

THE ROLE OF AI IN MANAGING PROJECT RESOURCES IN PAKISTAN

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ABSTRACT

This research examines the changing role of artificial intelligence (AI) in managing project resources, specifically in Pakistan. The objective is to determine the potential contributions of AI to PRM and its ability to aid managers in making well-informed choices. In recent times, Artificial Intelligence (AI) has emerged as a disruptive and influential factor in different technological domains, posing a challenge to existing conventions in multiple sectors. This study primarily investigates the unique circumstances of PRM (Public Relations Management) in Pakistan, where the possible ramifications of AI (artificial intelligence) still need to be comprehensively grasped. We use a quantitative study methodology to examine the difficulties encountered by project managers in the realm of resource management, as well as the potential benefits that artificial intelligence (AI) might provide in enhancing their decision-making procedures. The technique included distributing a survey to 220 persons, primarily skilled in project management, with a significant presence of younger age cohorts, highlighting the growing significance of AI adoption among the younger demographic. Many participants also have experience in project management or similarly connected areas. The results imply a connection between PRM and AI use, although it lacks statistical significance. This means a possible association that requires additional examination using a more extensive dataset. Future research on the influence of AI on PRM in Pakistan should use a larger and more comprehensive sample size. This study highlights AI's ever-changing and influential role in PRM (Public Relations Management). It emphasizes the need for ongoing investigation and adaptation to use its capabilities thoroughly.

Keywords: Artificial Intelligence (AI), Pakistan, Public Relations Management (PRM), Quantitative Research.

INTRODUCTION

The influence of new technology on different industries is undeniable. From prehistoric times, humans have been preserving knowledge, beginning with rudimentary cave art that recorded their thoughts and emotions. This early form of communication marked the transformation of private knowledge into public information. Various writing systems emerged as time progressed, and letters were used to document and share information through paper and books. The advent of digital documents, driven by the advancement of knowledge management technologies, significantly transformed data administration in the twentieth century (Duchess et al., 1993).

Artificial intelligence (AI) has become a fundamental element of knowledge management in the twenty-first century, significantly improving businesses' ability to efficiently acquire, create, and utilize information. AI has transitioned from theoretical research to practical applications, with numerous companies developing AI solutions in recent years. This evolution continues, with AI technologies like speech synthesis, voice recognition systems, neural networks, and knowledge-based planning and scheduling systems becoming increasingly prevalent (Lawrence, 1991).

The application of AI in Project Management and academia has not just ushered in a new era of innovation, but also a wave of efficiency. AI-powered software solutions are now streamlining processes that were once complex, time-consuming, and resource-intensive. These AI tools have transformed communication, monitoring, information gathering, and data analysis, promising a future where tasks are completed faster and with greater accuracy. Although project managers still rely on intuition and experience for critical

decisions, AI is evolving to provide real-time responses and make informed decisions by considering various project-related factors. Numerous studies have explored the impact of recent advancements in knowledge management systems, processes, and best practices. Furthermore, knowledge management systems have proven beneficial in the implementation of digital learning tools (Miguel & Nobre, 2020).

Moreover, advancements in AI extend beyond technological progress; they also encompass addressing ethical considerations and data privacy concerns, ensuring responsible and effective use of these technologies. For example, new regulations and frameworks are being developed to guide the ethical use of AI in business, promoting transparency and accountability in AI-driven decisions. This emphasis on ethics and responsibility not only enhances the efficiency of knowledge management but also fosters trust in AI applications, facilitating their wider adoption across various sectors. Additionally, continuous improvement in AI algorithms and the integration of machine learning further contribute to the sophistication and reliability of AI-driven systems, providing a solid foundation for their ethical use.

