VILNIUS UNIVERSITY
BUSINESS SCHOOL

INTERNATIONAL PROJECT MANAGEMENT

Inga Simanonytė

Dirbtinio intelekto panaudojimo potencialas skirtinguose projekto valdymo etapuose	**Exploration of artificial intelligence utilization potential in various stages of project management**

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Supervisor|_____

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SUMMARY

VILNIUS UNIVERSITY BUSINESS SCHOOL
INTERNATIONAL PROJECT MANAGEMENT STUDY PROGRAMME
INGA SIMANONYTĖ
EXPLORATION OF ARTIFICIAL INTELLIGENCE UTILIZATION POTENTIAL IN VARIOUS
STAGES OF PROJECT MANAGEMENT

Supervisor – docentas Andrius Valickas.

Master's thesis was prepared in Vilnius, in 2024.

Scope of Master's thesis – 46 pages.

Number of tables used in the FMT - 2.

Number of bibliography and references -112.

The FMT described in brief: This thesis examines the potential impact of artificial intelligence (AI) on the 12 principles of project management outlined in the PMBOK Guide, 7th edition. Interviews with project management professionals revealed perceived benefits of AI, such as automation and data-driven decision-making, as well as challenges like data security, integration difficulties, and ethical concerns. While AI adoption is currently limited, it shows promise, particularly in areas like risk management and team collaboration. The thesis suggests further research is needed to explore the full potential of AI in project management.

Problem, objective and tasks of the FMT: The updated PMBOK 7th edition presents new challenges for project managers by demanding more value creation without providing clear guidance. This research aims to: 1) identify these challenges, 2) provide guidelines for using AI in project management to address them, and 3) offer recommendations for future research on AI in the field.

Research methods used in the FMT: The study uses a mixed-methods approach, including literature review, AI-powered analysis of PMBOK guides, and interviews with project managers. It acknowledges the limitations posed by the rapidly evolving nature of AI and its inherent complexity.

Research and results obtained: Interviews with project management professionals revealed perceived benefits of AI, such as automation and data-driven decision making, but also challenges like data security and integration difficulties. While AI adoption is limited, it shows promise in areas like risk management and team collaboration, with leadership considered least likely to be impacted.

Conclusions of the FMT: This thesis examines the challenges introduced by the updated PMBOK 7th edition and explores how artificial intelligence (AI) can offer solutions. It identifies key challenges, provides guidelines for AI implementation in project management, and suggests directions for future research.

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INTRODUCTION

Artificial intelligence (AI) generalization has put many global companies on the path to utilizing this technology massively (Martinez, 2023). Reports show that 61% of the tasks in large US companies will be delegated to AI in the upcoming couple of years (Egan, 2024). The only question remains when this will trickle down to small companies. What processes will be changed is important to understand. The current trending TikTok is where users say they want AI to help them create art, not be art creators, as it currently appears. The reality is that AI will "transform humans' relationship with computers." Moreover, there is an underlying fear of our future. AI research in 2022 showed at least a 10% chance that AI transformation would be terrible. (Leaders, 2023).

Project management is a vast industry; approximately $48 trillion is invested. (Nieto-Rodriguez, Vargas, 2023). For years, the Standish Groups Chaos Report, the latest published in 2020, showed that only 31 percent of projects were successful, and around 1 in 5 failed. This percentage has remained relatively stagnant since 2011, and the report shows no significant improvement. So, we can presume that around $3.2 trillion is wasted.

This underlying approach that artificial intelligence will change the global outlook of work and how work is done will impact project management on a vast scale. Hopefully, it will become a tool for project managers to help them increase successful delivery and final results. The impact will revolutionize global industries. So, artificial intelligence is a game-changing technology that can reduce the project manager's and team's workload and predict risks and outputs. It is widely acknowledged that the efficacy of AI applications is contingent upon various factors, prominently the available data and the specific objectives for which AI is deployed. (Biloslavo et al., 2024). So, project management needs to be at the forefront of this global transformation and adopt it as soon as possible. It is important to note that the current progress of AI in project management is correlated to a lack of investment from the private sector and is mostly led by universities and public research institutions. (Gil, Martinez Torres & González-Crespo, 2021)

The problem with the updated PMBOK 7th edition guide putting new requirements on project management's shoulders is tremendous. The reality of creating a more expansive view of the value that project management must create without explicitly providing clear guidelines on how to do it puts project managers in a position where a systematic approach is lacking, and new technology like artificial intelligence still needs to be utilized systematically. Understanding AI's impact is complex, and a systematic approach needs to be improved. It is also necessary to clarify how to explain to project managers how they work or how this new technological advantage will impact their work.

The thesis aims to investigate utilization potential of AI in various stages of project management by exploring current research base on artificial intelligence and basing on insights from project management professionals involved in primarily initiatives of usage of AI in project management.

Objectives:

- To identify the main challenges in project management regarding the updated PMBOK 7th edition.

- To provide possible guidelines for using artificial intelligence in project management work.

- To create recommendations for future researchers to understand possible ways to approach artificial intelligence research in project management.

Research methodology. First, in the first theory part, the current information was analyzed and summarized to clearly understand project management challenges based on the updated PMBOK 7th edition and possible solutions that artificial intelligence can provide. Therefore, the data for the theoretical part of the topic was gathered using primary and secondary sources. To compare two different PMBOK Guides, 6th and 7th, an artificial intelligence tool provided by Stanford University, "Storm Gene," was utilized. The empirical research of the master's thesis was performed by interviewing the project managers. That helped to identify the key challenges and success determinants for the practical utilization of artificial intelligence, as it currently is in concurrence with the thesis's main aim. Throughout the thesis, multiple AI tools available online were utilized to do theoretical and later methodical analysis of collected data.

The structure of the thesis. The thesis is divided into four main parts: the theoretical part, which consists of the literature review; the methodological part, which provides guidelines for the research; the research part, which provides the results of conducted interviews with project management professionals; and the final part, which summarizes the conclusions and provide further recommendations.

The theoretical review reviews the current research on different aspects of project management and discusses the possibilities of AI impact.

It is important to note significant **limitations of the literature review** based on the subjects' wide narrative. Later, the project management professionals are interviewed to analyze the current AI practices. The key underlying understanding is, and the main limitation of this thesis, the vast daily changes in artificial intelligence and its complexity.

Justification of the novelty and relevance of the research. AI as a tool provides ample capabilities for different industries, but there is a lack of research on its current utilization of project

management professionals. When writing this thesis, no available research looked at the updated PMBOK Guide 7th edition, the extensive roles of project managers, and options for using artificial intelligence.

Keywords. Project management, artificial intelligence.

1. Theoretical analysis of AI in Project management.

1.1. Artificial intelligence

The common understanding of artificial intelligence is that this information technology system can reason, learn, and act like some aspects of a human being. However, the researchers have not finalized a clear definition of AI (Muhammad, Raharjo, 2023). Currently, the user can open any platform that uses artificial intelligence at its core, like ChatGPT, Midjourney, Copy.ai, Gemini.AI, or similar, and interact with it as a person would with any of his or her friends. This tool, as a matter of fact, is a massive transformation leading to global societal change. By the end of the 20th century, the internet increased innovative environments made by data-driven structures; this is the era commonly known as Society 4.0 (Ponraj et al., 2024). The new period is defined by Society 5.0, which is the fusion of the digital and real-world (Deguchi et al., 2020). The use of these terms is only needed to understand that the current transformation is just the first step in the massive transformation of our everyday lives, so to write an article about artificial intelligence and project management, the researcher analyzes and tries to predict only a tiny grain of the global change which on the next day of publishing this work can be made invalid but can provide some guidance for future research.

Artificial intelligence has different terms and many stages of development and approaches. OECD Council on AI quite recently updated the definition: "An AI system is a machine-based system that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments. Different AI systems vary in their levels of autonomy and adaptiveness after deployment." (Russell, Perset, Grobelnik, 2023). So, in more comprehensive terms, artificial intelligence changes the outcome it receives by predicting possible results. However, to evaluate the process of AI and comprehend the system behind this description, we need to understand a couple of key factors required for AI. The first is self-explanatory: the data pipeline includes not just one specific data set but data input that changes over time. The second and the third are related to algorithms; for AI, the algorithms must have a "thinking" option, so the predictive algorithms and experimentation platforms are crucial. The fourth and final is the infrastructure. (Iansiti, Lakhani, 2020).

As we understand it, we can understand why something so new as the current generative AI revolution is so old. John McCarthy, widely considered the father of artificial intelligence, first noted the notion of intelligent machines in the 1950s. J. McCarthy created a new coding language that allowed the machines to collect data and learn. The second and third factors were already at play in the 1950s. The global industrial change allowed AI technology to switch from logic-based systems to deep learning models that enable the technology to move to human-like interactions (Radanliev,

2024). This massive industrial change anchored in significant past innovations allows today's everyday transformation. The AI to which legendary Gary Kasparov lost its game is hardly comparable with today's AI tools (Baugues, 2023).

The recent tremendous zest is more related to ChatGPT's taking a generic approach to artificial technology and making it publicly available. Nonetheless, advantages in computing power guide the rapid development of artificial intelligence, so the importance of the first and fourth points is tremendous. On March 18, 2024, NVIDIA, the global leader in AI-driven chips, announced the launch of the Blackwell platform, which will allow companies to use trillion-parameter large language models 25 times cheaper. The adopters of the new chip technology will be none other than Amazon, Dell Technologies, Google, Meta, Microsoft, penAI, Oracle, Tesla, and xAI (NVIDIA Press release, 2024). The significance is that principal—national data centers will no longer be needed to sustain artificial intelligence development. "The International Energy Agency, a forecaster, estimates that over the next two years, global power consumption from data centers could more than double from its 2022 level, reaching 1,000 terawatt hours by 2026—equivalent to the electricity consumption of Japan." (The World Ahead, 2024).

Comprehending this rapid development seems complicated. Now, people without coding experience can code, and researchers can do research with the click of a button.

If the person used Facebook at any time after 2006, then as a user, he or she was utilizing one of the artificial intelligence products that used deep learning models. By 2016, Facebook announced that "FB Learner was ingesting trillions of data points on user behavior every day, and that engineers were running 500,000 experiments on them a month." (Horwitz, 2023). The amount of data available for companies like Google, Microsoft, Facebook, X, and others is staggering, and to be quite clear - it is the driving force of artificial intelligence.

1. 2. Project management updated guide

This chapter aims to expand the structural approach to utilizing artificial intelligence in project management, which previous researchers have already introduced to some extent. The researchers systematically reviewed the literature by structurally approaching the usage of artificial intelligence using PMBOK 6th guidelines and found some promising results (Muhammad, Raharjo, 2023). The findings show the vast impact of artificial intelligence on project management because AI can replicate human cognitive functions consistent with problem-solving. (Hashfi, Raharjo,2023). Resource allocation, communication, and cooperation can all be improved by utilizing AI tools (Sahadevan, 2023). However, the usual approach consists of only specific key aspects of project

management like resource allocation, risk prediction, scheduling, cost estimation, and communication (Shoushtari et al., 2024).

The current overview of project management and AI needs to be more extensive and correlate more with updated PMBOK 7th guidelines. It is important to note that "PMI clearly states that it does not invalidate the knowledge documented previously. However, the coexistence of these two perspectives was initially an unclear subject." (Amaro, Domingues, 2023). So, the newly updated guide puts quite a clear new view on project management and requires additional attention from researchers regarding AI utilization in project management. As mentioned in the previous chapter, the current literature on this aspect is lacking. If we look for specifics on more comprehensive aspects of project management, the literature needs to be more thorough. Regardless, researchers agree on challenges facing AI implementation in project management, some of which stem from the key aspects of the AI transformation, which are ensuring data quality, understanding model explainability, and putting ethical implications at the forefront of this transformation (Parekh, Mitchell, 2024).

The updated PMBOK Guide 7th edition was considered for this article to expand on the current research. PMBOK Guide 7th edition significantly changed the standard of project management. It now contains three aspects: an introduction, a system for value delivery, and project management principles. Project management principles are combined from 12 aspects: stewardship, team, stakeholders, value, systems thinking, leadership, tailoring, quality, complexity, risk, adaptability and resiliency, and change.

The Standford University tool Storm Gene was utilized to find apparent differences between the PMBOK Guide 6th and 7th editions. The final document provided with this tool is attached (Annex 1. Storm Gene article). This tool provided a structural approach to analyzing PMBOK Guide 7th changes:

1.   The updated PMBOK Guide eliminates process groups and knowledge areas, thus eliminating rigid methodologies to a flexible, adaptive project management framework.

2.   The new concept of principles and performance domains is introduced.

3.   Principles-based standards with the new 12 project management standards are becoming a project management focus.

4.   The agile approach is emphasized, thus increasing the focus on team collaboration.

5.   The new PMBOK Guide introduced new tools for project managers.

The first significant changes from the PMBOK Guide 6th to 7th editions eliminated previously known process groups—initiating, planning, executing, monitoring and controlling, and closing—which was previously defined as the standard for project management. In the PMBOK Guide 7th edition, this project management standard concludes with three key parts: an introduction,

a system for value delivery, and project management principles. This shift, based on the Standford Storm Gene tool, notes that it allows for a more flexible project management framework. This ability to change or be changed easily according to the situation is complex and challenging to navigate and more relates to Agile project management method than PMBOK Guide 6th approach.

The main difference in the theory of PMBOK Guide 7th lies in the updated view on the standard of project management. So, to expand on the current research on the utilization of artificial intelligence tools, we need to evaluate the updated outlook of the PMBOK Guide 7th edition. The approach will be based on the formula for reviewing these elements from the PMOK Guide, current research on these topics, and options for using artificial intelligence which provide some difficulties on the way.

