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THE USE OF ARTIFICIAL INTELLIGENCE IN PROJECT MANAGEMENT

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Purpose: The main purpose of the article was to indicate the possibilities of using artificial intelligence as a tool in project management processes in the studied medium-sized Polish companies.
Design/methodology/approach: This pilot study utilized an online survey questionnaire, which was developed following a thorough review of existing literature. The research focused on two key questions: Q1: What impact does AI have on Project Management? Q2: How are AI tools evaluated by its users in Project Management?
Findings: The implications arising from this research extend both theoretically and practically. Theoretically, it enriches the existing literature on AI in project management, underscoring the potential of AI to enhance project performance and decision-making. Practically, the findings offer valuable insights for project managers and organizations striving to integrate AI tools effectively, thereby improving efficiency, minimizing risks, and optimizing resource allocation. The research reveals that the integration of AI in project management significantly improves efficiency, decision-making, and risk management throughout the project lifecycle.
Research limitations/implications: This study examining the application of AI in project management encounters limitations like: the fast-paced development of AI technologies poses a significant challenge in maintaining the relevance of research findings, AI research may lean heavily on case studies, surveys, or secondary data, which might not adequately reflect broader industry trends, and the effective implementation of AI in project management relies significantly on the skills, attitudes, and acceptance of project teams and managers.
Practical implications: The application of AI-driven solutions enhances the execution of project management activities, leading to improved work efficiency and quicker results. It is anticipated that modern technology will be embraced with increasing boldness and innovation.
Social implications: The growing use of AI in project management has significant social implications, particularly concerning the future of work, human-AI collaboration, and the ethical use of technology in organizational settings.
Originality/value: This article explores the growing integration of AI-based solutions in project management. As businesses increasingly adopt AI, it is transforming operations by automating processes. This shift not only enhances efficiency but also improves the effectiveness of task execution, particularly for repetitive activities.
Keywords: Artificial Intelligence (AI), Project Management (PM), development, digitalization
Category of the paper: research paper.

1. Introduction

The rapid advancement of Artificial Intelligence (AI) has revolutionized numerous industries, including Project Management (PM). As organizations face increasing complexity in managing tasks, teams, and resources, the integration of AI tools offers new opportunities to streamline processes, enhance decision-making, and optimize project outcomes. The evolution of technology has significantly enhanced the functionality of artificial intelligence (AI). Advancements such as faster data analysis, increased storage capacity, and improved algorithms have all contributed to a new level of machine learning (ML). From intelligent scheduling algorithms to natural language processing for stakeholder communication, AI is reshaping the way teams collaborate and execute projects. By analyzing vast amounts of data in real time, AI can identify patterns, optimize resource allocation, and provide predictive analytics to ensure project timelines and budgets are met. Moreover, AI tools like chatbots, virtual assistants, and machine learning models are enabling proactive issue resolution, ensuring smoother project lifecycles. These developments enable more accurate predictions, allowing businesses to reduce costs and optimize their operations (Agrawal, Gans, Goldfarb, 2017). AI-driven solutions can automate routine tasks, analyze large volumes of data, predict project risks, and provide valuable insights, enabling project managers to focus on strategic goals rather than administrative details.

By adopting a structured approach, organizations can achieve specific goals within defined timeframes, budgets, and resource constraints. Effective PM plays a crucial role in introducing innovative products, coordinating events, or implementing company-wide initiatives. Companies that embrace project management are more likely to remain organized, meet deadlines, and deliver high-quality results. In PM, AI not only improves efficiency but also brings a significant shift in how projects are planned, executed, and monitored. From intelligent scheduling systems to predictive analytics, AI empowers PM to make data-driven decisions and adapt to dynamic environments. This paper explored the key applications of AI in PM, highlighting the benefits, challenges, and future potential of these innovative technologies in transforming traditional PM practices. The main aim of the article was to indicate the possibilities of using artificial intelligence as a tool in PM processes in the studied medium-sized Polish companies. In view of the above, the following research questions were posed: Q1: What impact does AI have on Project Management? Q2: How are AI tools evaluated by its users in Project Management? The study is of a pilot nature, using an online survey questionnaire preceded by literature research.

2. Project management basics

Understanding PM is crucial, as the concept of a project lacks a universal definition, which leads to divergent interpretations by researchers. For example, Heagney describes a project as a unique endeavor, characterized by specific deadlines, a financial plan, a defined scope of work, and necessary tasks to be completed. He also identifies key constraints within a project, which include performance, cost, time, and scope (PCTS) (Heagney, 2022). Lester (2006, p. 5) in his definition points out the aspects that determine the success of the project, in his opinion the effective planning, monitoring, and management of every aspect of a project, along with fostering motivation among all participants, is essential for achieving the project's objectives within the established parameters of time, cost, and performance. According to Kerzner (2017, p. 47): "Project management is a methodology for achieving goals by planning, organizing, coordinating, directing, and controlling resources over time to complete specific goals". Tereso et al. (2019, pp. 6-22) point to the general features of the project, which include: 1) well-defined quantitative and qualitative objectives, 2) a series of activities that are sufficiently complex to require management (highlighting their uniqueness), and 3) a clearly established start and end date, emphasizing the temporary nature of projects. Referring to the above PM is a systematic approach that involves planning, executing, and overseeing projects to achieve defined goals within established timelines and budgets. It requires the coordination of resources, tasks, and stakeholders to ensure successful outcomes. The core of PM focuses on balancing three key elements: scope, time, and cost — often referred to as the Project Management Triangle (PMT). Changes in one element of the triangle impact the others, so project managers must carefully manage these constraints to ensure project success (Larson, Gray, 2020, p. 9). Understanding the basics of PM is essential for ensuring that projects meet their objectives and deliver value.

