Title: The Role of AI and Automation in Enhancing Project Decision Making: A Qualitative Exploration of Evolving Practices.

Abstract

This research seeks to establish the impact of artificial intelligence and automation in the decision-making on projects. The study will make use of a qualitative secondary research method with an emphasis on thematic analysis in order to consolidate progressive practices from literature and case studies. This study aims to fill existing knowledge gaps in understanding how AI integration is undertaken in project management by analyzing how AI tools are used in decision-making processes, such as risk evaluation and assessment, resource allocation, and communication with the stakeholders. The outcomes will shed light on the potential of organizations to leverage AI to improve the quality, speed, and accuracy of decision-making processes and the constraints of such technologies. Research objectives are expected to contribute to the existing literature regarding how AI influences decision-making across diverse industries and add theoretical and pragmatic insights to managers and organizations of projects.

Contents

Introduction/ Background

The fast-paced, digital world of today has made project management more difficult.

The demands of current projects, which call for quick decision-making, economic resource allocation, and strong team communication, could be better for traditional approaches to handling (Karamthulla *et al.*, 2024). Typical applications of AI include predictive models, automated data processing, and machine learning, which filters extensive amounts of data and provides insights and recommendations to top management in real-time. This changes the earlier general approach to form a new one based on facts and figures (Niederman, 2021).

Since decision-making procedures are intrinsic to project management, these developments serve it exceptionally well. AI can easily support every stage of the project life cycle, including the allocation of resources as well as risk management and incorporation of stakeholders (Odejide and Edunjobi, 2024). For instance, AI tools forecast the risks of a project based on historical data, determine the best sequence of the project, and make decisions in cases where they are repeated. Automation, in contrast, improves the effectiveness of the business processes because it optimizes the tasks and prescribes the areas where the project managers should make the decisions (Mariani and Mancini, 2024).

However, like most things, the primary use of AI and automation in the management of projects also has some drawbacks (Soravito, 2023). Such concerns include the roles of AI-integrated tools, challenges of layoff and job creation, the use of AI and its moral dilemmas, and the issue of project managers and their changes in flexibility according to the latest technological trends (Mohamed, 2021). Furthermore, the current literature has paid more attention to the functional view, and more attention needs to be paid to studying the effects of AI on management decision processes. Hence, the purpose of this study is to fill this gap by offering a qualitative understanding of how AI and automation are redefining decision-making architectures (Shang, Low, and Lim, 2023).

Statement of problem and rationale

Mainly, as the size and the problem-solving scope of the projects increase, there is an inability to apply traditional decision-making heuristics stemming from the fact that there is too much data readily available (Malliaroudaki and Zoumas, 2024). This leads to inefficiency in decision-making, for example, providing poor or delayed decisions in large projects. As much as AI and automation come with solutions by offering fast, accurate results and leaving out errors, many organizations end up not implementing the use of such technologies because of issues to do with reliability, ethical questions, and compatibility with other software (Karamthulla *et al.*, 2024). This research seeks to fill these gaps by establishing an understanding of how project managers anticipate the benefits and risks of adopting AI in their decisions.

Research questions

- In what manner are automation and AI technologies being adopted to enhance the decision-making process in project management?

- What are the critical issues faced by the project manager in implementing AI in decision-making?
- How are the speed, accuracy, and quality of decisions impacted by AI in project management?

Research Aim

This research seeks to determine the impact of AI and automation on project decision-making processes, as well as the opportunities, concerns, and prospects of using the innovation.

- To examine the pattern of AI and automation in the project decision-making process.
- To highlight the issues of adopting AI in organizing project management-related activities.
- To assess the effects of integrating AI on decision-making accuracy, time frame, and quality.

Importance of research

This research is essential in several ways. First, it will help to address the need for more empirical studies focusing on analyzing changes in the role of AI in decision-making (Duan, Edwards, and Dwivedi, 2019). Second, awareness of the barriers to AI implementation in project management will enable organizations to develop the necessary strategies for adopting the recommended technologies. Last, this study will help to enrich the understanding of the effects of IA across industries, which provide valuable implications to project managers and other organizations that want to enhance the decision-making processes by means of innovation (Glikson and Woolley, 2020).

Literature review

The implementation of Artificial Intelligence, or AI, and automation in the project management domain has gained much attention in recent years (Fridgeirsson *et al.*, 2021). Of all the potential impacts that the AI capability to digest data and perform repetitive work may have on decision-making, more needs to be understood about how it will transform project management practices (Wagner and Wagner, 2024). This literature review is limited to the current status of research regarding AI and decision-making, the difficulties faced by project managers, and the gaps that this study intends to fill.

AI in project management

A lot of contentious comments have been made recently on the development of artificial intelligence. For instance, IBM CEO Ginni Rometty claims that artificial intelligence (AI) technologies are "technology to augment human intelligence...Generally speaking, we envision a society in which humans and machines work together to improve humankind and enable it to achieve its greatest potential. However, Bill Gates stated that artificial intelligence poses a threat to humanity, and Hawking stated that "the development of full artificial intelligence could spell the end of the human race" (Duan, Edwards, and Dwivedi, 2019).