The impact of artificial intelligence on project management emphasize the need to expand the structural approach to AI utilization in line with the updated PMBOK 7th guidelines. The research highlights the potential of AI in enhancing resource allocation, communication, and cooperation in project management. However, it also acknowledges the challenges in AI implementation, including data quality, model explainability, and ethical considerations. The updated PMBOK Guide 7th edition introduces significant changes to the project management framework, shifting from rigid methodologies to a more flexible and adaptive approach. This article evaluates the updated outlook of PMBOK 7th and its implications for AI utilization in project management, considering the new principles and performance domains.

1. 2. 1. Introduction and artificial intelligence

The introduction is the basis for the project's implementation. Its management is based on the organization itself; the decision to start the project can lie in the hands of the company, owner, or other dedicated structural unit. This understanding is similar to the usage of the initiation stage in PMBOK Guide 6th edition but is expanded tremendously.

So, the introduction can provide information on outcome, portfolio, product, program, project, project management, project manager, project team, and system for value delivery and value and "provides a basis for understanding project management and how it enables intended outcomes, <...> for understanding project management and how it enables intended outcomes." (PMBOK Guide, 2021, p. 3). There could be a presumption that artificial intelligence should impact this project management element the least. Nevertheless, is it the case? There is a common understanding that the planning stage is more formal than smaller ones for larger organizations, such as the public sector or large companies.

The system in which the project is created can be impacted enormously; it can guide the project manager in formulating the precise timetable and the resources he can have to implement the new projects in an organization, and it all can be highly driven by artificial intelligence. Research shows that organizations with a low-level understanding of artificial intelligence "are mainly concerned with administrative issues, such as finding the best way to launch the projects and attracting intrinsically motivated staff and the right partners" ((Neumann et al., 2022, p.131), so impact on them can be great and positive. AI can play a crucial role in the introduction state of project management because it can provide helpful input in "budgeting, change management, conflict management, documentation, office and information management, scheduling, knowledge management, leadership development, and efficient performance, project planning, people and other resources management, quality management and assurance, risk management, task management, and team management." (Thuraka et al., 2024, p.55).

We will see that many of Thuraka et al. (2024) cited concepts still need to have, at this point, quite clear, practical input. However, they provide approaches for the possible positive outcomes that can be achieved by utilizing AI in different aspects of project management.

For example, budgeting usage with an AI-based system could allow the expansion of inputs, like expenses, to generate outputs related to economic, political, and social outcomes. (Marotta, Au, 2022). It looks promising, but the key issue is that there needs to be detailed use cases for this concept. (Valle-Cruze et al., 2022). Some test cases have confirmed this, reporting two key factors: "1. The quality of results depends on the quality of the data. <...> 2. If practitioners lack knowledge and experience with the code interpreter's tools, they might overlook errors in calculations or thought processes that could potentially lead to inaccuracies." (Lee, Hayes, Maher, 2024). If we look at the knowledge-related aspects of Thuraka et al.'s (2024) list, there is a trap that we can fall into, which is its aversion to algorithms. Jarrahi et al. (2023) find that While avoiding automation dangers like algorithmic aversion or cognitive complacency, project managers must cultivate perceptions, skills, and work habits to benefit from their artificial partners for knowledge management. So, in this stage of project management, where a strategic approach is crucial, to adapt AI, the organisation itself needs to shift to a data-driven workflow and have managers open to change. (Keding, 2021)

The open question remains how to utilize this technology efficiently. Most new project principles will play a crucial role in the long run because they require project management to adapt and provide clear guidelines for themselves and their team. "As the use of AI places requirements on the organizational infrastructure as well as managerial working methods, research indicates that the

process by which it is implemented is decisive in its degree of trustworthiness and managerial acceptance." (Keding, 2021, p. 108)

The introduction of a project is crucial, with expanded responsibilities compared to the PMBOK 6th edition. AI's impact on this stage is significant, particularly for larger organizations, by guiding project managers in resource allocation and timeline setting. AI can assist in various aspects, including budgeting, change management, and risk management. However, successful AI implementation requires high-quality data and knowledgeable practitioners. Additionally, organizations need to transition to a data-driven workflow and foster openness to change among managers to utilize AI in project management effectively.

1. 2. 2. A system for value delivery and AI

PMBOK Guide 7th notes that value delivery lies in the outcomes, the results of a process or a project, which create benefits that create value. Created value is something of worth, importance, or usefulness. All components, such as programs and projects, must create value in the internal or external environments. This new way shifts the approach to project management from implementing individual projects to a significant context from the perspective of project-based organizations. It rewrites the structural product creation view - on time, on budget, on scope, to a view of the project to clients' needs and organizational strategies. (Xu et al.,2022). The key is delivering value in projects, which requires organizations to establish social and economic priorities and only define which projects are best suited to produce them (Clegg et al., 2020).

The studies examine various models of how value creation can be legitimized and how organization modification can influence even structural business models. The idea itself is simple - continued value creation can be achieved by integrating data, technology, and talent. It opens user experience and market reach. It can also be achieved by innovative systems and resource allocation to re-engineer and upgrade the value chain. (Qiao et al., 2024). Matarazzo et al. (2021) record that creating value shifts even the business model perspective, becoming more customer-oriented in small businesses. The other researchers disagree with this narrow view on value creation. First, value creation should not focus extensively on one aspect but move to more maximized hybrid value creation, combining project management value, business value, and public value. Second, project activities should be governed more effectively and start at the preparation stage, not only on project activities (Xu et al.,2022). "By strategically deploying AI as a transformative tool, entrepreneurs can navigate risks and uncertainties more effectively, optimizing their enterprises for sustained success in today's dynamic and global business environment." (Kiani, 2024).

The issue is that the current success rate of AI projects is low. AI projects often fail, curbing their enthusiasm and interest (Rschmelzer, 2024). So, to implement AI successfully in project management, managers often will have to look back to previous project management experience, but successfully integrating this tool is crucial in an ever-changing environment. (Bushuyev, Ivko, 2024). To create a holistic approach to AI integration multiple AI systems need to be utilized: "What makes the difference is the integration of the AI types with the value co-creation mechanisms (perceptive and responsive) and the different types of market knowledge, for a great part of data, information, and feedback come from interactions with human beings who, in turn, express their feelings and expectations in complex ways." (Leone et al., 2021, 856).

The PMBOK Guide 7th Edition emphasizes value delivery as a key aspect of project management, shifting the focus from individual projects to a broader organizational context. Value creation should be a central consideration throughout the project lifecycle, requiring organizations to prioritize both social and economic value. To achieve continuous value creation, it is essential to integrate data, technology, and talent effectively. Although AI can enhance value delivery, the success rate of AI projects remains low, underscoring the importance of effective integration and a holistic approach.

1. 2. 3. Project management principles and AI

The 7th edition of the PMBOK Guide can be called a completely new management system. Lyandau (2022) noted the main difference: the 12 principles in the updated guide give the same flexibility and freedom in making managerial decisions. However, it presents complications for researchers seeking to integrate them into the master's thesis. Some of the principles have tailored theories, such as leadership, stewardship, and quality. As Delliger (2025) claims, "Researchers select a purposive sample of studies that fit self-established criteria, and these data (studies) are analyzed (read and evaluated) so that patterns and meaning are gleaned <...> from the cumulative evaluation of findings of the set of studies."

The new 12 project management principles are a fundamental strategy, decision-making, and problem-solving guideline. As the principles overlap, it can be not easy to find relevant research on them, use comparable research on those principles, and look for ways artificial intelligence can improve them. So, to have clearer guidelines for the structural approach of the literature review, the Google Scholar research tool was utilized using relevant research on specific topics and project management and then looking at their notions for artificial intelligence. Due to the quality or relatability provided by Google Scholar, the first page and, in specific cases, the second page of search results were evaluated. This was needed because the current PMBOK Guide 7th edition principles

are universal; it is hard to focus on specific research or have a clear guide about them, so to describe each, we will use the PMBOK description, try to find relevant and new literature on the principles themselves, and at least one way to use artificial intelligence. (Blampied et al. 2023).

The PMBOK Guide 7th Edition introduces twelve new project management principles that offer flexibility but also introduce complexity for researchers. Although these principles may overlap, they serve as valuable guidelines for strategy, decision-making, and problem-solving. To address the challenges posed by this overlap, we utilized Google Scholar to identify relevant research. This process involved examining the top search results for each principle to understand its application in project management and to explore potential uses of artificial intelligence.

Stewardship and AI The updated PMOK Guide offers a new view of project management that considers the organization's values. Stewardship acts responsibly to carry out activities with integrity, care, and trustworthiness while maintaining compliance with internal and external guidelines. They demonstrate a broad commitment to the financial, social, and environmental impacts of the projects they support. In PMBOK Guide 7th, Stewards are responsible for carrying out activities with integrity, care, and trustworthiness while maintaining compliance with internal and external guidelines. As the guides highlight, a holistic view of stewardship considers financial, social, technical, and sustainable environmental awareness. Some researchers note that stewardship should replace leadership in the long run, but it remains unclear how. PMBOK Guide 7th still puts leadership as one of the principles while maintaining that these concepts may overlap. As Dalcher D. (2022) shows, the concept of stewardship lies in an expanded view of the product, and project managers should be "moving from self-interest towards service."

Additionally, he notes a current underlying need to account for the entire product life, not just its inception. Dalcher D. (2022) remarks that the stewards responsible need to start from the initial idea, go through development, evolution, and upgrades, and then end with the removal from service and ultimate dismantling. This is how stewardship extends project context itself. The possibility is staggering if we look at how AI can help stewards expand this view. " By harnessing AI's capabilities, we can build a more sustainable future where the responsible management of Earth's resources ensures a harmonious coexistence between humanity and the planet. The journey toward sustainable resource management powered by AI is an ongoing endeavor marked by innovation, cooperation, and a commitment to safeguarding the Earth for future generations." (Sumi, Chandrasekar, 2024).

Team collaboration and AI. PMBOK 7th edition describes the team: "Project teams are made up of individuals who wield diverse skills, knowledge, and experience. Team members who work collaboratively can accomplish a shared objective more effectively and efficiently than individuals working independently." Collaboration is widely understood as the key to the project's

success, but "strategies that can be implemented in practice to enhance collaboration are less well described" (Urton, Murray 2021). The challenge with the rise of artificial intelligence, in particular, is particular and unique. Researchers note that the collaboration between humans and machines is stagnant due to fear. "This gives rise to unique challenges for HRM function in contemporary organizations where they need to address workers' fear of working with AI, especially concerning future job loss and complicated dynamics associated with building trust between human workers and AI-enabled robots as team members." (Arslan A. et al. 2021. p. 82). This challenge will have to be overcome, and the interesting point here is that this challenge is twofold - humans need to get used to human-robot interactions. However, additionally, the machine learning system needs to be able to adapt to their human environment. As Demir et al. 2020 pointed out in their research: "AI-enabled machines, including robots, still need to be programmed to understand their team environment and effectively communicate with human co-workers."

(Demir et al., 2020). AI can be utilized quite clearly - by helping upskill employees quickly. So, it is clear that the knowledge system will have to be expanded, and project managers and their teams will have to focus on the extent of the new skills. Jaiswa et al. (2023) show that five skills will be critical for employee upskilling: data analysis, digital, complex cognitive, decision-making, and continuous learning skills.

Stakeholder's engagement and AI. The proactive engagement of stakeholders is key to success. As PMBOK 7th edition notes, stakeholders influence projects, performance, and outcomes, and teams' focus needs to be on engaging with them. The project dramatically depends on the stakeholders: customers, suppliers, employees, financiers, communities, managers, etc. A project manager's job is to manage and shape the relationships between projects and stakeholders; by understanding these relationships, value can be created.(Freeman, Elms, 2023). Research contributes to the idea of stakeholder engagement and project success (Ika, Pinto, 2022). However, the dominant roles of the project cycle and stakeholders are relatively contributed to internal stakeholders, which makes external stakeholders' interaction relatively desirable (Kordi et al., 2021). Artificial intelligence tools can help with stakeholder mapping and increased engagement. Still, it is also essential to understand that if stakeholders do not trust AI, they might need to use more currently available tools for decision-making or problem-solving with a bigger trust factor. (Kerzner, Farrow 2023).

Value and AI. In the PMBOK 7th edition, the value becomes the ultimate indicator of project success; this outcome is directly correlated with the customers' perspective. As it aligns with the business case, it must integrate into business needs, project justification, and business strategy. The Cambridge Dictionary describes value as useful and important. PMBOK 7th edition describes

value notes that are subjective - for some, the value produced by the project might not be valuable at all. This ambiguity of value is quite a challenge for project management. To better understand the concept of value, we can turn to Venkataraman and Pinto's description. They note that value directly correlates with costs: "Value is the relationship between meeting or exceeding the expectations of project stakeholders, as well as the resources expended to meet or exceed those expectations." This view, to some extent, is supported by other researchers. Bosch-Rekveldt et al., 2023, note that "this paradox between project performance and success can be explained by time, cost, and quality expectations but also by a magnitude of societal values that kick in once the project ends."

Systems thinking and AI. Systems thinking expands the project management view from directly focusing on the project to a wider, interchangeable view that combines large systems. Simply put, one project might be part of a bigger program, or the project itself might have multiple subprojects. This idea appeals to composing numerous layers of project management into a greater systematic approach. Systematic thinking puts different environments, such as financial, social, political, and environmental systems, into perspective and their impacts on one another. The tool that project managers can utilize is casual mapping. (Ackermann, 2023). Can Artificial intelligence help with that? Current research says no. Bishop (2021) states that "deep understanding" is not always required to engineer a device to do x, but when we do attribute agency to machines or engage in unconstrained, unfolding interactions with them, "deep [human-level] understanding" matters." The current AI tool can be a guide for system thinking but, in reality, cannot replace human understanding. As we look for ways to improve system thinking, we can adapt the five Ps -problem, parameter, process, pathway, and purpose - methodology. (Nabavi & Browne,2023) By expanding the view on the projects, AI can only guide us with accessible information, data, and correlations but cannot provide clear guidelines.