Every project has its own cycle, and typically PM consists of five phases, known as the Project Life Cycle (PMI, 2021; Simion, Popa, Albu, 2018, 93–100; Alotaibi, Mafimisebi, 2025, pp. 93-99; Tereso et al., 2025, pp. 6-22): (1) Initiation – Defining the project's purpose, goals, and feasibility: (2) Planning – Creating a detailed project plan that outlines tasks, timelines, resources, and budgets; (3) Execution – Implementing the project plan by assigning tasks and managing the team; (4) Monitoring and Controlling – Tracking progress, identifying issues, and making necessary adjustments to stay on track: (5) Closure – Completing the project, reviewing outcomes, and documenting lessons learned. The Project Life Cycle (PLC) provides a framework for managing projects efficiently and ensures that all essential phases are covered to achieve project success. The PLC consists of clearly defined stages that help project managers and teams organize work, monitor progress, manage risks, and deliver successful outcomes (Enshassi, Kochendoerfer Ghoul, 2016, pp. 50-68; Labuschagne, Brent, 2005, pp. 159-168).

Effective PM requires well-defined roles to ensure tasks are completed efficiently. The most common roles include (Meredith, Mantel, 2018, pp. 77-89):

- Project Manager – Oversees the project from start to finish, managing resources, risks, and stakeholder communication.
- Project Team – Individuals responsible for executing tasks and delivering project outputs.
- Stakeholders – People or organizations affected by the project, including clients, sponsors, and end-users.

The PM is the primary person responsible for planning, executing, and closing a project. Their role includes managing the project's scope, budget, timeline, and communication with stakeholders. Key Responsibilities of a Project Manager are (Meredith, Mantel, 2018, pp. 77-89):

- defining project goals and deliverables,
- creating project plans and schedules,
- allocating resources and managing budgets,
- identifying and mitigating risks,
- communicating with stakeholders,
- ensuring project completion on time and within budget.

From the above, communication stands out as a vital element in project management. It is essential for project managers to keep all stakeholders updated on the project's progress, any changes, and any challenges that arise. By fostering effective communication, misunderstandings are minimized, and alignment among team members is strengthened (Kerzner, 2017, pp. 208-212).

To enhance the work of Project Managers, a range of new tools has been developed. While these tools are not classified as AI, they have arisen from rapid technological advancements and have sparked a growing interest in AI assistance. Among the most popular options are (Top 10 Project Management Tools, https://www.simplilearn.com/tutorials/..., 2024):

- Trello: This tool allows users to create boards filled with customizable task cards. Each card can be edited and assigned to specific team members, with deadlines, comments, and file attachments, facilitating the organization of unique project stages.
- Asana: Asana enables users to structure project stages through sidebars, portfolios, teams, and tasks. Information can be displayed in various formats, including timetables, lists, panels, and calendars. Users can initiate projects from scratch or utilize pre-existing templates, and the platform offers custom field-based segmentation and filtering options.

- Basecamp: Designed to aid in task identification and deadline setting, Basecamp helps users create to-do lists while providing automated progress reports, collaborative timelines, and real-time group chats. This tool assists in overseeing the overall development of projects and keeping team members connected.

Together, these tools significantly streamline project management processes, paving the way for greater efficiency and collaboration.

The evolution of PM can be traced through four distinct industrial revolutions. In the first phase, the expertise and intuition of experienced project managers played a crucial role, as there was little reliance on research-based methods and procedures. The second industrial revolution introduced tools for project scheduling, most notably the Gantt chart. With the advent of the third revolution, time management tools emerged, including Critical Path Method (CPM) and Program Evaluation and Review Technique (PERT). This period also saw the rise of new management approaches, such as Earned Value Management, among others. Finally, the fourth phase is characterized by advancements in global technology and the onset of the digital age (Heagney, 2022, 20-26). The era of digitalization has brought very interesting and useful solutions in PM.

3. AI into project management

The use of AI tools in PM is transforming traditional workflows by improving efficiency, reducing risks, and enhancing decision-making. These tools allow project managers to automate routine tasks, optimize resources, and focus on delivering successful project outcomes. As AI technology continues to evolve, its role in project management will become even more significant, helping companies achieve greater project success rates.

Project managers employ a variety of tools and techniques to effectively oversee all project processes. This includes functions such as comprehensive project planning, resource cost management, risk mitigation strategies, and change management. The primary purpose of these tools is to develop suitable action plans that address potential risks and uncertainties that may arise in the ever-evolving project landscape (Nakayama, Chen, 2016, 1-6). Project management tools serve a multitude of purposes. They are essential for designing and controlling project plans, managing deliverables, allocating resources, overseeing budgets, assigning staff roles and responsibilities, facilitating communication, and ensuring quality management. Additionally, these tools provide managers with valuable data that enables them to make informed decisions (Serrado, Turner, 2015, pp. 30-39).

