of decision-making processes. Despite these concerns, the survey results pointed to growing confidence in AI's ability to enhance project outcomes.

In 2024, the positive trajectory continued, with 58% of respondents acknowledging AI's contribution to improved project quality and ROI. Additionally, 68% reported enhanced communication and collaboration, demonstrating AI's ability to streamline workflows and foster team efficiency. Nonetheless, uncertainty persisted, with 37% of respondents unsure about AI's measurable benefits, reflecting the complexity of evaluating its true impact in multifaceted workflows. Barriers such as ethical considerations, quality concerns, and organizational adaptation challenges remained significant but did not overshadow the optimism surrounding AI's transformative potential.

4.3 Barriers and Challenges to AI Integration

While the benefits of AI are clear, significant challenges remain. In 2021, respondents identified a lack of understanding and access to adequate tools as primary obstacles to adoption. Over half (51%) admitted to having limited knowledge about AI, and many organizations struggled with the structural and cultural shifts required for integration. By 2023, these barriers evolved to include ethical and privacy concerns, cited by 26% of participants, as well as organizational strategy gaps (28%) and the cost of implementation (25%). Respondents highlighted fears of data breaches, regulatory compliance issues, and the potential misuse of AI systems.

In 2024, these challenges persisted but showed signs of diminishing as organizations gained more experience with AI. Ethical and privacy concerns remained a significant barrier for 19% of respondents, while 22% pointed to inadequate tools and 20% to a lack of organizational strategy. These findings suggest that while the industry is making progress, achieving seamless and responsible AI integration requires sustained effort and careful

planning. These findings can be seen in Table 2, which was obtained based on sources [19][33][34].

Metrics		2021	2023	2024
Number of participants		116	320	211
AI Adoption	Not using AI	59%	8%	1%
	Limited use	27%	12%	64%
	Quite frequent use	12%	57%	
	Always using AI	N/A	23%	35%
Barriers to AI Adoption	Lack of understanding	51%	20%	51%
	Lack of adequate tools	N/A	25%	22%
	Ethical, privacy, and security concerns	N/A	26%	19%
	Lack of organizational strategy	N/A	28%	20%
Main AI application	Integration & Automation	45%	33%	59%
	Effective use of resources	N/A	32%	33%
	Project Scheduling	N/A	47%	42%
	Generate Ideas / Content	27%	N/A	77%
	Accurate Metrics	N/A	27%	30%
AI future impact	Insignificant	6%	N/A	2%
	Moderate	29%	N/A	30%
	Noteworthy	65%	N/A	68%

Table2. Percentage of people that adopted AI Tools across the years

5. Conclusions

AI-powered tools are transforming the landscape of software project management, bringing real, practical benefits like task automation, better collaboration, and smarter decision-making. Tools such as Jira, ClickUp, Asana, and ChatGPT have become essential in modern workflows, helping teams streamline operations, reduce overhead, and make decisions based on data. With the power of AI, project managers can focus on high-level strategy, fostering innovation and flexibility in an ever-changing business environment.

However, this shift isn't without its challenges. As AI becomes more integrated into workflows, it requires careful management to ensure it complements, rather than replaces, human expertise. Ethical issues, like data privacy and the transparency of AI-generated recommendations, need to be tackled head-on. For example, with tools like ChatGPT becoming more common, there are important questions about accountability and the potential risks of relying too heavily on AI for critical project decisions. Additionally, it's crucial to find a balance between AI's ability to automate and the need for human qualities in project management, such as creativity, adaptability, and emotional intelligence, which are key to long-term success.

Recent data shows that companies are becoming increasingly confident in AI's role in project management, with businesses valuing the efficiency and cost savings AI-driven tools bring. Satisfaction rates with AI tools reflect both progress and areas needing improvement, such as better alignment with existing workflows and the ability to customize tools to fit unique project needs.

The role of AI in project management is constantly evolving, unlocking new possibilities while introducing new challenges. Moving forward, organizations must invest not only in AI technologies but also in developing their teams and refining their processes. As AI platforms continue to advance, it will be essential to ensure that their use adheres to ethical standards and regulatory requirements to build trust and encourage long-term adoption.

In the end, AI-powered tools in software project management represent a major shift in how we work, offering incredible opportunities to boost efficiency, reduce risks, and achieve better results. However, to fully realize AI's potential, we need a thoughtful approach—one that blends human expertise with machine intelligence, addresses ethical concerns, and fosters a culture of continuous learning and innovation. By doing this, we can create a future for software project management that's not just technologically advanced but also deeply rooted in human values.

While AI tools have seemingly evolved in the last few years, there is much more they can achieve in terms of managing software projects. Improvements are being achieved at a fast rate and there is a push for the development of features that could replace human input entirely, such as solving complex problems, speech (both recognition and production), image vision, and motor skills for humanoid robots.

Should these innovations be achieved, a new look at the capabilities of the most relevant AI tools and respective studies about the field need to be reviewed and new studies have to be realized for an accurate representation of their effects on software project management.

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