Leadership and AI. There is no clear definition of what leadership is. The commonly agreed definition stems from influence on others and the ability to guide others toward achieving a common goal. PMBOK 7th defines conditions for leadership as a behavior to support individual and team needs, which directly correlates with PMBOK 7th view on stewardship. PMBOK Guide 7th effective leadership stems from adaptability and motivation. These aspects are crucial in AI integration in any culture or project. As Matli (2024) notes, this can be achieved by continuous learning and adaptation. As this research notes, there might be a fundamental shift in leadership roles, with fewer human leaders needed. "By promoting open communication and the honest presentation of ideas and feelings while seeking to restrain the display of inappropriate emotions, such behavior promotes trust"(Kelly, 2023, p. 234)

However, transition requirements will be enhanced to enable leaders in AI. As some researchers point out, it will include clear vision and communication, educational initiatives, adaptability and flexibility, and inclusive decision-making (Sarioguz & Miser, 2024). Through systematic analysis of historical project data and pattern recognition, AI provides project leaders with insights that can strengthen strategic decision-making (Ruiz et al., 2021). "By using conscious leadership tactics, a leader working with AI will have greater tools needed to assess and manage the impact of AI on the lives of others and their own" (Kelly, 2023)

Tailoring and AI. Tailoring is a complex topic that needs a clear framework. PMBOK 7th suggests that the key to implementing tailoring is to "design the project development approach based on the context of the project, its objectives, stakeholders, governance, and the environment using a "just enough" process to achieve the desired outcome while maximizing value, managing cost, and enhancing speed." Two frameworks currently on the table should be utilized for tailoring: knowledge-based and mathematical approaches.

The validity is that the knowledge-based approach is more related to the project manager's expertise and can vary depending on the skills and knowledge of the project manager. Mathematical approach factors such as success are contributed to it, and appropriate methods correlating with project goals are considered based on it. (Rodrigues, Domingues, Oliveira, 2023). It is important to understand that tailoring should focus more on human interactions. "In tailorable technologies, users of an information systems are actively involved in its design process." (Fechner et al., 2024).

Furthermore, insights driven by AI assist businesses in understanding customer behavior, personalizing experiences, and developing targeted marketing campaigns. This ultimately results in increased customer engagement, loyalty, and revenue growth. Nevertheless, organizations must address ethical considerations and guarantee transparency in AI decision-making processes. (Bharadiya, 2023)

Quality and AI. PMBOK 7th edition requires project managers to focus on quality, which is a clear requirement for any project. Maintaining this focus "produces deliverables that meet project objectives and align with relevant stakeholders' needs, uses, and acceptance requirements." Quality management has a positive effect on projects. It may directly improve innovation, operational performance, and financial performance. (García-Fernández, Claver-Cortés, Tarí, 2022). There are many approaches to managing quality, such as lean, Kaizen, Juran, and so on. The successful approaches relate to a holistic view inside the companies regarding how quality is managed in specific projects or organizations (Fernandes,2020).

For successful management of quality and utilization of artificial intelligence, the need to establish appropriate tools for collecting and analyzing big data is important; this requires an

analytical and conceptual framework (Agrawal et al., 2023). Those tools are currently not widely available in the market, and huge company investments are required to produce them. As Santhanam, 2020, notes, "AI comes with some special quality attributes (fairness, explainability, etc.) which must be integrated into the quality management methodology. Various processes and tools to support the quality management of the application are in their infancy, mostly as prototypes from research projects." But the work should be starting on utilizing AI tools in quality and decision making there are positive research that show that quality can be improved by the tools already available. (Salhab, et al., 2023)

Complexity and AI. Complexity is increasing in all project management aspects because projects themselves are becoming grander and more complex to manage. The PMBOK Guide 7th edition describes complexity as a characteristic of a project or its environment. It is not easy to manage complexity because it depends on human behavior, system behavior, and ambiguity. Human beings always try to simplify processes while adopting clear understanding of complex word: "We want to understand the world, which we in our lucid moments acknowledge to be complex, and we therefore create ourselves images, simple models, explanations with which we feel comfortable." (Strikwerda, 2023, p.31). "The most elegant way to deal with complexity, to reduce its complicatedness without forfeiting the benefits of complexity, is to have a proper education, knowledge, a fitting style of thinking, which is a sufficient complex cognitive structure." (Strikwerda, 2023, p.337). "Project complexity can develop into a foundation and promoter for generating and honing on opportunities and assisting complete project attainment." (Sahli, 2024, p. 180)

Project managers can only move forward through conditional evaluation and navigation. Complexity management includes processes to understand, plan strategy and responses, and manage project complexity. (Morcov, Pintelon, Kusters 2021). For example, supply chain AI tools can be extremely positively utilized in different environments because they have prediction capabilities (Vaka, 2024). So, depending on the project type, AI tools can be extremely helpful and reduce human error. While complexity is inherent in modern projects, AI can be a valuable tool for project managers to navigate this complexity and improve project outcomes. AI's ability to analyze data, predict trends, and automate tasks can help address the challenges posed by increasingly complex project environments.

Risk management and AI. PMBOK Guide 7th edition notes that "a risk is an uncertain event or condition that, if it occurs, can have a positive or negative effect on one or more objectives." It can impact a project's scope, budget, time, resources, technology, or unexpected situations that can occur. The research shows that "managers cannot adequately apply risk analysis to the project management process and individual company processes. They do not focus on prevention and often

only deal with the consequences of negative events." (Masár et al., 2022). It is confirmed by multiple surveys that are available online; data from the Project Management Institute (2024) shows that 1 in 3 project managers think that risk is unavoidable. So, AI opens the doors for more efficient project management, and that impact can be tremendous because machine learning can analyze complex data beyond human comprehension. "AI excels at analyzing vast amounts of data from various sources, including past project data, industry reports, and even weather forecasts. By identifying potential threats early in the project lifecycle, project managers can implement proactive mitigation strategies minimizing their impact on the project timeline and budget."(Odejide & Edunjobi, 2024).

AI can revolutionize risk management in projects. By leveraging AI's analytical capabilities, project managers can move from reactive to proactive risk management, leading to more successful project outcomes.

Adaptability and resiliency and AI. In PMBOK 7Th edition, adaptability consists of one, the resilience of two traits: "Adaptability refers to the ability to respond to changing conditions. Resiliency consists of two complementary traits: absorbing impacts and recovering quickly from a setback or failure." In research, the capability to be resilient is defined as a dynamic ability that requires project managers to anticipate and plan, cope and recover, adapt and learn, and combine almost all project management principles to achieve. (Zhang et al., 2023). In regard to adaptability, researchers Mc Loughlin & Priyadarshini (2021) found eight dimension taxonomy of adaptive performance:

- Learning work tasks, technologies, and procedures.
- Dealing with uncertain and unpredictable work situations.
- Demonstrating physically orientated adaptability.
- Solving problems creatively.
- Handling emergencies or crises.
- Demonstrating interpersonal adaptability.
- Demonstrating cultural adaptability.

To be useful in ever-changing work, project managers must become part of an organizational culture that values innovation, experimentation, and adaptability and encourages employees to embrace change and explore new opportunities. (Ekemezie & Digitemie, 2024). AI can be a guiding tool for adaptability and resiliency because it analyzes real-time project data and potential disruptions and can provide guided suggestions. (Odejide & Edunjobi, 2024).

Adaptability and resilience are critical for navigating the dynamic nature of projects. AI can play a significant role in supporting these qualities by providing data-driven insights and recommendations, helping project managers respond effectively to change and uncertainty.

Change and AI. Change, as described in PMBOK 7th edition, is the structural transition from a current state to a future state that generates the required benefits. Additionally, it is a different stage from project change control. Change management is quite a wide discipline, as described in numerous books.

There are models of how change can be managed, starting with exploring why change is required and crafting the message to stakeholders. (Harrison et al., 2021). Kotter's 8-Step Model and Lewin's 3-Stage Model of Change are mostly applied in the healthcare system (Harrison et al., 2021). In sustainability, Stouten, Rousseau, & Cremer's model of ten key evidence-based steps is suggested as useful (Sancak, I.E. (2023). Some researchers find over 15 common strategies in 16 different change management models and frameworks. They are reviewed by Phillips and Klein (2023), and found that the five common change management strategies were the following:

- Communicate about the change.

- Involve stakeholders at all levels of the organization.

- Focus on organizational culture.

- Consider the organization's mission and vision.

- Provide encouragement and incentives to change.

Successful change management can involve communication, creating, and spreading a vision (Dempsey et al.,2021). 78 percent of respondents believe that change management driven by artificial intelligence can improve efficiency by improving risk identification, personalizing change strategies, and providing real-time monitoring and adaptation (Peddisetty & Reddy, 2024). The leading problems with adopting AI in change management are less extensive training and limited skills. (Lemos et al., 2022). Top-down and bottom-up approaches can tackle this issue; as Valtiner and Reidl (2021) note, the "AI ambassadors" approach can bridge the gap between professional IT specialists and teams working on the projects. Their research shows that top-down approaches are reached by adapting the organization's strategy and definition of lighthouse projects. The bottom-up part is reached through upskilling and providing new boundary conditions.

Effective change management is critical for project success. AI offers the potential to significantly improve change management processes, but organizations need to address challenges related to training and skills gaps to fully realize these benefits.

1. 3. A Analysis of Literature Using Large Language Models:

A Case Study with ChatGPT

The provided research analyzes AI utilization in project management based on guidelines provided by the PMBOK guide 7th edition. It explores AI's potential impacts on specific project management principles and practices. This research was uploaded to ChatGPT to provide a summary of the findings based on the information provided. Bause Standford's tool "Storm Genie" do not allow for uploading of the documents, this tool that was utilized before, was not used. Below are key aspects that ChatGPT identified as important aspects of the research and was confirmed by additional researchers review.

1. AI can enhance project initiation by supporting budgeting, scheduling, and resource allocation. However, data quality and user expertise remain critical challenges (Thuraka et al., 2024; Marotta & Au, 2022).

2. AI's role in value creation involves integrating data-driven insights into project planning to align outcomes with organizational strategies. This requires combining AI systems and human interaction for optimized decision-making (Qiao et al., 2024; Leone et al., 2021).

3. Project Management Principles

1. Stewardship: AI can support sustainability and lifecycle considerations in project stewardship, promoting long-term resource management (Dalcher, 2022; Sumi & Chandrasekar, 2024).

2. Team Collaboration: AI tools can enhance team dynamics by upskilling employees in data analysis and adaptive learning, addressing fears of human-AI collaboration (Demir et al., 2020; Jaiswa et al., 2023).

3. Stakeholder Engagement: AI can improve stakeholder mapping and trust-building despite challenges in external stakeholder interactions (Kerzner & Farrow, 2023).

4. Value: AI supports defining and achieving value by analyzing cost-benefit relationships and societal impacts (Venkataraman & Pinto, 2023; Bosch-Rekveldt et al., 2023).

5. Systems Thinking: AI can assist in systems thinking by providing insights into interconnected environments but lacks the capability for deep, human-like understanding (Ackermann, 2023; Bishop, 2021).

6. Leadership: AI fosters data-driven decision-making, enhancing leaders' abilities to adapt and maintain open communication (Kelly, 2023; Sarioguz & Miser, 2024).

7. Tailoring: AI tools offer customizable approaches to tailoring project strategies, balancing expertise with algorithmic precision (Rodrigues et al., 2023).

8. Quality: AI-driven quality management tools can improve stakeholder satisfaction but require advanced data handling frameworks (Agrawal et al., 2023; Santhanam, 2020).

9. Complexity: AI mitigates project complexity through predictive analytics in supply chain management (Vaka, 2024; Morcov et al., 2021).

10. Risk Management: AI excels in risk identification and mitigation by analyzing large datasets to preempt project challenges (Odejide & Edunjobi, 2024).

11. Adaptability and Resilience: AI enables real-time disruption analysis and promotes adaptive performance in dynamic environments (Zhang et al., 2023; McLoughlin & Priyadarshini, 2021).

12. Change: AI enhances change management by identifying risks and customizing strategies, though successful adoption requires organizational cultural shifts (Peddisetty & Reddy, 2024; Valtiner & Reidl, 2021).

Overall, the theoretical analysis serves as a valuable resource for understanding the evolving role of AI in project management. It effectively highlights AI's potential to enhance project initiation, value creation, and core project management principles.

2. Research methodology

The following chapter will focus on the practical use of artificial intelligence in project management. In the upcoming sections, the thesis research method will be introduced. It will cover the research design, purpose and goals of this thesis, the sample size of participants, and the rationale for their selection. After this, the study methodology will be introduced, and a brief discussion and summary of the interview questions will be provided. Finally, the section on research analysis will explain the data's structure, grouping, and analysis. In this thesis section, the theory will be tested with the practical research outcomes to align with the study aims and achieve the research purpose.

2.1. Research design

The current research on AI's impact on project management is limited, so using quantitative research methods could lead to limited outcomes. Qualitative research allows us to explore new phenomena more adequately. Lim (2024) instructs that this type of research "<…> is indispensable in its ability to unpack and make sense of complex, multifaceted social phenomena." Additionally, qualitative research allows researchers to inquire project management professionals about their broader view of new social phenomena and gather data from "focal actors of interest"(Elsbach & Kramer,2016, p. 251). So, "qualitative research often focuses on participants who are likely to provide rich information about the study questions, known as purposive sampling."

(Wright et al., 2016). It is important to note that the danger of it, as Tongco (2007) suggests, is that "the researcher judges the informant's reliability and competency." (Tongco, 2007).

As we constructed key interview goals, semistructured interviews were selected. "Semistructured interviews facilitate more focused exploration of a specific topic, using an interview guide." (Fossey et al., 2002, p. 727).