AI tools offer significant practical benefits across various aspects of PM. One of their most valuable functions is the ability to predict outcomes based on the analysis of provided data. For example, managers can leverage data from past projects and apply these insights to current

initiatives. This capability helps identify potential mistakes and issues that may arise in the future, allowing teams to formulate proactive action plans. Ultimately, decision-making remains in the hands of human employees. However, research shows that autonomous AI for management is currently under development, paving the way for even greater efficiency and insight in the future (Clemente, Dominigues, 2023, pp. 1769- 1776).

One of the best examples of AI integration in PM is ChatGPT, particularly its latest version, ChatGPT-4. Weng's research highlights its key functions, including human-like responsiveness, language translation, and text summarization. Specific tools such as Talk-to-ChatGPT (enhances two-way communication for better decision-making), Web-ChatGPT (provides real-time, accurate responses), and ChatGPT Sidebar (offers templates for queries, summaries, and localization) are emphasized. ChatGPT supports all key areas of PM, including: Integration, Scope, Time, Cost, Quality, Communication, Risk, Procurement, and Stakeholder Management. It assists in creating action plans, updating reports, estimating task durations, budgeting, risk analysis, strategy development, and improving stakeholder communication. Due to these functions, this tool's significance is highlighted in this master's thesis and will be further discussed in subsequent chapters (Abbas et al., 2023; Weng, 2023, pp. 30-38; Nwosu, 2023). In general, AI enhances the accuracy of project processes by reducing the likelihood of human errors and freeing up managers to focus on non-automatable initiatives. While time is a finite resource that cannot be stretched, AI facilitates its reallocation from one task to another, making this transition smoother and more efficient.

Table 1 outlines traditional PM tools and techniques, detailing their descriptions and functions, alongside AI tools that can address similar challenges. With AI, these tasks become less time-consuming and resource-intensive, particularly with regard to human resources. Many of the activities listed in the table were once performed manually by employees using standard PM tools, such as Gantt charts. Today, thanks to the availability of AI assistance tools, these tasks can be completed more quickly, accurately, and with minimal resource loss.

Human error is a persistent challenge that can hinder project progress, result in additional costs, and consume valuable time when rectifying mistakes. In this context, AI serves as a valuable ally, enhancing precision and reducing the likelihood of errors, all while saving time. By analyzing data, AI can offer suggestions and recommendations that help minimize these issues. Such insights can optimize project processes and significantly enhance productivity. For example, AI might identify constraints in the project schedule and propose effective strategies to navigate them (Niederman, 2021, p. 1578).

AI can offer valuable insights into employee performance, revealing areas where knowledge and skills may be lacking. This clarity allows organizations to identify employees who may require additional support or training. To achieve this, AI relies on data regarding each worker's output and whether it meets established expectations. Furthermore, AI's predictive capabilities

can enhance resource allocation based on the performance analysis mentioned earlier, ultimately saving time and resources while providing necessary support for employees (Mohite et al., 2024, p. 421).

In PM, any modifications or changes that arise during execution can lead to delays and increased costs. However, AI introduces greater flexibility in such situations, fostering a more agile approach to PM. With the help of AI algorithms, the likelihood of disruptions and bottlenecks is minimized, enabling timely responses to adjustments by quickly processing new data and offering improved strategies. For example, financial resources are critical to any project, serving as a key indicator of efficiency and productivity measured in terms of profits. It is essential for a project manager to thoroughly examine the budget to ensure it can meet all project demands. They must have a clear understanding of the project's financial sources, prioritize tasks appropriately, and manage the allocation of funds effectively—distinguishing between those that require more investment and those that need less. Tracking and controlling any potential additional costs to ensure timely project completion can be time-consuming and challenging (El Khatib, Falasi, 2021, pp. 251-260).

Table 1.
Overview of traditional project management tools and techniques, with AI integration

Project Management tools and techniques	Description	AI tools	Description	Role in Project Management
Pre-Project Study	Pre-Project Study (also known as a Feasibility Study or Pre-Project Analysis) is a critical preliminary assessment conducted before officially starting a project. The purpose of this study is to evaluate the viability, feasibility, and potential impact of a proposed project, helping organizations determine whether the project is worth pursuing. It ensures that decision-makers have enough information to proceed with confidence or reconsider the project if it seems too risky or unprofitable.	ChatGPT-4	It can handle essential paperwork, enhance communication, and generate up-to-date performance reports. By taking on these time-consuming responsibilities, it allows managers to focus on other critical aspects of the project. Additionally, it offers comprehensive risk analysis and, thanks to its linguistic capabilities, can serve as an interpreter during meetings with stakeholders and shareholders who may not be familiar with complex technical terminology.	Project Initiation and Planning
Logical Framework	It helps to clarify the project's objectives, identify data requirements, highlight key components, and assess the basis for the project's performance level.			
WBS	It begins the process of dividing a project into distinct sections and tasks.	Textio	This effective writing tool can assist in developing job and position descriptions during the initial stages of project implementation. Additionally, it is capable of generating clear and articulate instructtions and reports.	
TCP	Managing the three interrelated project constraints—scope, time, and cost—is crucial, as they significantly impact the quality of the project's outcomes.			

Cont. Table 1.