According to Panetta, 2018, AI is ranked as the top strategic technology in Gartner's 2018 technology trend report. Through 2025, the success of digital projects will be determined by the application of AI to improve decision-making, reimagine business models and ecosystems, and transform the customer experience. 59% of organizations, according to the Gartner poll, are still gathering data to develop their AI strategy, while the remaining organizations have already advanced in piloting or implementing AI solutions (Duan, Edwards, and Dwivedi, 2019).

Decision-making can also be enhanced by using AI in terms of predictive analytics, real-time data analysis, and process optimization (Taboada *et al.*, 2023). For instance, big data and business analytics tools, which rely on artificial intelligence capabilities, help in the evaluation of risks by a project manager, intelligent resource allocation, and probable upcoming project delays. This minimizes the influence of human factors and bias and enables a more effective calculation of profits in projects that time-honored techniques cannot always address. It can have sensible roles in working on the apparatus of automatic time management, work accomplishment calendar, and work-in-progress tracking that will control many burdens coming through to the project manager (Wamba-Taguimdje *et al.*, 2020). Although these tools provide efficiency, there needs to be more literature regarding the impact of automation on decision-making frameworks within project management (Wagner and Wagner, 2024).

Challenges of AI integration

However, several challenges continue to be characteristically associated with integrating AI into decision-making. The literature review also revealed that a common concern expressed by project managers is that AI tools are not to be trusted. According to Duan et al., 2019, There are more instances where managers deny the application of AI completely. For instance, they believed that automated systems do not capture specific contextual or relational details that the human mind can recognize. This is a challenge in implementing AI in project decisions since the literature shows that current use needs to fully reflect the availability and impact of AI tools (Duan, Edwards, and Dwivedi, 2019).

Further, its reliability and acceptability in decision-making are still an area of concern as far as the ethicality of AI is concerned. Questions like the privacy of data, prejudice of algorithms, and effect on human occupation have been discussed in many studies. These challenges encourage researchers to examine more ways in which AI can be implemented appropriately in project management without compromising ethical issues (Shaw *et al.*, 2019).

Gaps in literature

Despite the fact that there is a growing body of literature on the technical benefits of implementing AI within the system for project management, the qualitative effects of AI on decision-making have remained a subject of limited investigations. While the majority of the studies focus on tools and applications, there needs to be more insights into project managers' perceptions and decision-making regarding AI (Malliaroudaki and Zoumas, 2024). Further, the nature of how AI interplays between self-generated knowledge and the application of data analytics is not well investigated

(Gil, Martínez Torres, and González-Crespo, 2021). This gap is essential since decision-making is also a human-centered activity, which incorporates judgment, experience, and flexibility, all of which have not found a significant amount of attention in the current literature.

Addressing the gaps

This research will fill the gaps through qualitative secondary research on the roles of AI and automation in decision-making for projects. Therefore, the study will sample qualitative research design from previous literature, reports, and case analyses to identify thematic areas such as AI implementation, issues, and emerging structures of decision-making in project management. In this way, this research will integrate various findings in order to offer a synthesized view of how AI works across different contexts and inform managerial decision-making beyond its technological implications. This approach makes it possible to explore existing knowledge comprehensively to facilitate the achievement of the intended objectives for filling the established research gaps.

Theoretical framework

This research study will be guided by decision-making theory and the Technology Acceptance Model. Decision-making theory deals with how decisions are arrived at when there is uncertainty, and this is problematic in project management, where demands and data can be unmanageable. It underscores the movement from reliance on human hunches or heuristic approaches to solving problems, as is typical in production systems, to intelligent use of AI and automation techniques supported by significant data insights. This shift is essential in capturing how project managers modify the way in which they process decisions in order to incorporate AI technologies appropriately.

This paper reveals how the Technology Acceptance Model (TAM) (Davis, 1989) presents a necessary view to assess the extent to which project managers accept AI tools. In TAM, it is believed that perceived usefulness and perceived ease of use are factors that impact technology acceptance. Using this model, the research will investigate the following significant areas concerning the decision of project managers regarding the advantages and issues of applying AI. The synthesis of these theoretical frameworks will facilitate an appreciation of the changes that are currently emerging in PM decision-making processes as powerful AI technologies gain more ground. The proposed framework will help perform the thematic analysis of the existing literature to reveal how AI changes the decision-making processes within the framework of contemporary project management issues (Davis, 1987).

Methodology

This research will, therefore, use a qualitative secondary research methodology where the researcher will use published literature, reports, and case studies that have embraced the use of AI and automation in decision-making in project management. The rationale for using a qualitative approach is appropriate because the study seeks to uncover the richness of participants' experiences and perceptions rather than trying to find statistically significant results. Secondary research

prevents the researcher from investigating only details within a subject, as it enables the researcher to develop a more comprehensive understanding of the research area without the direct gathering of primary data.