According to Kallio et al. (2016), five stages must be implored:

First, we comprehend and evaluate whether this approach is the best for the ongoing research. Artificial intelligence is a not-yet-known subject for project managers impacting project management. By choosing the semistructured interview method, we allow ourselves to explore the topic more broadly, looking for specific saturation aspects of the view of project managers. Harvey-Jordan and Long 2001 highlight that "during an interview, a subject is free to talk as openly as he or she wishes, and the frankness of opinions can get to the heart of the matter."

The second stage of this research has already been completed. In the first part, we reviewed current research on AI's impact on project management. During the review, guided by the updated PMBOK 7 edition, we noticed fractions in current AI and project management research. At this point, it is clear that the approach lacks a straightforward system. Additionally, there should be rationality in this situation that stems from the idea that artificial intelligence may not impact project management to the extent that we might presume regarding the potentiality of this tool. This should be reflected in the created guide for the semistructured interview. It is important to understand that the current research is limited and fragmented. Our goal is to find some common trends in this situation.

The third stage is formulating the interview guide. Fossey et al. (2002) note, "Interview guides usually contain questions and prompts designed to guide the interview in a focused yet flexible and conversational manner." As Harvey-Jordan and Long (2001) explain, the goal is not to lose flexibility: "The interview schedule framework should be sufficiently flexible to allow themes that develop throughout the discussions to be explored."

The final stage is testing interview questions and presenting them in the theses. The research mentor reviewed the material, and with some changes, it was approved. The problem with additional pretesting was related to sample size issues; as this thesis focused on project managers working with projects, their time was hard to adapt to the main interviews, and it was not feasible to find additional time for the pretesting stage.

Ultimately, the research aims to utilize qualitative inquiry to gain a deeper understanding of how AI is perceived and applied in the field of project management.

2.2. Research sample size and participants

After choosing the research method, it is necessary to specify the part of the selection of participants. As this thesis aims to explore AI's potential in project management with a specific guide from PMBOK 7th edition, the best way forward is to concentrate on project management professionals. The need to work at least 5 years with project management was introduced for informants to fit the research goals.

Eight project management professionals agreed to participate in the interview until first saturation was noticed, indicating the repeats of the themes. Fossey et al. (2002) highlight, "No fixed minimum number of participants is necessary to conduct sound qualitative research. However, sufficient information must be gathered to describe the phenomena being studied fully". So, the additional sampling would be redundant for more interviews. "In other words, patterns are recurring, or no new information emerges, a situation sometimes referred to as 'saturation" (Fossey et al., 2002, p. 726). In the thesis purposive sampling was used to select participants who were relevant and likely to provide valuable insights. In total, interviews were conducted with eight professionals until data saturation was, meaning that no new themes or information emerged from the additional interviews. This approach ensured that enough data was collected to understand the phenomenon without introducing unnecessary redundancy. The more detailed information about interviewed professionals and their experience is narrated in the table 1.

Table 1: *The list of the participants of the interviews.*

Interviewees	Experience
Interviewed 1 (I1)	Project manager with more than 20 years of experience in project management, dedicated to infrastructure projects
Interviewed 2 (I2)	Program manager with more than 20 years of project management experience. Currently working on major infrastructure projects in Lithuania.
Interviewed 3 (I3)	Portfolio manager with more than 20 years of experience in project management, currently leading a team of project professionals dedicated to change management.
Interviewed 4 (I4)	Project manager with more than 5 years of experience in project management, dedicated to infrastructure projects
Interviewed 5 (I5)	Project manager with more than 5 years of experience in public project management, currently working on global project management projects

Interviewed 6 (I6)	Project manager with more than 10 years of experience in project management, currently working on Polish and Lithuanian projects
Interviewed 7 (I7)	Project manager with more than 10 years of experience in project management, currently leading the project management team at one of the biggest public Lithuania company
Interviewed 8 (I8)	Project manager with more than 10 years of experience in project management, dedicated to infrastructure projects

2.3. Research method

The main tool for the research was a questionnaire, which was prepared according to the literature review and in the guidance with thesis objectives:

- To identify the main challenges in project management regarding the updated PMBOK 7th edition.

- To provide possible guidelines for using artificial intelligence in project management work.

- To create recommendations for future researchers to understand possible ways to approach artificial intelligence research in project management.

Based on this, the questionnaire was created using three concepts: usage of AI (3 questions), benefits of AI (2 questions), and challenges of AI (9 questions). In addition, one subcategory related to challenges and the PMBOK Guide 7th Edition was used, which correlated with four related questions. In total, 14 questions were used for semistructured interviews, which were added in Annex 2 - the questionnaire.

Interviews were conducted remotely using the ZOOM platform. Each interview was recorded for transcription purposes, and each interviewer was informed that video or transcriptions would be limited and used only partly for research; after the research was completed, the recordings would be destroyed. During the interviews, some interviewees, to clarify their points, used the names of specific projects; for this research, those names will not be revealed at any point. So, neither the names of the participants nor their companies and project names will be revealed at any point; each participant was coded based on the order of time of their interviews with numbers 1,2,3, and so on. For example, the first interviewee will be Interviewed1 (I1), etc.

2.4. Research data analysis method

After the research was conducted, the interview data were structured by codes. As researchers highlight, the flow of codes comes from research data: "Theory codes use terminology

from extend theory, whereas grounded codes use terminology and ideas directly flowing from the data." (Elsbach & Kramer,2016, p. 351). As Leavy (2020) explains: "One analytic strategy with a list of codes is to classify them into similar clusters. The same codes share the same category, but it is also possible that a single code can merit its group if you feel it is unique enough. After the codes have been classified, a category label is applied to each grouping. Sometimes, a code can also double as a category name if you feel it best summarizes the totality of the cluster." (Leavy, 2020, p.887).

The thesis objectives guide us, so we will continue the research and accumulate the results according to them. Additionally, two AI tools ChatGPT and Gemini.AI were utilized for the data analysis and coding.

3. Empirical research results and discussion

After completing the research, the results will be analyzed and presented in the following chapter. The research was conducted through semi-structured interviews with ten participants to gather sufficient information to achieve the objectives outlined previously.

What became clear during the interviews is that the integration of artificial intelligence in project management is still limited. Most participants agreed that this technology is advantageous but needs more growth. Informant 4 said, "I would generally view innovations positively, especially in this field, but we do not know the possibilities yet. It will probably be challenging when you do not know the possibilities and start with those uncertainties." A project management professional with a focus on engineering I1 expressed a notable absence of AI utilization, attributing this to the precision requirements ingrained in their industry: "So let us call it the centimeter or millimeter level, and as far as we have looked into it, artificial intelligence advises based on examples, right? However, for us, each project is unique; someone will rarely say, "Design it according to this and that specific project."

However, there are still options for usage, mostly analyzing extensive online data to understand different topics project managers might not know. I3 utilized AI tools extensively for stakeholder analysis, particularly in synthesizing and interpreting large volumes of data from various sources: "So I am interested in quickly understanding the stakeholders, and the tools I use are mostly those large language tools, which people call artificial intelligence. I use them, and they help me better organize documents, information, and emails to understand the stakeholders' interests and types." This approach enables a strategic understanding of stakeholder needs and potential reactions, positioning AI as an asset in their workflow. Additionally, it is confirmed by I5 as he notes that share engines do not provide quick results: "I mostly use it for searching for information when I need to find it faster than through some search engines. Moreover, for, as they say, curating information." I7,

though not currently employing AI directly, discussed their organization's forward-looking strategy to incorporate AI tools after mastering foundational project management technologies: "Honestly, now, as of today, we are not using it. Furthermore, if colleagues use it, I know they do so on their own devices. The company is making small steps in that direction. So, briefly and clearly, no. As for why, it might be because we are implementing a project management methodology on a company-wide scale."

With this limitation noted in the first part of this thesis confirmed, we look at the aspects of AI that project managers need to understand so that guidelines for using artificial intelligence in project management can be developed.

3.1. Challenges of AI usage in project management

During the analysis of the interviews, two AI tools were used to identify the challenges that project managers face when using artificial intelligence in project management: ChatGBT and Gemini.AI.

Based on the ChatGBT assessment, the participants identified five key challenges:

1. Lack of Customization and Individuality.
2. Data Privacy and Confidentiality Concerns.
3. Lack of Trust and Reliability.
4. High Implementation and Operational Costs.
5. Resistance to Change and Skill Gaps.

Based on the Gemini.AI assessment, the participants identified, also, five key challenges:

1. Accuracy and Reliability of AI.
2. Data Security and Confidentiality.
3. Integration with Existing Project Management Systems.
4. Maintaining Human Oversight and Expertise.
5. Ethical Considerations.

It is important to identify that only two elements are closely correlated, and each system provides an additional three elements. One element related to data issues is "data security and confidentiality" in the Gemini.AI case and "Data privacy and confidentiality concerns" in the ChatGPT list; additionally, one more element related to reliability and trust is "Accuracy and Reliability of AI" in the Gemini.AI case and "Lack of Trust and Reliability" in the ChatGPT case.

So, overall, during the interviews, eight challenges were discussed by the professionals:

1. Data Privacy and Security, and Confidentiality.
2. Lack of Customization and Individuality.

3. Lack of Trust, Accuracy and Reliability.

4. High Implementation and Operational Costs.

5. Resistance to Change and Skill Gaps.

6. Integration with Existing Project Management Systems.

7. Maintaining Human Oversight and Expertise.

8. Ethical Considerations

Overall, we will examine and retest this information by manually checking data in each interview and looking for saturation on each challenge. So, more than one person needs to identify the challenge of using AI. These challenges highlight the complex considerations surrounding AI adoption in project management, emphasizing the need for trust, customization, ethical considerations, and integration with existing systems.

Data Privacy and Security, and Confidentiality. As both tools identified only this challenge for the usage of AI, it was easy to confirm it. I1 noted the key aspect where it comes from: "If you don't have a system that allows you to share information securely, you will end up in a situation where your company's information will be the basis for training models, which will then share that information with everyone else." So, if the company has a competitive advantage in doing specific projects or has the skills and expertise to do it, that can be lost in the age of AI. As we mentioned before, data is the key aspect of AI models. They learn of the constant flow of data, but additionally, the data and expertise that companies have play crucial roles in the competitiveness of the company or the team. I6 said that additional risk depends on the sector: "I think that the use of AI in project management in biotechnologies life sciences would be much more complex and pose much greater risks than its use, for example, in the construction sector."

Additionally, it is interesting to see how data plays an interesting role in this circle - we need data to create better tools for the project managers. Still, project managers must consider that the data they can provide might be advantageous tools for other companies. I4, which works in construction sector management, noted: "Maybe we'll either wait for others to go down that path and teach us a lesson, or we'll try to start first." But the current reality is more complex already, as I5 told: "Ilya Sutskever, one of the founders of OpenAI, I think he said this week that the challenge in creating, developing and improving artificial intelligence models will be the availability of data. The Internet is also a limited resource; in Europe, the availability of data, in general, is getting sadder and more ridiculous, but in other countries, there are also similar challenges, so I think the conclusion is that I see a lot of complications related to data protection and data availability."

So, sharing sensitive company data with AI raises significant security concerns, hindering its adoption in project management, but without doing it we cannot create tools that would allow

project mangers to expand on their work efficiency. Concerns about sharing sensitive company data with AI systems hinder its adoption.

Lack of Customization and Individuality. AI struggles to address the unique needs of specific projects, as it often relies on general rules and templates that fail to meet the requirements of various industries. Speaker I1, who works in the engineering sector, clearly defined it: "Each project is specific and requires hands-on work. While design software provides many templates, they are never fully reliable." Additionally, I2 noted: "There are no tools, ready-made tools, and this year, in the coming 2025, probably the production and release of new tools will begin." To add a comment from I5: "Well, there is a huge downside here because if a project manager, especially in certain thematic, deep analysis or knowledge-intensive projects, should not trust artificial intelligence tools, I don't think they can right now." Furthermore, I6 noted: "This means that the smarter AI tools get and the more they expand and improve, the more AI will solve content problems. So far, in the early stages, artificial intelligence has mostly helped and streamlined processes related to automation, planning, and forecasting." I3 adds to it: "From processing, systematization, analysis, I get a product that does not meet the desired quality, and the further, the more. And an even bigger challenge - I no longer like the product I create with AI. It is no longer unique." As I1 described their case on trying to use AI tools: "So in reality AI, as you say, you tell him, but he takes all that information from the Internet and since I read a lot before, what everyone knows there, what cleaning equipment suppliers, what they write, I understood. artificial intelligence, that he rewrote the same thing in other words. But there is no such individuality as accepting it."

I3 provides metaphorical description of this issue: "Just like when you go to a Maxima store, you find products that suit 80 percent of the buyers, but you don't buy the exclusive, I don't know, you don't buy Dubai chocolate, right? That's because Instagram culture today needs Dubai chocolate, but Instagram culture, TikTok culture is not a Maxima buyer." So, AI struggles to address the unique needs of specific projects, relying on general rules and templates that fail to meet various industry requirements.

Lack of Trust, Accuracy and Reliability. Artificial intelligence is a tricky technology to understand, but as mentioned in this thesis, it is guided by four key factors: data, algorithms, testing platforms, and infrastructure. (Iansiti, Lakhani, 2020) So, the project managers and their organizations are met with unique challenges if they want to work with artificial intelligence; in the current environment of providers of AI tools, this challenge is the data itself. "Trust" was never part of the scope of this research when looking at research on artificial intelligence and project management. Still, it became a focal point during the interviews with the professionals.