Gantt charts	A clear and straightforward visual depiction of the time allocation and task distribution throughout the project.	RPA	Routine tasks that are performed daily can often be automated, significantly reducing the need for manual labor. Common examples of such tasks include organizing and tracking timetable data, as well as identifying potential risks based on the provided input.	Scheduling and Time Management
PERT	It explores the various options available for each task and assesses their feasibility within the specified time constraints.			
CCM	It assists in identifying potential drawbacks of the project and adapting to any changes and risks associated with them.	Clock-wise	Streamlined the project's scheduling process by developing and updating team plans.	
Kick-off meeting	Internal: Present the project objectives and details to the responsible team. External: Connect with the client to discuss the project details and review drafts.	Conversica	It serves as a virtual assistant primarily for sales departments, facilitating seamless communication among team members through carefully organized schedules and support.	Responsibility and Communication
RACI	Its primary function is to assign and display different types of responsibilities to ensure that the appropriate personnel can effectively carry out the relevant tasks.			
FPCP	It outlines the communication channels as well as the variety, intensity, and format of the data exchanged between the project's internal and external stakeholders.	Zoom.ai	Records and stores data from meetings, on basis of which may create a summary with the main points of that meeting; also, helps with crafting proper emails.	
Progress reports	They collect and present the data, which reveals the project's level of progress.	Data RPM	It aids in reducing companies' operating expenses by analyzing project data and predicting potential investment issues and inefficient resource utilization.	Monitoring and Reporting
EV	It evaluates a project's performance in terms of profitability, allowing for more accurate forecasts of its future trajectories based on factors such as scope, pricing, and organizational data.			
Decision tree	A framework outlining the potential hazards and opportunities of the project, along with strategies for addressing them as they arise.	Decision tree algorithms	Effectively illustrates each step of the decision-making process along with potential outcomes, while offering personalized recommenddations based on the provided data, characteristics, and preferences.	Decision-Making
PCF	Facilitates monitoring of the project's financial resources and funds acquired, serving as a basis for evaluating the project's performance.	IA	Streamlining financial management processes through automation, including spending control and budget creation, among others.	Financial Manageme

Note: WBS - Work Breakdown Structure, TCP - Triple Constraint of Project, PERT - Program Evaluation and Review Technique, RPA - Robotic Process Automation, CCM - Critical Chain Method, RACI - Responsibility Assignment Matrix, FPCP - Formalized Project Communication Plan, EV - Earned Value, PCF - Project Cash Flow, IA - Integration & Automation.

Source: own research according to (Zadeh, Khoulenjani, Safaei, 2024, pp. 1-10; Manchana, 2022, pp. pp. 192-208; Dam et al., 2019, pp. 41-44; Brlečić Valčić, Dimitrić, Dalsaso, 2016, pp. 131-145; Smith, Brown, 2020, pp. 120-134; Khoulenjani, Zadeh, Ghafourian, 2024, pp. 71-85; Zadeh, Khoulenjani, Safaei, 2024, pp. 1-10).

AI tools, such as ChatGPT-4, can relieve project managers of some of these burdensome tasks, like budget monitoring and adjustments. This not only simplifies the management process but also enhances overall effectiveness and productivity.

3.1. Benefits and challenges in project management practices

Project management practices are essential for achieving successful projects, as they ensure that objectives are met promptly, within the defined scope, and within budget. Nevertheless, PM presents its own unique advantages and challenges, which can ultimately impact the outcomes of a project. Integrating AI into project management significantly boosts productivity, efficiency, and accuracy. By automating routine tasks, enhancing decision-making, optimizing resource allocation, and offering real-time insights, AI empowers organizations to achieve greater success in their projects. This not only leads to more effective project delivery but also helps to lower costs and minimize risks. The most frequently mentioned benefits are (Holzmann, Lechiara, 2022, pp. 151-162; Anantatmula, 2008, pp. 34-48; Zadeh, Khoulenjani, Safaei, 2024, pp. 1-10; Khoulenjani, Zadeh, Ghafourian, 2024, pp. 71-85):

- Automation of Repetitive Tasks - AI automates tasks like scheduling, reminders, and reporting, allowing project managers to focus on strategic work, e.g. tools like ChatGPT can draft reports and automate updates;
- Improved Decision-Making - AI analyzes data to provide insights for better decisions, predicting risks and performance trends, e.g. predictive tools forecast delays or resource shortages;
- Enhanced Risk Management - AI identifies risks early by analyzing patterns, helping managers mitigate issues before escalation, e.g. AI predicts resource conflicts and market changes;
- Resource Optimization - AI allocates resources effectively by analyzing workloads and skills, e.g. recommends the best team members for tasks;
- Enhanced Communication - AI chatbots improve collaboration through real-time responses and automated updates, e.g. tools like Talk-to-ChatGPT assist with queries and project information;
- Accurate Time and Cost Estimation - AI provides realistic timelines and budget forecasts, preventing overruns, e.g. scheduling tools adjust timelines based on progress.
- Task Prioritization - AI helps prioritize tasks based on deadlines and resource availability, e.g. flags critical tasks and reallocates resources to meet deadlines;
- Continuous Learning - AI learns from past projects, improving future performance, e.g. suggests best practices from previous lessons learned.

In conclusion, Artificial Intelligence (AI) is revolutionizing PM by automating tasks, enhancing decision-making, and boosting productivity. By incorporating AI tools into their project workflows, organizations can streamline processes, minimize human error, and ultimately achieve more successful project outcomes.