SIGNIFICANCE OF THE STUDY

This study is significant as it delves into the evolving role of artificial intelligence (AI) in the Project Resource Management (PRM) realm in Pakistan. By exploring the current challenges project managers face and assessing how AI can enhance decision-making processes, this research highlights the transformative potential of AI in optimizing project resources. The findings underscore the need for a deeper understanding of AI's practical applications in PRM, particularly in the context of developing countries like Pakistan. This study contributes to the body of knowledge by providing empirical evidence on the slight positive correlation between PRM and AI utilization, suggesting a foundation for further exploration and strategic integration of AI in project management practices.

LITERATURE REVIEW

The Role of Project Management in Management Sciences

Project management has solidified its place as a crucial subset of management science. It involves applying various methodologies, skills, tools, and techniques to guide a project towards achieving its objectives. This holistic approach is vital for the successful completion of any project. Understanding that a project is a temporary endeavour to create a unique product, service, or result is essential. Typically commissioned by a business or customer, each project is unique due to its distinctive characteristics. Even projects with similar natures differ due to various driving factors and the absence of standard features. This uniqueness requires a non-repetitive set of skills, resources, expertise, and financial management. Instead, project management aims to deliver sustainable outcomes that support the goals of the business or client, whether short-term, medium-term, or long-term (Vrontis et al., 2022).

Key Components of Project Resource Management

Project resource management involves identifying the resources needed for project completion, securing them, and managing them efficiently. These resources include physical and human elements, such as knowledge, skills, tools, equipment, and raw materials. These components are crucial to ensure the smooth execution of all project tasks. Each project team member has specific roles and responsibilities, and their active involvement in the planning and development stages significantly contributes to the project's overall success (Miguel & Nobre, 2020). A project's tasks are divided into distinct phases, known as Process Groups, executed at various stages of the project's lifecycle. Within the project resource management knowledge area, the following processes are conducted: Resource Management Planning; Estimate Activity Resources; Acquire Resources; Develop Team; Manage Team; Control Resources.

The Project Manager's Role in Human Resource Management

The project manager plays a vital role in human resource management, ensuring that each team member meets the conditions for project progress. The project manager manages and leads various components, ensuring the team has access to necessary resources and adequate training. The team also requires technical and psychological support to ensure effective stakeholder communication. The project manager also evaluates whether the team receives appropriate recognition for their efforts and milestone achievements (Steels & De Mantaras, 2018).

Forming and Growing the Project Team

During the planning phase, the project manager is tasked with forming the project team, defining roles, responsibilities, and competencies, and forecasting workforce needs. In the execution phase, the project manager hires the required experts. However, the project manager may only sometimes have complete control over resource acquisition due to budget constraints, allocation to other projects, geographical and cultural limitations, or lack of authority over staffing decisions (Abdeldayem & Aldulaimi, 2020).

Once the project team is assembled, the project manager fosters their growth. This involves creating a supportive team environment, enhancing team member capabilities, and promoting effective teamwork. A positive work environment is crucial for both employee satisfaction and project success. Project managers can achieve this by identifying obstacles and opportunities for improvement, providing timely feedback and support, and appropriately recognising and rewarding outstanding performance (Pan & Froese, 2023).

The Impact of AI on Project Management

The rapid advancement of technology has led to numerous innovations aimed at simplifying, improving, and automating tasks previously performed by humans. Artificial intelligence (AI) is the most significant and far-reaching among these advancements. AI not only saves time and money but also has profound societal impacts. Machines are increasingly taking over various human tasks, transforming social interactions and altering lifestyles. AI mimics human cognitive functions such as problem-solving, complex planning, logical reasoning, negotiation, decision-making, forecasting, adaptability to new environments, understanding different languages, and visual/auditory recognition (Al et al., 2021).

Adoption and Ubiquity of AI in Various Industries

The adoption of AI has surged across multiple industries due to its enhanced problem-solving capabilities. Companies are recognising AI's potential for long-term cost savings and improved performance. AI's integration into everyday tools, such as Google Maps, exemplifies its ubiquity. These systems use AI to provide optimal routes through GPS and real-time traffic updates. Additionally, AI-powered virtual assistants like Apple's Siri and Microsoft's Cortana use Natural Language Processing to interact with users, performing tasks such as making phone calls, sending texts, and offering restaurant recommendations. AI's influence on our lives continues to expand (Aziz et al., 2014).