This could indicate the limitation of the thesis. Yet, we can notice in multiple articles that researchers did on systematical reviews of the impact of artificial intelligence on project management that was used during the review that trust was never part of the results. It is not a new aspect of research data, as AI has become part of industries working in healthcare, the military, etc., and this aspect of the relationship between humans and AI is widely analyzed outside of project management. (Schelble et al., 2024) Li et al. (2023) suggest three key domains of AI-enabled trust: trust management, intrusion detection system, and recommender system, which stem from the technical and security aspects of AI. The reality is that to be effectively integrated into project management, AI must be trusted, and research shows that different aspects of AI and humans regarding trust need to be solved differently; for example, in the military, trust tends to be relinquished based on the level of the decision the military is taking, etc. (Afroogh et al., 2024).

If we see different aspects of trust in various sectors, we can presume that in project management, we can find new elements of trust that need to be addressed. So, during the interviews, the users who already interacted with AI noted that the lack of trust grew over time. "The biggest challenge is that I cannot trust any tool; the results are of average quality," said I3. I5 additionally mentioned that "without sufficient expertise, project managers cannot trust AI completely and must verify outputs against their knowledge." I7 expands on this view: "You are a human; you understand how it is, and artificial intelligence, it will cause a certain sense of distrust, I think." I4 adds to it: "There's probably going to be a lot of testing, a lot of that transition period before you trust it, before we double-check that AI. That's probably going to be the risk. You're probably going to have to do a lot of trial and error." In metaphorical view, I5 explains this issue: "A doctor prescribes you medication. We assume that a doctor is an expert and understands how the medication works. Right? If I'm a doctor, I know the truth. I don't understand how the medication works. I just know that this medication is recommended for these symptoms. I am. Somehow this project manager with artificial intelligence, I must trust what others tell me and more or less. But I have no way to prove it. I don't fully understand. I can't argue why this is the case."

Trust is crucial in integrating innovations into organizations, projects, and teams. As I2 added: "And the artificial intelligence studied a million records in our charts, made such an optimization plan, suggested doing this thing, and I sit and look at that plan and think, how can I check if it did well. How do I know if it did well? I'm not as smart as that artificial intelligence. I don't have as much information. I can either trust it. I can either not trust it." The strange degrading of information provided by AI tools from earlier adopters shows that, at this point, trust is decreasing rather than increasing in these tools. Project managers and organizations face challenges trusting AI due to data concerns and the need to verify outputs against their knowledge.

High Implementation and Operational Costs. An underlying cost is associated with more tailored tools for specific industries or projects. Companies can invest in generative AI tools, which allow you to access more professionally working models, and it does not cost much. However, having tools tailored to your needs and requirements in the specific industry is quite costly. So, adopting AI for project management involves significant expenses in terms of setup and training. I7, during his interview, said that his company currently is not investing in AI but thinking about it: "Deployment costs and the need for complex IT systems are major barriers to adopting AI in project management." I3 noted that AI implementation requires significant investment in technology and staff training. Adopting AI involves significant expenses in setup, training, and complex IT systems, creating barriers to entry.

Resistance to Change and Skill Gaps. As we spoke with participant I7, who is currently implementing major change in their company in regards to project management, they noted similarities that they think will play a crucial role in any implementation of new technology or practices in the company: "This will also happen with the implementation of artificial intelligence, and there will be some resistance until the small fraction that uses artificial intelligence and is ahead of the curve overcomes the majority of workers who do not use this technology today." Participant I3 noted that investing in high-quality project managers, their expertise, and understanding will be crucial to moving forward. But in reality according I5, there is new possibilities too: "Older or less qualified people can also contribute to the development of products that were previously completely dependent on human resources, on expertise in, say, graphic design." Additionally, I8 mentions that: "The main challenges would be two: lack of understanding of artificial intelligence tools and difficulties in integrating them into existing work practices and systems." Implementing AI requires cultural change and investment in staff training to overcome resistance and address skill gaps.

Integration with Existing Project Management Systems. As we already mentioned, the decision to integrate AI into the company requires investment and cultural change, and those AI tools must be able to work with the already implemented technology. As I7 noted during his explanation, the company is extensively investing in new IT solutions but still not working on AI: "It's short and to the point, no. And if you look at why, it's basically because it's like that, because we've implemented, let's say, a project management methodology across the company." As I4 noted, explaining that their leadership is currently working on creating a new AI team inside the company, but the current adoption is still in process: "In principle, we want to have this thing, but we haven't gotten around to it yet."

The complexity of the upcoming integration also should be considered - at some point, AI will have to be integrated into other AI systems: " AI in project management is inseparable from

AI. So, imagine if we equip project managers here with artificial intelligence, and all the other parts of the projects, which are technical and do not have project management per se, can remain; no, that will not work. <...> For example, in a construction project, one artificial intelligence will do the design, another artificial intelligence will do the calculations, a third artificial intelligence will organize the work, and the project management artificial intelligence will coordinate all this." AI tools must integrate seamlessly with existing technology, requiring investment and compatibility considerations.

Maintaining Human Oversight and Expertise. This notion has already been introduced in a couple of trust-related aspects. The current environment and specific industries cannot rely on AI to solve their workload. I1 noted: "We don't need ideas, conceptual things like that, but we do have, well, accuracy is very important." I3 mentioned that in the current situation with projects, the AI tools start to lose their uniqueness: "It unifies that production and the challenge are that if we talk about project management, change management, we need uniqueness because every project, whether it's unique or not, has its unique challenges, and when we try, first of all, or not, to create standard access for everyone, that's already a challenge, and when we try to use, whether it's not, the same outputs from those tools, well, it doesn't create additional interpreters." And the participant adds: "So the challenge is to be the best. Being better than some tools will be a big one because the temptation to use it, to adapt it, to make your work easier, will be great."

I5 comments that we need to be focused on when using AI tools: "This is probably the biggest one that you still have to check. Check the information because there have been cases when either old information or inaccurate information is provided, and so on." As I1 noted speaking about their projects, that AI do not adapt and do not provide great results, only some guidelines and ideas for the work: "Young people are not very interested in engineering. They said, we will work until retirement and even if health allows, even retirement age, because, for example, Vilnius Tech no longer prepares such engineers. We used to have a group of forty, a master's degree of twenty, but now there are maybe three people. So, as you say, artificial intelligence will not take away our jobs, but I think that young people are the ones who will find work, it is possible that artificial intelligence will help young people, they will collect our experience from past projects from the Internet."

Human oversight and expertise remain crucial, as AI tools may not fully replace human skills and judgment.

Ethical Considerations. The key ethical considerations are related to the data itself. As I3 told you, the reality of losing your uniqueness is losing the aspect of human between human communication - it becomes easy to cancel work agreements with hundreds of employees or write your communication with AI become easy. Still, the answers you get might be written by AI, too:

"The profession demands justice so that those decisions are ethical, fair, equal for the interested party, and measured equally. This is the challenge here." As we become part of copying from the AI community, for example, in the case of creating a building using AI data, you can be left with partial plagiarism. As I1 said: "Well, and that will appear, well, copying, plagiarism; I think that separate rules will appear because architects are very protective of their authorship. For example, we even sign contracts because of plagiarism, and architectural contracts are very strict." As I8 said: "There may be ethical issues around data privacy, errors in decision-making, or misuse of AI. It is important to ensure that AI is used responsibly and in accordance with ethical standards."

Additionally, I2 notes: "And one of the main ones is how do we know that the artificial intelligence represents you. <...> And artificial intelligence is created by a few big corporations who have made their black boxes for everyone else. It's nice to have a black box that gives you answers you like. But at some point, those answers become incomprehensible, but you have to trust them."

Ethical concerns arise regarding data privacy, potential errors in decision-making, misuse of AI, and the need for responsible use.

3.2. Benefits of AI usage in project management.

During the interviews' analysis, two AI tools were used to identify the benefits project managers can receive when using artificial intelligence in project management: ChatGBT and Gemini.AI.

Based on the ChatGBT assessment, the participants identified nine key benefits:

1. Enhanced Planning and Scheduling
2. Improved Risk Management
3. Resource Optimization
4. Data-Driven Decision Making
5. Automation of Repetitive Tasks
6. Enhanced Stakeholder Analysis
7. Predictive Analytics for Better Outcomes
8. Streamlined Information Access
9. Adaptability to Agile Methodologies

Based on the Gemini.AI assessment, the participants identified four key benefits:

1. Improved Efficiency and Speed
2. Enhanced Decision-Making
3. Better Communication and Collaboration
4. Increased Project Success Rates

Gemini.AI assessment combined more elements from ChatGBT in a more summarized view of the interviews. The first point, "Improved Efficiency and Speed," combines - ChatGBT points: Automation of Repetitive Tasks and Resource Optimization. The second point, "Enhanced Decision-Making," combines - Improved Risk Management, Data-Driven Decision Making, and Predictive Analytics for Better Outcomes. The third point, "Better Communication and Collaboration", combines Enhanced Stakeholder Analysis and Streamlined Information Access. The fourth point, "Increased Project Success Rates," discusses better risk management and Enhanced Planning and Scheduling. Additionally, manually rechecking information from the interviews, the topic of agile methodologies that chatGBT noted as one of the points was never exploited in any of the interviews.

Based on it, four key benefits were identified:

1. Automation and resource optimization.

2. Data-driven decision-making and predictive analytics.

3. Stakeholders' analysis and information access.

4. Possibilities for better Project Success Rates (risk management, planning, and scheduling)

Automation and resource optimization. During the interviews, multiple participants noted the positive outlook of AI's future possibilities, mostly related to removing technical work from project managers and utilizing automation and resource optimization. As I8 said: "Artificial intelligence will allow project managers to focus more on strategic and creative solutions as daily administrative and analytical tasks will be automated."

As I6 mentioned: "Another thing is that if the system is well automated at the portfolio level, we will be able, for example, to manage resources more effectively. This means that if artificial intelligence thinks that some project is saving budget, it will be able to show us information in real time that we have a surplus budget. We can already invest something additional."

There are already some aspects that are being utilized inside the projects and could be guidelines for the future notion of how AI will impact everyday life; I3 described it by efficiency in work: "We could have invested much money, for example, in resources, in some copywriter who writes texts for a great project. Now, they are no longer needed. We could have invested in developers. Well, because they have become more efficient in their work, we need less because they can code much faster with the help of artificial intelligence." I5 agreed with this notion, too: "I hope that the more they will be, the more well-functioning, say, graphics, video design tools that work well can be incorporated into your work." Additionally, I6 noted: "I think that currently artificial intelligence can allow for the prediction of certain simpler automated processes." I7 noted that: "Since a very strong

topic in our daily lives is resource management, I think it will be here, and this should be because resource management is somehow more tangible, you certainly have a number of employees, or you don't, but you can take from practice and try to apply this, so I think that artificial intelligence in the coming years will affect this part, resource management, automation and their efficiency, their optimization."

I1 noted that the future AI, when the current learning curve will succeed, can be excitingly beneficial for project management, as the participant mentioned - starting from personal assistance and ending with writing legal documents or managing resources: "Because, you see, we have that project management, that looking at deadlines, communicating with subcontractors, hiring, something, well, we do not have, for example, an electrician, we need to hire. This is artificial intelligence project management for you. It will say, look, then you do not have an electrician; you should request it sooner, and you have deadlines."

The interviewees envision a future where AI significantly enhances project management by streamlining workflows, optimizing resources, and allowing project managers to focus on higher-level strategic initiatives.

Data-driven decision-making and predictive analytics. This part of AI's benefits throughout all the interviews was at the stage of the final goal, which has not yet been achieved. So, as participants spoke about it, they noted that it could not be yet. The need for it would change the daily workflow of project managers tremendously, allowing them to focus on the key issues in the project that AI identifies and the manager cannot look for. As I8 said: "Predictive analytics can help you better plan the course of a project, anticipate potential problems and thus reduce the likelihood of errors, ensuring better results. Predictive analytics can also greatly contribute to making more accurate decisions, as it allows you to predict risks, delays and budget overruns." As I6 noted: "Another thing is that if the system is well automated at the portfolio level, we will be able, for example, to manage resources more effectively. This means that if artificial intelligence thinks that some project is saving budget, it will be able to show us information in real time that we have a surplus budget. We can already invest something additional." However, concerns were expressed about it. As I3 spoke of the future of these achievements, as far as his industry is concerned, the participant noticed that the great expectations at this point of AI are not achieved. There should be some skepticism about this technology: "Expectations, well, in my opinion, it will be clear in a couple of years when we see whether there is a very big breakthrough or not because the breakthrough has been really big so far in the past year, but now I do not see it anymore."

While the participants recognize the transformative potential of AI in these areas, they also maintain a cautious outlook, emphasizing the need for continued development and realistic expectations.

Stakeholders' analysis and information access. Stakeholder management is an important aspect of project management, which, overall, more closely relates to human interactions, and AI will not change most speakers during their interviews. However, it was a common consensus that preparation for stakeholder analysis and information is one of the key tools that AI is already utilizing. I3 said that this aspect is the most helpful at the current stage of AI: "I use them, and they help me systematize documents, information, letters, to understand the interests of stakeholders, their types. Well, being able to try out behavior and reaction is what helps me the most in this part of the analysis. I would say, in the analysis part." I6 notes: "Another thing is analytical and information reading skills, to correctly interpret and predict those changes, I do not know, in the communication, risk register." I4 agreed with this idea: "Usually, for information search, you need to find it faster than through some search engines. Furthermore, for information, as they say here, for decorating. However, it must be said that you always have to check a lot because there have been cases when they analyze the completely wrong side." Participant I2 noted: "Artificial intelligence should be very useful in stakeholder management, because it will be able to provide one of these, currently generative, and one of its advantages is to be able to reformulate thoughts, yes, the kind of language that a particular stakeholder wants to hear." As I5 notes: "It is difficult to reach unified conclusions if we are talking about individual continents. Because on a global scale, this evolution will undoubtedly be significant, it will penetrate artificial intelligence products, it will penetrate different areas, those products that are already perfect, teams, businesses, will want to optimize and apply them themselves." Overall, the interviewees see AI as a valuable tool for enhancing efficiency and effectiveness in stakeholder management, particularly in information gathering and analysis. However, they emphasize the continued importance of human oversight and critical thinking.