Project management practices inevitably encounter challenges, including scope creep, resource constraints, ineffective communication, and unrealistic expectations. However, by adopting robust planning methods, enhancing communication strategies, and implementing effective risk management, project managers can navigate these hurdles and ultimately increase the likelihood of project success. Typical AI challenges faced by project managers include (Aarseth, Rolstadås, Andersen, 2014, pp. 103-132; Cárdena et al., 2014, pp. 323–339; Zadeh, Khoulenjani, Safaei, 2024, pp. 1-10):

- Scope Creep - One of the most prevalent challenges in PM is scope creep, which occurs when changes or additions to the project's scope are made without appropriate approval. This often leads to delays, increased costs, and overwhelms the team.
- Resource Constraints - Projects frequently face limitations in terms of budget, personnel, and time. Inefficient allocation of these resources can result in delays, diminished quality, and team burnout.
- Poor Risk Management - Neglecting to identify and address potential risks early on can jeopardize project timelines and outcomes. Unforeseen issues can disrupt the flow of the project and escalate costs.
- Communication Breakdowns - Miscommunication among team members or with stakeholders can lead to misunderstandings, delays, and conflicts. Inadequate communication often results in unmet expectations and potential project failure.
- Unrealistic Deadlines and Expectations - Imposing unrealistic deadlines or goals creates undue pressure on the project team, leading to stress, lowered productivity, and a decline in work quality.
- Technological Challenges - Introducing new tools and technologies without sufficient training can pose significant challenges for teams. Ineffective use of these tools may hinder project progression.
- Stakeholder Management - Balancing the expectations of various stakeholders can be daunting, especially when their interests' conflict. Disalignment with stakeholders can lead to dissatisfaction and contribute to project failure.
- Resistance to Change - Teams may resist new processes, tools, or methodologies that are rolled out during the project. This resistance can hinder progress and negatively impact project outcomes.

PM practices encounter a range of challenges that can impede the successful completion of projects. These obstacles can affect timelines, budgets, and overall outcomes. Therefore, it is essential for project managers to recognize and tackle these issues proactively.

The role of AI in PM is indeed transformative, however, its dependence on high-quality data, the potential for factual inaccuracies, and the absence of emotional intelligence in decision-making present significant challenges. In the context of reliance on high-quality data, it is essential to recognize that artificial intelligence (AI) models are fundamentally data-driven. AI systems, including predictive analytics tools and project scheduling software, necessitate accurate, complete, and pertinent data to operate effectively. The presence of poor-quality data can lead to misleading predictions, erroneous recommendations, or suboptimal resource allocation. Furthermore, if the data input into an AI system is outdated, inconsistent, or biased, the resultant outputs will inherently reflect these deficiencies (Zadeh, Khoulenjani, Safaei, 2024, pp. 1-10; McGilvray, 2021).

Regarding the potential for factual inaccuracies, AI systems may misinterpret patterns, particularly within dynamic or intricately nuanced project environments. For example, correlations between project delays and resource allocation might engender incorrect causal assumptions. Additionally, the lack of contextual awareness can be problematic, while AI excels at pattern recognition, it may overlook the unique situational factors that influence a particular project (Manchana, 2022; Kollar, Alshibli, 2024).

Moreover, in terms of bias amplification, biases present in the training data can lead AI systems to perpetuate factual inaccuracies, adversely affecting decision-making processes. It is also vital to acknowledge the impact of emotional intelligence on decision-making within project management. AI lacks the capacity to understand or empathize with human emotions, which are critical in effectively managing teams. For instance, when reallocating resources, AI may fail to consider the potential impact on team morale, which could result in dissatisfaction or decreased productivity. AI systems, being governed by programmed logic, are unable to adapt to nuanced human interactions such as resolving interpersonal conflicts or motivating underperforming team members. Decisions made solely on the basis of AI may overlook ethical dimensions that require empathy and fairness, such as understanding the reasons behind a team member's failure to meet deadlines due to personal challenges (Bammidi et al., 2024).

It is also essential to ensure the effective implementation of artificial intelligence. Companies seeking to adopt this technology should take the following steps into consideration: 1) Foster a culture of learning by educating stakeholders and employees about the fundamentals and potential outcomes of AI; 2) Safeguard employment opportunities, even in the wake of automation technology implementation; 3) Establish clear regulations and empower authority in addressing systemic biases and managing data storage practices; 4) Recruit professionals with AI expertise to ensure optimal maintenance and support, 5) Provide comprehensive training for staff members to equip them with the necessary skills. By following these guidelines, organizations can enhance their AI integration and maximize its benefits, which also concerns project management (Wang, 2019, pp. 1-6).

4. Own research

4.1. Research methods and materials

This paper investigates the pivotal applications of artificial intelligence in project management, emphasizing the advantages, challenges, and future prospects of these groundbreaking technologies in reshaping traditional PM methodologies. The primary objective of this article is to illustrate the potential of leveraging artificial intelligence within project management processes, particularly in medium-sized Polish companies. To achieve this, two key research questions have been formulated: Q1: What impact does AI have on Project Management? Q2: How are AI tools evaluated by its users in Project Management? Regarding the Q1 analysis, respondents were asked about the following issues: In your role, do you frequently engage with project management processes, or are you part of a project team? Do you have any concerns about data security when it comes to the use of AI in the firm's projects? Are you concerned about replacing your job with Artificial Intelligence? Does the use of AI help you save time on your tasks and improve the overall time management of your projects? How much do you trust and depend on the decisions and answers provided by AI? In the analysis of responses to Q2, respondents were asked about: Which AI tools do you utilize on a daily basis? How would you assess the effectiveness of the AI tools you've selected for managing your projects? Which Project Management activities could yield the greatest benefits to the project when automated using AI? Is there a need for AI training and education?