Data collection methods

Information will be sourced from scholarly-discipline journals, business publications, and academic reports and case studies available from scholarly online and offline journals, books, and Research databases such as Google Scholar, IEEE XPLORE, and The Project Management Institute's repository. This approach gives an opportunity to investigate and compare a plethora of information regarding the application of AI in decision-making, the problems faced by project managers, and the dynamic nature of incorporating AI into companies, among others.

Sample and sampling strategy

The sample will, therefore, include a wide array of current qualitative and quantitative studies on AI in project management, particularly issues related to decision-making. The sampling method will be purposive sampling in that only those sources that deal with the application of AI in decision-making will be used. The inclusion criteria will be oriented toward the publication dates of the material, which should be at most ten years old due to modern trends in AI advancement. There will be no primary participants involved; however, the sample size will be based on the availability of suitable materials and quality research papers (Castleberry and Nolen, 2018).

Data analysis techniques

All collected data will be analyzed using thematic analysis to reveal such features as patterns and themes (Kiger and Varpio, 2020). It means that the collected data are analyzed by assigning codes and categorizing them according to the themes connected with the use of AI, decision-making difficulties, and benefits perception. The study proposes the use of thematic analysis as it is relevant for analyzing meanings within qualitative data and associating the findings with research queries (Braun & Clarke, 2006). This approach guarantees that there is a practical and exhaustive analysis of the existing literature, as it helps to understand how artificial intelligence influences project management decisions.

Implications and contribution to knowledge

This research will cover this gap by identifying the use of AI and automation to analyze decision-making processes in project management through a qualitative approach. To that end, the study itself will analyze relevant prior research and contribute to the identification of new trends in AI, focusing on its adoption, obstacles, and change from the use of human knowledge to the use of data as a basis for decision-making. This paper shall further enhance the existing literature by focusing on the role that AI plays for project managers and proposing a construct that outlines AI-enhanced decision-making frameworks in the project management domain from a dynamic perspective.

Potential limitations

Secondary data restricts access to present-day AI advancement and new trends in management projects. Further, as the study methodology is qualitative, the report's conclusions would not apply to all industries or project categories. These include the limitation to the number of sources analyzed, which may also limit the amount of time spent analyzing specific sources. In order to overcome these limitations, the research would like to focus on the most recent studies only. Thematic analysis would be used to allow pattern recognition across studies, thus making the results more rigorous (Walker, 2021).

Ethical considerations

This research is consequential research based on secondary data; no direct participants will be involved; therefore, there will be no issue of informed consent or confidentiality. However, the study shall ethically obtain all materials by using proper citations and observing issues related to patents. "Measures will also be taken to ensure data credibility and integrity and present credible research findings that will not mislead any reader by providing a detailed depiction of the work and interpretation of the authors (Khan, 2015).

Proposed timeline
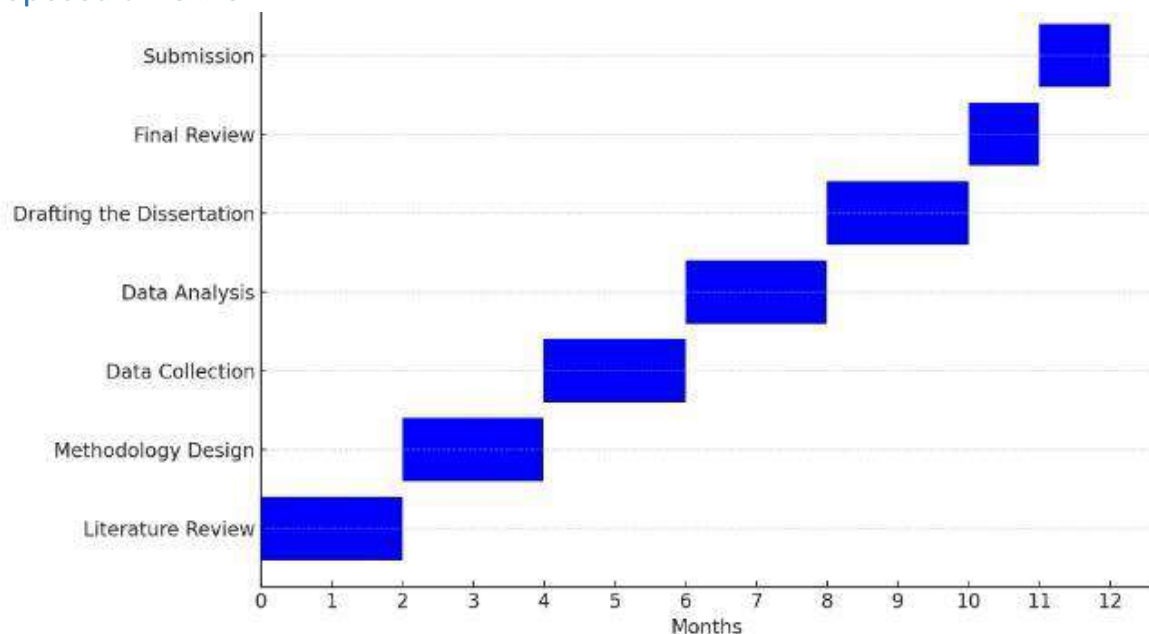
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