Possibilities for better Project Success Rates (risk management, planning, and scheduling). At the beginning of this thesis, the idea was that stagnation in global numbers of project success could be shifted by implementing AI in projects. Every participant in the interviews noted that, at this point, none of them participated in AI projects, but they all tried some aspects of their everyday live AI tools. The idea here is - that the possibility of more successful projects could lie in the concept of a freeer project manager who does not monitor day-to-day but works on the reports already provided for them by AI. As I2 noted: "The role of the project manager will change, and the technical project management will be done without the intervention of the project manager. He will only have to accept the results. Moreover, the technical part here is budget, scope, risk, and calendar

planning." I8 said that: "It is likely that AI will become integral to project management in the future, especially due to automated decision-making and risk management processes, and project managers will have to pay more attention to strategic decisions."

Additionally, participant I2 noted, "It is most likely that risk management will be influenced, although not directly, because there is a very large amount of information in risk management that needs to be able to be read and is difficult for people to do." So, the crucial aspect of what lies on the project manager's shoulders is sometimes understanding complicated technical aspects of the project, which AI, even at the current level, allows us to utilize as a tool. As I4 noted: "We often try to assess those risks for each project ourselves manually. Artificial intelligence could do that." It is agreed by I6, too: "I think it can be used for time planning; it can set critical paths, which means that it can be used to make the whole planning process much faster and more efficient." Preventing human errors or understanding the historical aspects of similar projects more widely can help create more successful projects; as I5 noted: "These tools can help circumvent or avoid human errors that occur when planning with such simple methods." While none of the interviewees had directly managed AI-powered projects, they recognized AI's potential to transform project management by automating tasks, improving decision-making, and ultimately increasing the likelihood of project success. This aligns with the initial hypothesis that AI can positively impact project outcomes.

3.3. 12 principles of Project Management

During our interviews, each participant was asked to identify one or more principles of the new PMBOK Guide 7 edition that artificial intelligence will impact the most and the least. The results of the interviews are shown in Table 1. 12 Project Management principles, , where the "+" sign represents the added value by AI, and the "-" represents the least impactful area by AI.

Table 2: *12 Project Management principles*

	I1	I2	I3	I4	I5	I6	I7	I8
STEWARDSHIP					+			-
TEAM	+				+	+	-	
STAKEHOLDERS		+	-				-	
VALUE								
SYSTEMS THINKING								

LEADERSHIP	+	-		-	-		-	-
TAILORING			+			+		
QUALITY	-		+		+			
COMPLEXITY		+						
RISK	-	+	+				+	+
ADAPTABILITY AND RESILIENCY	+							
CHANGE							+	

The study concludes that AI has the potential to impact all 12 project management principles significantly, albeit to varying degrees. While challenges remain, AI offers numerous benefits for project managers, including enhanced decision-making, improved efficiency, and increased project success rates. To provide a clearer understanding, the Gemini.AI tool was used to summarize the findings that were currently provided and based on the 12 principles of project management. The finding was overviewed manually and fixed. Mistakes, the bellow is the review:

1. Stewardship: AI can assist project managers in fulfilling their stewardship responsibilities by analyzing extensive data related to a project's financial, social, and environmental impacts. This enables more responsible and informed decision-making throughout the project lifecycle.

2. Team: AI tools can automate routine tasks, allowing project managers to concentrate on strategic leadership and team collaboration. Additionally, AI can help upskill team members, ensuring they possess the knowledge and abilities to work effectively with AI technologies.

3. Stakeholders: AI can analyze stakeholder data to identify key individuals and groups, predict their behaviors and potential reactions, and tailor communication strategies accordingly. This leads to more effective stakeholder engagement and collaboration.

4. Value: AI can assist project managers in defining and achieving value by analyzing cost-benefit relationships and societal impacts. This ensures that projects deliver meaningful outcomes that align with stakeholder needs and business objectives.

5. Systems Thinking: While AI cannot replace human understanding, it can aid in systems thinking by providing insights into interconnected environments and potential risks. This broader perspective helps project managers make more informed decisions within complex systems.

6. Leadership: AI can support project leaders by providing data-driven insights for strategic decision-making. This allows leaders to focus on motivating and guiding their teams, fostering a culture of adaptability and innovation.

7. Tailoring: AI tools offer customizable approaches to project strategies, balancing expertise with algorithmic precision. This ensures that project management methodologies are tailored to each project's unique needs.

8. Quality: AI-driven quality management tools can analyze project data to identify potential quality issues and recommend corrective actions. This contributes to increased stakeholder satisfaction and improved project outcomes.

9. Complexity: AI can help project managers navigate complexity by analyzing large datasets and providing predictive insights. This enables proactive risk mitigation and informed decision-making in dynamic environments.

10. Risk: AI excels in risk identification and mitigation by analyzing extensive datasets to anticipate potential project challenges. This allows project managers to proactively address risks and minimize their impact on project objectives.

11. Adaptability and Resiliency: AI enables real-time analysis of disruptions and promotes adaptive performance in dynamic environments. This helps project teams respond effectively to changing conditions and recover quickly from setbacks.

12. Change: AI enhances change management by identifying risks and customizing strategies. This ensures smoother transitions and minimizes disruptions during project implementation.

The results in Table 1 show a quite clear consensus that AI will affect the human-type aspects of principles like leadership the least. I5 put it: "Because of the same issues of human resource volume, time issues, human error prevention, what concerns quality, and all that oversight, we avoid it." I2 noted, "Because the main problem that we will probably face is that people will be very resistant to decisions that do not come from the people. So they will need a face to the decision that's made, one way or another. Moreover, leadership, I think, at least for a fairly long period, will be a human endeavor." I4 noted that he cannot see the impact on leadership from AI's side: "I do not know how it could help this. You can be the first to do anything anywhere and be the leader. " I8 noted: ""Management" and "Leadership" will have the least impact, as these principles depend more on people's skills and decisions." In reality, the impact on leadership can be indirect; I5 suggested this way of thinking: "Leadership can be indirectly derived only from the fact that having those tools leaves more time to work on those key principles, team management, and all other important things

without focusing on those small ones that can be fully covered or for which tools can be used to manage and work."

As we mentioned in the previous analysis of this thesis, the part that will be most impacted can be risk and might be team management because most respondents understood it as resource management.

CONCLUSIONS AND RECOMMENDATIONS

The primary objective of this thesis was to identify the main challenges in project management regarding the updated PMBOK 7th edition, to provide possible guidelines for using artificial intelligence in project management work, and to create recommendations for future researchers to understand possible ways to approach artificial intelligence research in project management. Our thesis uncovered a diverse way project management professional utilize the current AI tools, even at the present development level.

The interviews provide insights into AI's perceived benefits, challenges, and current applications in project management. The findings highlight that while the integration of AI in project management is still developing, it presents significant potential alongside considerable challenges.

Key challenges identified include:

1. concerns about data privacy and security.
2. the need for AI tools to adapt to the unique requirements of individual projects,
3. the importance of establishing trust in AI-generated outputs,
4. the high costs associated with implementing AI solutions,
5. resistance to adopting AI technology among project managers,
6. difficulties integrating AI with current project management systems,
7. the necessity of human oversight in AI-driven projects,
8. ethical considerations related to AI usage.

Despite these challenges, interviewees recognize the potential benefits of AI, including:

1. the automation of routine tasks,
2. enabling data-driven decision-making,
3. enhancing stakeholder analysis,
4. potentially increasing project success rates.

The study also explores which of the 12 PMBOK Guide 7th edition principles are perceived to be most impacted by AI. Risk management and team collaboration are identified as key areas for AI integration. Conversely, leadership is viewed as the principle least likely to be affected by AI, as it is considered a predominantly human-centered domain.

The research concludes that while the adoption of AI in project management is currently limited, it holds substantial promise for the future.

Future research can use this thesis as a guide for forthcoming research; as was discussed in this thesis, most of the topics are extremely extensive, and individuals should be able to seek individual theses

on their own. Every aspect and new part of the updated PMBOK 7 edition guides individual needs for an additional and deeper look and understanding. Additionally, this author is hopeful that the thesis provides some guidelines on using the artificial intelligence tools currently available online - the tools cannot provide theoretical information on available research, but they can help summarize gathered data. In any case, it is important, and each research should do manual confirmation because, as in this thesis, some answers might not correlate with uploaded data.

BIBLIOGRAPHY AND A LIST OF REFERENCES

Ackermann F. (2023). Systems Thinking for Project Management? Risky Not To. Systems Thinking. 2023. Vol. 3:1-13. DOI: 10.54120/jost.0000017

Afroogh, S., Akbari, A., Malone, E., Kargar, M., & Alambeigi, H. (2024). Trust in AI: progress, challenges, and future directions. *Humanities and Social Sciences Communications*, *11*(1), 1-30.

Agrawal, R., Wankhede, V. A., Kumar, A., & Luthra, S. (2023). A systematic and network-based analysis of data-driven quality management in supply chains and proposed future research directions. *The TQM Journal*, *35*(1), 73-101.

Amaro F., Domingues L. (2023). PMBOK 6th meets 7th: How to link both guides in order to support project tailoring? Procedia Computer Science, Volume 219, Pages 1877-1884, https://doi.org/10.1016/j.procs.2023.01.486

A Guide to the Project Management Body of Knowledge (PMBOK Guide) - Seventh Edition and The Standard for Project Management (2021). *Optimize Risk Responses.* USA: Project Management Institute.

Arslan A., Cooper C., Khan Z., Golgeci I, Ali I. (2021) . Artificial intelligence and human workers interaction at team level: a conceptual assessment of the challenges and potential HRM strategies. International Journal of Manpower, Vol. 43, Issue 1.

Baugues, G. (2023, May 18). The first man to lose his job to ai. haihai.ai. https://www.haihai.ai/kasparov/#:~:text=In%201997%2C%20Kasparov%20famously%20lost,chess%20player%20in%20the%20world.

Biloslavo R., Edgar D., Aydin E., and Bulut C. (2024). Artificial intelligence (AI) and strategic planning process within VUCA environments: a research agenda and guidelines. Management Decision.

Bishop, J. M. (2021). Artificial intelligence is stupid and causal reasoning will not fix it. *Frontiers in Psychology*, *11*, 513474.

Blampied, N., Buttrick, R., Jucan, G., Piney, C. ("Kik"), Stevens, C., Violette, D., & Max Wideman, R. (2023). In Search of Project Management Principles. Project Management Journal, 54(6), 588-606. https://doi.org/10.1177/87569728231158261

Bosch-Rekveldt M., Bourne M., Forster R., Kirkham R., Pesamaa O. (2023) Performance measurement in project management. International Journal of Project Management, Vol. 41.

Bharadiya, J. P. (2023). Machine learning and AI in business intelligence: Trends and opportunities. *International Journal of Computer (IJC)*, *48*(1), 123-134.

Bushuyev, S., & Ivko, A. (2024). Construction of models and application of syncretic innovation project management in the era of artificial intelligence. Eastern-European Journal of Enterprise Technologies, (3).

Chiou, E. K., & Lee, J. D. (2023). Trusting automation: Designing for responsivity and resilience. *Human factors*, *65*(1), 137-165.

Clegg S., Skyttermoen T, Vaagaasar A. (2020) Project management: a value creation approach.

Dalcher D. (2022).Rethinking Project Management for a Dynamic and Digital World. Routledge.

Deguchi, A., Hirai, C., Matsuoka, H., Nakano, T., Oshima, K., Tai, M., & Tani, S. (2020). What is society 5.0 (Vol 5, pp. 1e23). Society.

Dellinger, A. B. (2005). Validity and the review of literature. Research in the Schools, 12(2), 41-54.

Demir M., McNeese N.J. , Cooke N.J. (2020) Understanding human-robot teams in light of all-human teams: Aspects of team interaction and shared cognition. International Journal of Human-Computer Studies, Volume 140, https://doi.org/10.1016/j.ijhcs.2020.102436.

Dempsey, M., Geitner, L., Brennan, A., & McAvoy, J. (2021). A review of the success and failure factors for change management. *IEEE Engineering Management Review*, *50*(1), 85-93.

Egan M. (2024). AI is replacing human tasks faster than you think. CNN Business. Available online: https://edition.cnn.com/2024/06/20/business/ai-jobs-workers-replacing/index.html

Ekemezie, I. O., & Digitemie, W. N. (2024). Best practices in strategic project management across multinational corporations: a global perspective on success factors and challenges. International Journal of Management & Entrepreneurship Research, 6(3), 795-805.

Elsbach, K. D., & Kramer, R. M. (2016). Handbook of qualitative organizational research: Innovative Pathways and Methods. Routledge.

Fechner, P., König, F., Lockl, J., & Röglinger, M. (2024). How Artificial Intelligence Challenges Tailorable Technology Design: Insights from a Design Study on Individualized Bladder Monitoring. *Business & Information Systems Engineering*, 1-20.

Fernandes, A. A. R. (2020). The influence of quality management on organization performance: service quality and product characteristics as a medium. *Property Management*, *38*(3), 383-403.

Fossey, E., Harvey, C., McDermott, F., & Davidson, L. (2002). Understanding and evaluating qualitative research. Australian & New Zealand journal of psychiatry, 36(6), 717-732.

Freeman R. E., Elms H. (2023) The Social Responsibility of Business Is to Create Value for Stakeholders. Springer press.

García-Fernández M., Claver-Cortés E., Tarí J.J.(2022) Relationships between quality management, innovation and performance: A literature systematic review. European Research on Management and Business Economics,Volume 28, Issue 1, https://doi.org/10.1016/j.iedeen.2021.100172.