This study adopts a pilot approach, employing an online survey questionnaire that follows an extensive review of the relevant literature. Statistical frequency analysis was used for processing the gathered research material. 53 employees from small and medium-sized Polish enterprises took part in the study.

4.2. Respondent`s profile

Table 2 shows the characteristics of the respondents according to age, gender and job position. The respondents were relatively young, with the majority falling within the 31-40 age range at 49%, and as well as a significant portion 31%, being over 41 years old. Only a small percentage of employees were between 21- 30 years old (12%), while those under 20 represented a mere 8%. The gender identification of survey participants revealed a minor disparity between male and female workers, with 47% identifying as male and 53% as female.

This indicates a diverse workforce that may foster equal opportunities across genders. In terms of occupations, the most populated roles included IT specialists (29%), social media content creators (22%), copywriters (19%), account managers (17.4%), data analyst (12%), graphic designers (11%), Junior social media specialist (7%).

From the above, it can be concluded that the survey questionnaire was primarily distributed to employees who utilize modern IT technologies and AI-driven solutions in their work.

Table 2.
Respondent`s profile

Characteristics	Respondent`s profile					
Age	< 20	21-30	31-40	>41		
	8%	12%	49%	31%		
Gender	male	female	other			
	47%	53%	-			
Job position	Social media content creator	Copywriter	IT specialist	Data Analyst	Graphic designer	Junior social media specialist
	22%	19%	29%	12%	11%	7%

Source: own work based on conducted research.

4.3. Research findings – the use of AI in project management activities

Q1: What impact does AI have on Project Management?

For this research, it is crucial to understand the participants' relationship with project management. As illustrated in Figure 1, 37.8% engage with project management occasionally, while 33.9% participate regularly. Additionally, 17% indicate they are involved from time to time, and only 11.3% report no involvement whatsoever. However, most of the respondents are involved in activities related to PM.

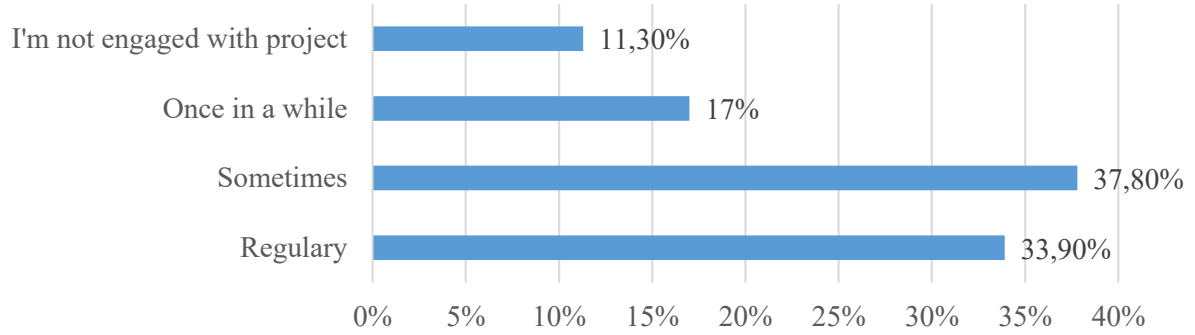

Figure 1. In your role, do you frequently engage with project management processes, or are you part of a project team?

Source: own research.

Data safety is crucial for every organization. In this particular firm, 26% of employees express some level of concern regarding data safety related to AI, while 13% are particularly troubled by the company's data security measures. Additionally, 32% of employees find it difficult to take a stance on the issue, and 21% have no opinion at all, 8% believe there are no concerns at all (Figure 2).

Respondents were also asked about their concerns about their workplaces being replaced by AI. The fear of being replaced by AI was voiced by 45% of participants, indicating concerns about replacement to a limited extent, while 14% felt there was a significant risk involved. In contrast, 27% of respondents did not believe such a risk existed, and 14% were unsure.

Next, respondents were asked about: Does the use of AI help you save time on your tasks and improve the overall time management of your projects? In their opinion AI plays a significant role in enhancing time efficiency. Notably, 49% of participants reported a frequent improvement in their time management when AI is employed, while 35% expressed strong conzfidence in its effectiveness for saving time. 16% of those surveyed had no opinion on this subject.