Gil, J., Martinez Torres, J., & González-Crespo, R. (2021). The application of artificial intelligence in project management research: A review.

Harrison, R., Fischer, S., Walpola, R. L., Chauhan, A., Babalola, T., Mears, S., & Le-Dao, H. (2021). Where Do Models for Change Management, Improvement and Implementation Meet? A Systematic Review of the Applications of Change Management Models in Healthcare. *Journal of Healthcare Leadership*, *13*, 85–108. https://doi.org/10.2147/JHL.S289176

Harvey-Jordan, S., & Long, S. (2001). The process and the pitfalls of semistructured interviews. Community practitioner, 74(6), 219.

Hashfi M. I, Raharjo T. (2023). Exploring the Challenges and Impacts of Artificial Intelligence Implementation in Project Management: A Systematic Literature Review. International Journal of Advanced Computer Science and Applications, Vol. 14, No. 9.

Horwitz J. (2023) *How Facebook went all in on AI.* MIT Technology Review. Available online: https://www.technologyreview.com/2023/11/14/1083336/how-facebook-went-all-in-on-ai/

Iansiti M & Lakhani K.R. (2020). Competing in the Age of AI. HBR's 10 Must Reads on AI, pp. 3–4.

Ika L.A., Pinto J.K. (2022). The "re-meaning" of project success: Updating and recalibrating for a modern project management. International Journal of Project Management, Volume 40, Issue 7, https://doi.org/10.1016/j.ijproman.2022.08.001.

Jaiswa A., Arun C. J., Varma A. (2023). Rebooting employees: upskilling for artificial intelligence in multinational corporations. Artificial Intelligence and International HRM. Routledge.

Jarrahi, M. H., Askay, D., Eshraghi, A., & Smith, P. (2023). Artificial intelligence and knowledge management: A partnership between human and AI. *Business Horizons*, *66*(1), 87-99.

Kallio, H., Pietilä, A. M., Johnson, M., & Kangasniemi, M. (2016). Systematic methodological review: developing a framework for a qualitative semistructured interview guide. Journal of advanced nursing, 72(12), 2954-2965.Keding, C. (2021). Understanding the interplay of artificial intelligence and strategic management: four decades of research in review. *Management Review Quarterly*, *71*(1), 91-134.

Kelly, L. (2023). Artificial Intelligence and Authentic Leadership. In Mindfulness for Authentic Leadership: Theory and Cases (pp. 227-258). Cham: Springer International Publishing.

Kerzner H., Farrow E. (2023). The Impact of Artificial Intelligence on Stakeholder Relations Management Practices. International Institute for Learning. Available online: https://blog.iil.com/the-impact-of-artificial-intelligence-on-stakeholder-relations-management-practices/

Kiani, A. (2024). Artificial intelligence in entrepreneurial project management: a review, framework and research agenda. *International Journal of Managing Projects in Business*.

Kordi, N. E., Belayutham, S., & Che Ibrahim, C. K. I. (2021). Mapping of social sustainability attributes to stakeholders' involvement in construction project life cycle. Construction Management and Economics, 39(6), 513–532. https://doi.org/10.1080/01446193.2021.1923767

Leaders (2023).How to worry wisely about artificial intelligence. The Economist - Technology and society. Available online: https://www.economist.com/leaders/2023/04/20/how-to-worry-wisely-about-artificial-intelligence

Lee, M. E., Hayes, D., & Maher, C. S. (2024). AI as a Budgeting Tool. Public Finance, 1.

Lemos, S. I., Ferreira, F. A., Zopounidis, C., Galariotis, E., & Ferreira, N. C. (2022). Artificial intelligence and change management in small and medium-sized enterprises: an analysis of dynamics within adaptation initiatives. *Annals of Operations Research*, 1-27.

Leone, D., Schiavone, F., Appio, F. P., & Chiao, B. (2021). How does artificial intelligence enable and enhance value co-creation in industrial markets? An exploratory case study in the healthcare ecosystem. *Journal of Business Research*, *129*, 849-859.

Leavy, P. (2020). The Oxford Handbook of Qualitative Research. Oxford University Press.

Li, Z., Fang, W., Zhu, C., Gao, Z., & Zhang, W. (2023). Ai-enabled trust in distributed networks. *IEEE Access*.

Lim, W. M. (2024). What is qualitative research? An overview and guidelines. Australasian Marketing Journal.

Lyandau, Y. V. (2022). Project management based on PMBOK 7.0. *Imitation Market Modeling in Digital Economy: Game Theoretic Approaches*, *368*, 283-289.

Marotta, G., & Au, C. D. (2022). Budgeting in the Age of Artificial Intelligence–New Opportunities and Challenges. *Available at SSRN 4168230*.

Martinez A. (2023). Google to Fire 30,000 Employees After Success of Its AI-Powered Services. The HR Digest. Available online: https://www.thehrdigest.com/google-to-fire-30000-employees-after-success-of-its-ai-powered-services/

Masár, M., Hudáková, M., Melkovič, T., & Šuleř, P. (2022). *Global survey of current barriers to project risk management and their impact on projects*. Journal of Business Economics and Management, 23(5), 1194–1210. https://doi.org/10.3846/jbem.2022.17784

Matarazzo M., Penco L., Profumo G., Quaglia R. (2021) Digital transformation and customer value creation in Made in Italy SMEs: A dynamic capabilities perspective. Journal of Business Research, Volume 123, 2021, Pages 642-656.

Matli, W. (2024). Integration of warrior artificial intelligence and leadership reflexivity to enhance decision-making. *Applied Artificial Intelligence*, *38*(1), 2411462.

Mc Loughlin, E., & Priyadarshini, A. (2021). Adaptability in the workplace: Investigating the adaptive performance job requirements for a project manager. Project Leadership and Society, 2, 100012.

Morcov S., Pintelon L., Kusters R.J. (2021) A Framework for IT Project Complexity Management. 14th IADIS International Conference Information Systems.

Muhammad, I. H., & Raharjo, T. (2023). Exploring the challenges and impacts of artificial intelligence implementation in project management: A systematic literature review. *International Journal of Advanced Computer Science and Applications, 14*(9) https://doi.org/10.14569/IJACSA.2023.0140940

Nabavi, E., & Browne, C. (2023). Leverage zones in Responsible AI: towards a systems thinking conceptualization. *Humanities and Social Sciences Communications*, *10*(1), 1-9.

Neumann, O., Guirguis, K., & Steiner, R. (2022). *Exploring artificial intelligence adoption in public organizations: a comparative case study*. Public Management Review, 26(1), 114–141. https://doi.org/10.1080/14719037.2022.2048685

Nieto-Rodriguez A., Vargas R.V. (2023) How AI Will Transform Project Management. Harvard Business Review. Available online: https://hbr.org/2023/02/how-ai-will-transform-project-management

NVIDIA Press release (2024). NVIDIA Blackwell Platform Arrives to Power a New Era of Computing. Available online: https://nvidianews.nvidia.com/news/nvidia-blackwell-platform-arrives-to-power-a-new-era-of-computing

Odejide O.A, Edunjobi T.E. (2024). AI in Project Management: Exploring Theoretical Models For Decision-Making And Risk Management. Engineering Science & Technology Journal, 5(3), 1072-1085. https://doi.org/10.51594/estj.v5i3.959

Parekh P., Mitchell O. (2024). Utilization of artificial intelligence in project management. International Journal of Science and Research Archive, 13(01), 1093–1102. DOI: https://doi.org/10.30574/ijsra.2024.13.1.1779

Peddisetty, N., & Reddy, A. K. (2024). Leveraging Artificial Intelligence for Predictive Change Management in Information Systems Projects. Distributed Learning and Broad Applications in Scientific Research, 10, 88-94.

Phillips, J., Klein, J.D. Change Management: From Theory to Practice. TechTrends 67, 189–197 (2023). https://doi.org/10.1007/s11528-022-00775-0

Ponraj R. P., Ravindran V., Ragunathan S., Swaminathan K., Sigamani T. (2024) Chapter 3 - Society 5.0 and explainable artificial intelligence—implications, XAI Based Intelligent Systems for Society 5.0, Elsevier, Pages 61-101. https://doi.org/10.1016/B978-0-323-95315-3.00009-7.

Project Management Institute. (2024). IPM's Data Digest: September – Enhancing Project Success Through Risk Management. Available online: https://projectmanagement.ie/blog/ipm-data-digest-september-enhancing-project-success-through-risk-management/

Perfect Designer Publisher (2024). *Who Was The Father Of Artificial Intelligence?* Available online: https://perfectdesigner.medium.com/who-was-the-father-of-artificial-intelligence-c99b7e1be75f

Odejide, O. A., & Edunjobi, T. E. (2024). AI in project management: exploring theoretical models for decision-making and risk management. Engineering Science & Technology Journal, 5(3), 1072-1085.

Qiao W, Ju Y., Dong P., Tiong R. (2024) How to realize value creation of digital transformation? A system dynamics model. Expert Systems with Applications, Volume 244, https://doi.org/10.1016/j.eswa.2023.122667.

Radanliev, P. (2024). Artificial intelligence: reflecting on the past and looking towards the next paradigm shift. Journal of Experimental & Theoretical Artificial Intelligence, 1–18. https://doi.org/10.1080/0952813X.2024.2323042

Rodrigues M.C., Domingues L., Oliveira J.P. (2023). Tailoring: a case study on the application of the seventh principle of PMBOK 7 in a public institution.Procedia Computer Science,Volume 219,Pages 1735-1743, https://doi.org/10.1016/j.procs.2023.01.468.

Ruiz, J. G., Torres, J. M., & Crespo, R. G. (2021). The application of artificial intelligence in project management research: A review. International Journal of Interactive Multimedia and Artificial Intelligence, 6(6), 54-66.

Russell S., Perset K., Grobelnik M. (2023). Updates to the OECD's definition of an AI system explained. OECD AI. Available online: https://oecd.ai/en/wonk/ai-system-definition-update

Rschmelzer. (2024). *Reasons for AI Project Failure: Overpromising & underdelivering*. Cognilytica. Available online: https://www.cognilytica.com/reasons-for-ai-project-failure-overpromising-underdelivering/

Sahadevan, S. (2023). Project Management in the Era of Artificial Intelligence. European Journal of Theoretical and Applied Sciences, 1(3), 349-359. DOI: 10.59324/ejtas.2023.1(3).35.

Salhab, H., Allahham, M., Abu-AlSondos, I., Frangieh, R., Alkhwaldi, A., & Ali, B. (2023). Inventory competition, artificial intelligence, and quality improvement decisions in supply chains with digital marketing. *Uncertain Supply Chain Management*, *11*(4), 1915-1924.

Sahli, A. (2024). Project complexity management–A design-based approach to managing information technology projects (Doctoral dissertation, Brunel University London).

Sancak I.E. (2023) Change management in sustainability transformation: A model for business organizations. Journal of Environmental Management, Volume 330, https://doi.org/10.1016/j.jenvman.2022.117165.

Santhanam, P. (2020). Quality management of machine learning systems. In Engineering Dependable and Secure Machine Learning Systems: Third International Workshop, EDSMLS 2020, New York City, NY, USA, February 7, 2020, Revised Selected Papers 3 (pp. 1-13). Springer International Publishing.

Sarioguz, O., & Miser, E. (2024). Artificial intelligence and participatory leadership: The role of technological transformation in business management and its impact on employee participation. International Research Journal of Modernization in Engineering, Technology and Science, 6(2).

Schelble, B. G., Lopez, J., Textor, C., Zhang, R., McNeese, N. J., Pak, R., & Freeman, G. (2024). Towards ethical AI: Empirically investigating dimensions of AI ethics, trust repair, and performance in human-AI teaming. *Human Factors*, *66*(4), 1037-1055.

Shoushtari F., Daghighi A. and Ghafourian E. (2024). Application of Artificial Intelligence in Project Management. International Journal of Industrial Engineering and Operational Research, Volume 6, No. 2.

Strikwerda, J. (2023). In Organized Complexity in Business: Understanding, Concepts and Tools. Cham: Springer International Publishing.

Sumi A.M., Chandrasekar K.S. (2024). Chapter 4 - Artificial intelligence for sustainable stewardship of Earth resources. Data Analytics and Artificial Intelligence for Earth Resource Management, Elsevier, Pages 65-75.

The World Ahead (2024). The very real constraints on artificial intelligence in 2025. The Economist. Available online: https://www.economist.com/the-world-ahead/2024/11/20/the-very-real-constraints-on-artificial-intelligence-in-2025 .

Thuraka, B., Pasupuleti, V., Malisetty, S., & Ogirri, K. O. (2024). Leveraging artificial intelligence and strategic management for success in inter/national projects in US and beyond. *Journal of Engineering Research and Reports*, *26*(8), 49-59.

Tongco, M. D. C. (2007). Purposive sampling as a tool for informant selection.

Urton D., Murray D. (2021) Project manager's perspectives on enhancing collaboration in multidisciplinary environmental management projects. Project Leadership and Society, Volume 2. https://doi.org/10.1016/j.plas.2021.100008.

Vaka, D. K. (2024). From Complexity to Simplicity: AI's Route Optimization in Supply Chain Management. *Journal of Artificial Intelligence, Machine Learning and Data Science*, *2*(1), 386-389.

Valle-Cruz, D., Fernandez-Cortez, V., & Gil-Garcia, J. R. (2022). From E-budgeting to smart budgeting: Exploring the potential of artificial intelligence in government decision-making for resource allocation. Government Information Quarterly, 39(2), 101644.

Valtiner, D., & Reidl, C. (2021). On change management in the age of artificial intelligence: a sustainable approach to overcome problems in adapting to a disruptive, technological transformation. *Journal of Advanced Management Science Vol*, *9*(3).