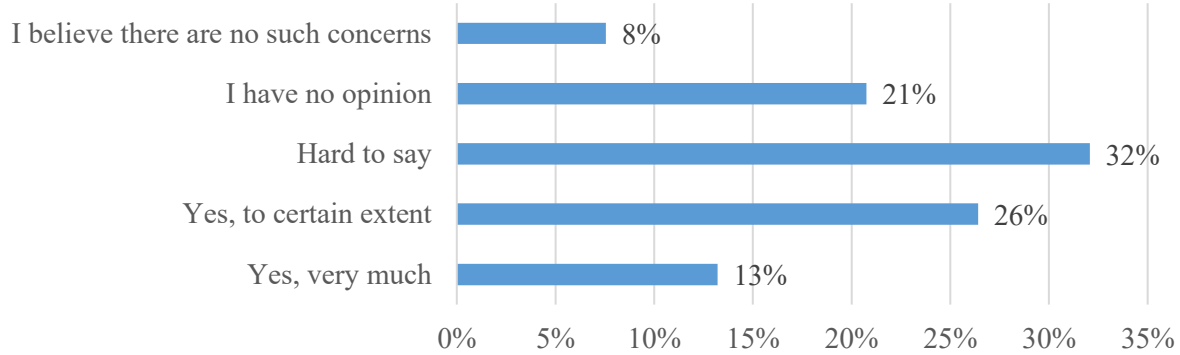

Figure 2. Do you have any concerns about data security when it comes to the use of AI in the firm's projects?

Source: own research.

As indicated in Figure 3, only a small number of workers place complete trust in AI decisions and answers. The majority of employees, specifically 47%, express a significant level of trust in AI, though not entirely unwavering. Meanwhile, 23% remain neutral, and a small percentage exhibit a strong or complete distrust towards AI.

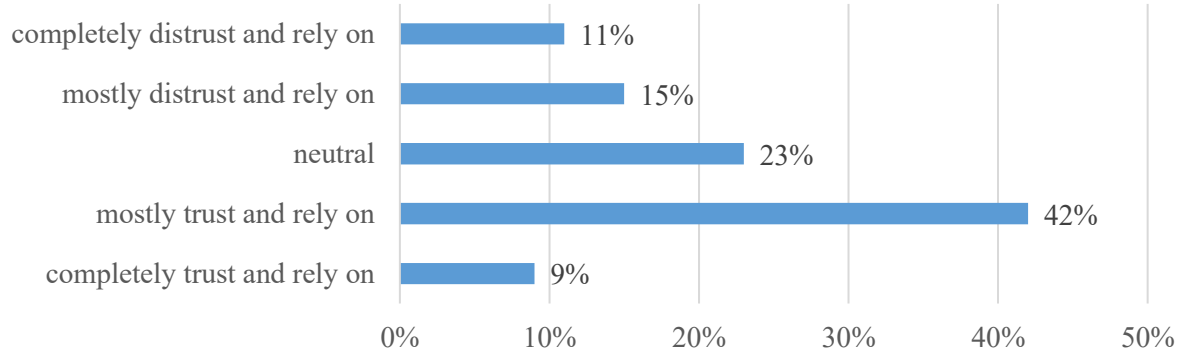

Figure 3. How much do you trust and depend on the decisions and answers provided by AI?

Source: own research.

Q2: How are AI tools evaluated by its users in Project Management?

Respondents were asked what AI tools they use on a daily basis and could choose several of the proposed options. As illustrated in Figure 4, Zoom and ChatGPT stand out as the predominant AI tools utilized by respondents, commanding significant utilization rates of 91% and 89%. Also Data RPM tool and Trello (or Bitrix24) achieving significant utilization rates of 43% and 37%. In contrast, other tools such as Textio, Conversica and Basecamp follow at a distance, with usage rates of 17%, 15% and Basecamp, respectively. This may indicate that employees are still learning how to use more advanced AI technologies in PM.

According to the question: How would you assess the effectiveness of the AI tools you've selected for managing your projects? Employees' feedback on AI tools reveals varying levels of effectiveness. Specifically, 42% of respondents believe these tools are moderately effective when managing projects, while 35% consider them highly effective. Additionally, 23% maintain a neutral stance, and notably, no respondents indicated that they find AI tools ineffective.

The survey respondents were then asked about which Project Management activities could yield the greatest benefits to the project when automated using AI? They also had several answer options to choose from.

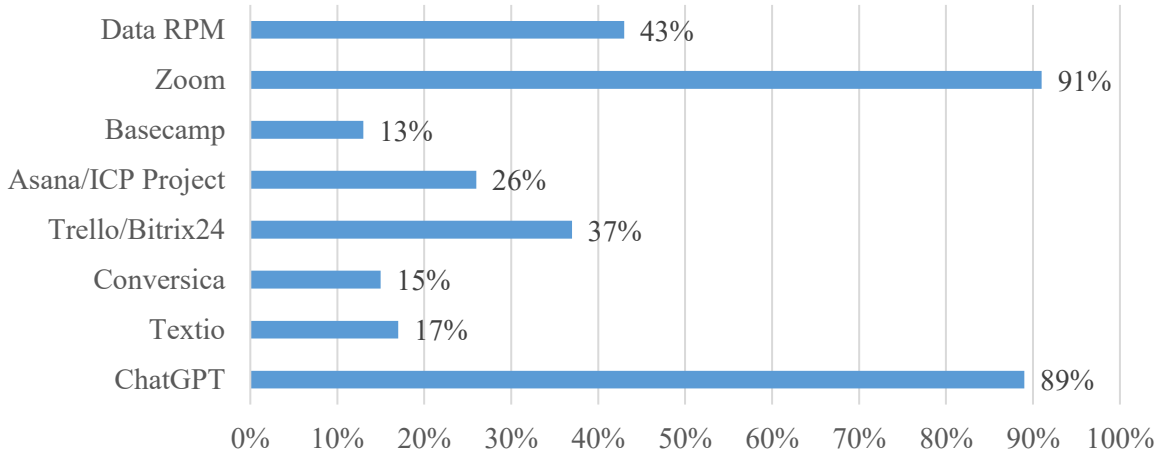

Figure 4. Which AI tools do you utilize on a daily basis?