Venkataraman R.R., Pinto J.K. (2023) Cost and Value Management in Projects. Published by John Wiley & Sons, Canada.

Williams, M., & Moser, T. (2019). The art of coding and thematic exploration in qualitative research. International Management Review, 15(1), 45-55.

Wright, S., O'Brien, B. C., Nimmon, L., Law, M., & Mylopoulos, M. (2016). Research design considerations. Journal of graduate medical education, 8(1), 97–98.

Xu, Q., Jia, G., Wang, X., & Chen, Y. (2022). Governing Value Creation in a Major Infrastructure Project Client Organization: The Case of Beijing Daxing International Airport. Sustainability, 14(5), 3001. https://doi.org/10.3390/su14053001

12 Principles of Project (2021). Management Project Management Institute. Available online: https://www.pmi.org/-/media/pmi/documents/public/pdf/pmbok-standards/12-project-management-principles.pdf?rev=03749f118ff84aca97a64af1d49bb1ac

Zhang, S., Zhang, F., Xue, B., Wang, D., & Liu, B. (2023). Unpacking resilience of project organizations: A capability-based conceptualization and measurement of project resilience. International Journal of Project Management, 41(8), 102541.

Annex 1. Storm Gene article.

Compare A Guide to the Project Management Body of Knowledge 6th edition with 7 edition.

Check https://storm.genie.stanford.edu/article/353927 for more details

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summary

The comparison between the 6th and 7th editions of the Project Management Body of Knowledge (PMBOK) Guide highlights a significant evolution in project management practices, marking a shift from a process-oriented framework to a principles-based approach. Originally published in 1996, the PMBOK Guide serves as a foundational resource for project management professionals worldwide, es- tablishing best practices and methodologies that are crucial for navigating complex project environments. The transition to the 7th edition, released in 2021, reflects the growing need for

adaptability and responsiveness in an increasingly dynamic business landscape, where traditional methodologies often fall short in meeting contemporary challenges.[1][2][3].

The 6th edition, published in 2017, consisted of 750 pages detailing 49 processes categorized into five Process Groups and ten Knowledge Areas, providing a struc- tured, prescriptive methodology for project managers.[4][5] However, as project management evolved, the limitations of this rigid framework became apparent. The 7th edition responds to these limitations by streamlining the content to less than 400 pages and introducing 12 guiding principles alongside eight performance domains, which emphasize the value delivered by projects rather than merely their outputs.[3][- 6][7]. This new structure encourages practitioners to adopt more flexible, value-driven approaches, fostering collaboration and stakeholder engagement throughout the project lifecycle.

One of the most notable changes is the integration of agile methodologies and hybrid approaches, reflecting the increasing demand for flexibility in project management practices.[6][8] This shift not only aligns with modern business practices but also rec- ognizes the importance of delivering continuous value and adapting to stakeholder needs as they evolve throughout the project. The emphasis on ethical considerations, integrity, and adaptability further underscores a holistic view of project management that transcends mere process adherence, addressing the complexities of today's project environments.[9][10][11].

Despite the positive reception of the 7th edition, it has not been without controver- sy. Critics argue that the removal of established processes may create confusion for project managers accustomed to the structured guidance of previous editions. Nonetheless, the evolution of the PMBOK Guide signifies a critical response to the changing demands of the profession, underscoring the need for ongoing adaptation and learning in the field of project management.[11][12].

History

The Project Management Body of Knowledge (PMBOK) Guide has undergone significant evolution since its inception in 1996, reflecting the changing landscape of project management practices. The transition from the 6th to the 7th edition marks a pivotal moment in this history, underscoring the shift from a process-based to a principles-based framework that accommodates the dynamic nature of contemporary project environments[1][2].

Evolution of PMBOK Editions

The early editions of the PMBOK Guide primarily focused on defining processes and best practices essential for project management. The 5th edition, released in 2013, emphasized ten knowledge areas and detailed processes that project managers were expected to follow[4]. This structure was beneficial for standardization but began to show limitations as project management evolved towards more adaptive methodologies. The 6th edition, published in 2017, continued this trend, introducing updated

terminology and refining existing processes while maintaining a strong focus on the knowledge areas and their corresponding processes[13].

Shift to PMBOK 7th Edition

The 7th edition, released in 2021, represents a transformative shift in project man- agement philosophy. It introduces a more flexible approach that prioritizes principles and performance domains over rigid processes, reflecting a broader understanding of project contexts and the complexities of modern projects[3][2].This edition includes 12 fundamental principles and 8 performance domains, providing a comprehensive framework that supports various project delivery methodologies, including predictive, incremental, and iterative approaches[14][4].

The emphasis on value-driven approaches, effective communication, and adapt- ability highlights the importance of aligning project objectives with organizational goals, a concept that has gained traction amid the shift from industrial to knowledge economies[3][15][2]. José Figueiredo's contributions to this discourse advocate for a greater emphasis on tacit knowledge and genuine exploration in project manage- ment practices, underscoring the need for a more holistic understanding of project environments[3][1].

As the PMBOK continues to evolve, it remains a cornerstone for project management professionals worldwide, providing a vital framework for navigating the complexities of project execution in an increasingly competitive business landscape[16][14].

Comparison of 6th and 7th Editions

The transition from the 6th edition to the 7th edition of the PMBOK Guide marks a significant shift in project management philosophy and methodology. The 7th edition is notably more compact, comprising less than 400 pages compared to the 750 pages of the 6th edition, and it adopts a principles-based approach rather than the previous process-based standard[5][6]. This evolution reflects the rapidly changing landscape of project management and aims to address contemporary challenges faced by project managers.

Major Differences

Elimination of Process Groups and Knowledge Areas

The 6th edition detailed 49 processes categorized into 5 Process Groups and 10 Knowledge Areas, which guided project managers in a structured, prescriptive manner. However, the 7th edition eliminates these processes and instead briefly touches upon Process Groups, having retired the 6th edition altogether[5]. This change signifies a shift away from rigid methodologies towards a more flexible and adaptive project management framework.

Introduction of New Concepts

The 7th edition introduces several new concepts, such as project delivery principles, a systems view, and eight Project Performance Domains, which focus on the overall value delivery rather than specific deliverables[5][7]. This approach emphasizes that projects are not merely about outputs, but about creating outcomes that deliver value to the organization and its stakeholders. The eight Project Performance Domains in- clude Stakeholders, Team, Development Approach and Life Cycle, Planning, Project Work, and Delivery, among others.

Principles-Based Standard

The 7th edition employs a principles-based standard that captures 12 Principle Statements, guiding project teams with broad parameters for effective project man- agement[5]. These principles encourage practices such as stakeholder engagement, adaptability, and value optimization, which are essential in today's dynamic envi- ronment. In contrast, the 6th edition's process-based approach was prescriptive, emphasizing adherence to defined processes rather than encouraging flexibility and contextual tailoring[7].

Emphasis on Agile and Hybrid Methodologies

Another significant change in the 7th edition is the integration of agile practicesand hybrid approaches, reflecting the growing demand for adaptability in project management[6]. This edition encourages project managers to embrace change and foster collaboration within teams, aligning with contemporary business practices and technologies. The focus on agility represents a fundamental shift from therigid processes of earlier editions, allowing for a more fluid approach to project management.

New Sections and Tools

The 7th edition also introduces new sections dedicated to commonly used models, methods, and artifacts, providing practical tools for project managers[7].This includes strategies for leadership, communication, and motivation, alongside methods for data gathering, analysis, and estimation. Such resources aim to support project teams in managing projects effectively within a rapidly evolving landscape.

Methodology and Practices

Shift from Process-Based to Principle-Based Framework

The transition from the Sixth to the Seventh Edition of the PMBOK Guide marks a significant shift in methodology, moving away from a prescriptive, process-oriented approach to a more flexible, principle-based framework. The Seventh Edition intro- duces 12 universal principles that serve as foundational guidelines applicable across various methodologies and project types, enabling a broader application of project management practices in diverse environments[8].

Agile Techniques and Integration

One of the key adaptations in the Seventh Edition is the incorporation of Agile methodologies and hybrid approaches into mainstream project management prac- tices. This is a response to the rising demand for adaptable frameworks that can accommodate the dynamic nature of contemporary projects. Agile techniques, such as sprints and Kanban, have been integrated into project management practices to allow for quicker iterations and improved flexibility, ensuring that project teams can effectively balance exploration and exploitation within Agile software development contexts[17][8].

Value Delivery Focus

The emphasis on value delivery represents another critical evolution in project management practices. The concept of a value delivery system has been introduced, shifting the focus from merely completing projects to achieving outcomes that provide tangible benefits to stakeholders. This change reflects a holistic view of project man- agement, recognizing the importance of stakeholder engagement and the continuous delivery of value throughout the project lifecycle[8][9].

Ethical Considerations and Integrity

Ethical behavior and integrity have also gained prominence in project management practices as organizations recognize the importance of fostering a trustful envi- ronment. This emphasis aligns with the modern trend of focusing on people man- agement, where collaboration and stakeholder satisfaction are viewed as essential components of successful project execution[10].

Tailoring and Adaptability

Both editions acknowledge the necessity of tailoring methodologies to fit the spe- cific context of projects. However, the Seventh Edition places greater emphasis on adaptability, allowing project managers to customize their approaches based on project needs and stakeholder expectations. This adaptability is vital in navigating the complexities and changing dynamics of modern project environments[11][8].

Reception and Impact

The reception of the Project Management Body of Knowledge (PMBOK®) Guide, particularly in its transition from the 6th to the 7th edition, reflects significant shifts in

the project management landscape. The PMBOK® Guide has traditionally focused on processes, process groups, and knowledge areas associated with waterfall delivery methods. However, the 7th edition represents a pivotal move towards embracing agile and hybrid methodologies, highlighting the need for adaptability in project management practices[11][12].

Shift in Focus

The introduction of 12 foundational principles in the 7th edition emphasizes a more holistic approach to project management. These principles encourage project man- agers to be value-driven, adaptable, and engaged with stakeholders throughout the project life cycle. This shift indicates a broader

understanding that successful project management is not solely about rigid processes, but about aligning with stakeholder needs and delivering tangible value[11][12].

Stakeholder Engagement and Value Delivery

One of the most impactful changes is the heightened emphasis on stakeholder engagement. Understanding and addressing the interests and needs of stakeholders is critical for achieving project success. The principles outlined in the 7th edition guide practitioners to initiate early dialogue, facilitate workshops, and work collaboratively to navigate conflicts, thereby fostering an environment of mutual respect and collab- oration[11][12].

Moreover, the concept of value has taken center stage. The 7th edition encourages project managers to focus on balancing benefits gained against resources spent, underscoring that the definition of value can vary among stakeholders and can evolve over the course of a project. This nuanced understanding of value aims to drive more effective decision-making and project outcomes[12].

Educational Implications

The evolving framework has significant implications for project management educa- tion and training. There is a shift from a focus on memorizing processes to under- standing and applying principles that can guide behavior across various methodolo- gies. As a result, educational programs and materials are expected to adapt, priori- tizing principles and their practical applications over rigid process adherence[11][12].

References

[1]: What's New in PMBOK 7th Edition: A Comprehensive Guide

[2]: PMBOK Guide 6th vs 7th Edition: Unveiling the Key Differences - PMaspire

[3]: Project Management Evolution: A Journey from PMBOK 5th to 7th Edition

[4]: PMBOK 6 VS PMBOK 7 – what has changed? - PMI Netherlands

[5]: PMBOK 7th Edition: A deep dive into modern project management

[6]: PMBOK 7 vs PMBOK 6: The Key updates and changes in the 7th Edition

[7]: PMBOK 7th Edition Guide 2024: Release Date, Latest Version Changes, PMI ...

[8]: PMBOK® Guide 7th Edition vs 6th Edition - Project Management Academy

[9]: Difference Between PMBOK Guide 6th & 7th Ed. (PMBOK 6 vs 7) - PMExperto

[10]: The Evolution of PMBOK: Comparing the 6th and 7th Editions

[11]: What's New in the PMBOK 7th Edition Compared to the 6th Edition?

[12]: PMBOK Guide 6th Edition vs 7th Edition - Spoclearn

[13]: Top Agile Case Studies: Examples Across Various Industires - KnowledgeHut

[14]: PMBOK 6 vs. PMBOK 7: Which Edition Is Right for You? - ProThoughts Solution

[15]: Adapting to the Innovations of the PMBOK® Guide 7th Edition - LinkedIn

[16]: 12 Project Management Principles Explained by Experts

[17]: The 12 Principles of Project Management - Rebel's Guide to Project ...

Annex 2. THE QUESTIONNAIRE.

1. Do you utilize artificial intelligence during project management? If so, how? If not, why?

2. What challenges with using artificial intelligence during project management can you identify?

3. What specific areas of project management do you believe AI will impact the most in the upcoming years?

4. How do you perceive the role of predictive analytics in improving project outcomes?

5. What skills must project managers develop to work effectively alongside AI tools?

6. Can AI enhance the value delivery systems in project management?

7. How will AI impact the project management framework defined in the PMBOK Guide 7th edition?

8. The new PMBOK Guide 7th edition defines 12 key principles of project standards: Stewardship, Teams, Stakeholders, Value, System thinking, Leadership, Tailoring, Quality, Complexity, Risk management, Adaptability and resiliency, and Change. Which of one of them or more will impact AI the most, which will impact AI the least, and why?

9. Can you describe any successful implementations of AI in project management you have witnessed or been part of? What were the outcomes?

10. What future trends do you foresee in integrating AI into project management?

11. How do you foresee AI changing the role of project managers?

12. What challenges do you anticipate organizations will face when integrating AI into their project management practices, and what recommendations would you give to organizations adopting AI in project management practices?

13. How do you see the evolution of AI technologies influencing project management methodologies over the next decade?

14. Are there any ethical considerations or risks associated with relying on AI for project management decisions?