Source: own research.

Figure 5. highlights the key areas of Project Management that would greatly benefit from automation through AI. These areas include Scheduling and Planning, with 68% of leaders identifying it as advantageous, Progress Tracking at 56%, and Data Collection, which garnered 45% support. The remaining activities had similar values (between 30% and 39%) when it comes to benefiting from the use of AI.

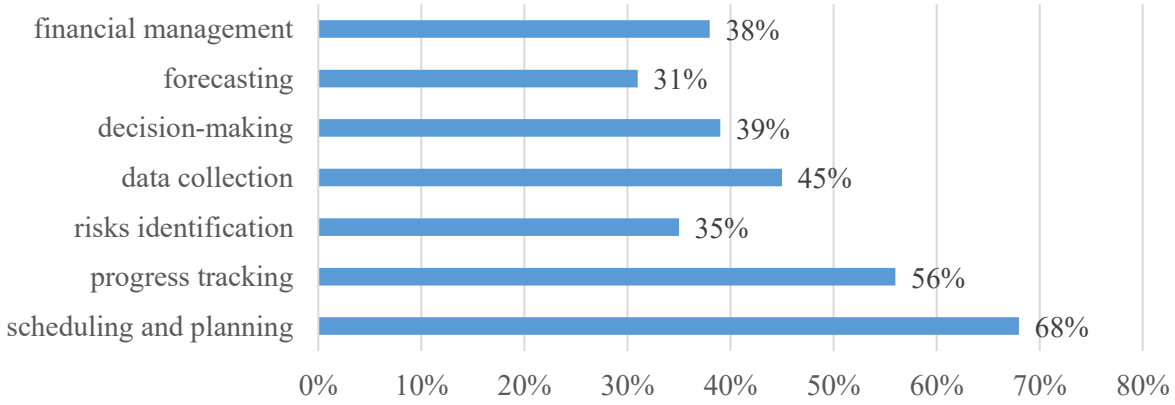

Figure 5. Which Project Management activities could yield the greatest benefits to the project when automated using AI?

Source: own research.

To highlight the importance of deepening competences in the use of AI tools in PM, the respondents were asked about the necessity for training and education in the field of AI, and

40% of respondents indicated that they need such training. Additionally, another 42% occasionally express a desire for it. Meanwhile, 10% have no opinion on the matter, and 8% are not interested at all. The research also showed, that a significant number of respondents have expressed their views on the need for an AI specialist within the firm. Specifically, 31% of the workforce reported a strong demand for this role, while 43% indicated a moderate level of demand. In contrast, 14% of employees remain uncertain about the idea, and 12% would not consider it at all.

5. Conclusion

Artificial Intelligence (AI) is revolutionizing project management by automating repetitive tasks, enhancing decision-making, and improving overall project outcomes. The incorporation of AI tools enables project managers to streamline workflows, minimize human error, and redirect their focus from routine operations to strategic initiatives.

AI-driven solutions can optimize essential aspects of project management, including planning, risk management, resource allocation, and progress tracking. By analyzing historical data and identifying patterns, these AI systems equip project managers with the ability to anticipate potential risks and delays, facilitating proactive decision-making. Furthermore, AI tools offer real-time insights and recommendations, enhancing a project's agility and responsiveness to changes.

However, embracing AI in project management also introduces certain challenges. These encompass ethical considerations, data security risks, and the necessity for upskilling project teams to effectively utilize AI tools. Importantly, AI should be viewed as an aid rather than a substitute for human judgment. Successful project management continues to rely on critical thinking, leadership, and emotional intelligence.

According to the conducted research, and answering the first research question (Q1) the majority of respondents are actively involved in project management activities, with 37.8% engaging occasionally and 33.9% regularly. This indicates that insights gathered about AI's impact are relevant to those with direct project management experience. Also, data safety emerges as a notable concern, with 26% of employees expressing some level of worry about AI-related data security, and 13% being particularly troubled by existing measures. However, a significant portion (32%) remains undecided on this issue, and 21% express no opinion, reflecting mixed sentiments about data safety in AI usage. Concerns about AI replacing human roles are prevalent but not unanimous. While 45% acknowledge limited concerns about replacement and 14% feel a significant risk, 27% do not perceive a threat, suggesting divided opinions on AI's impact on job security. Also, findings highlight a general inclination toward

trusting AI, albeit with some reservations, emphasizing the importance of transparency and reliability in AI systems to build greater confidence among users.

Referring to the second research question (Q2), towards growing reliance on AI tools in project management very important is the need for training to maximize their potential, and the importance of specialized roles to enhance AI implementation. Widely used tools like Zoom and ChatGPT dominate, advanced AI tools remain underutilized, suggesting a learning curve for adoption in PM. A majority of respondents find AI tools effective for project management, with 42% rating them as moderately effective and 35% as highly effective.

In summary, AI has the capacity to transform project management by boosting efficiency and enhancing decision-making. To maximize the advantages of AI, organizations must ensure that project managers possess the skills required to effectively collaborate with AI systems and address any ethical or security concerns that arise. Ultimately, the successful integration of AI into project management hinges on striking a balance between technological innovation and human expertise.

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