The continuous growth in AI research and its potential applications has led to the establishment of numerous research facilities dedicated to this field. An increasing number of AI companies are emerging, accompanied by substantial investments in AI research. European businesses and governments increasingly recognise the importance of strategic planning to navigate the rapidly evolving AI landscape. This recognition is driven by the widespread acceptance of AI's practical and economic benefits, prompting a concerted effort to keep pace with advancements.

Global Trends and Challenges in AI Adoption

Currently, the European Union (EU), the United States (US), and China dominate the AI research and deployment market. However, the EU must catch up to the US and China in

adopting new digital technologies, particularly AI. Significant barriers to AI adoption in Europe include a workforce needing more skills to utilise AI technologies effectively and a lack of expertise within organisations to develop AI systems and applications aligned with their workflows. Over the years, the integration of AI into Project Management practices has become increasingly common, with various tools and algorithms developed for different applications. These tools include algorithms and machine learning programs that enhance accuracy in identifying control, monitoring, and cost-related issues, estimating project scope, budget, and success, and generating initial plans and resource allocations (Steels & De Mantaras, 2018).

Predicting Project Success with AI Technologies

The primary objective of the methods discussed in this article is to predict project success by identifying critical success factors using AI technologies such as Bayesian models, neural networks, and genetic algorithms. Although these AI-based tools currently serve as supplements rather than replacements for traditional tools, they demonstrate significantly higher accuracy than their conventional counterparts. It is noteworthy that integrating existing essential tools is a growing trend aimed at leveraging their strengths while addressing their weaknesses (Franken & Wattenberg, 2019).

The Importance of a Coordinated Approach in Project Management

This highlights the importance of a coordinated approach with various project management tools. Modern machine learning tools and technologies support this finding by addressing crucial project management challenges related to planning, deadlines, and ineffective monitoring and control processes. Solutions in project resource management are now available to help project managers improve their resource planning, acquisition, and management processes. Several integrated technologies assist project managers in making informed resource decisions (Aljamee & Naeem, 2020). The project manager is pivotal in team development and management, promoting skill and competency development, maintaining a productive work environment, and using leadership and emotional intelligence to motivate the team.

Ensuring effective communication and collaboration is crucial for progress, as is providing fair compensation for completed work. E-learning technologies have long been utilised in organisations as efficient, time-saving methods by offering highly effective online educational systems. These systems can adapt to the learner's emotional responses, using cues to modify the instructional approach (Rakova et al., 2021). A review of existing literature on AI integration into Project Management and digital tools for enhancing AI in Project Resource Management reveals distinct benefits to these systems. As AI research advances, more aspects of daily life will be influenced by AI systems, from professional tools to home assistants. This review highlights the variety of AI and machine learning models applied in project management, emphasising these technologies' growing impact and potential to improve project outcomes.

RESEARCH METHODOLOGY

Our review of existing literature highlights significant gaps in our understanding of how AI can be leveraged in project resource management. This research aims to identify the current challenges Project Managers face in Project Resource Management within organizations and assess how existing AI algorithms can enhance decision-making processes.

A quantitative research methodology was employed to collect data for this study. The study targets individuals with experience in project work, extending beyond just Project Managers. This approach aligns with utilizing artificial intelligence to support entire project teams. Participants were invited to join the research through various platforms, including Facebook, LinkedIn, and WhatsApp, ensuring a diverse and comprehensive data set.

RESEARCH FINDINGS AND DISCUSSION

The research method briefly explains the data and its sources, variable definitions and analysis methods used in the research. If the sub method includes a table, then the placement of the table uses flat center with the title above the head of the table and the source below the table using Arial font size 10. Each table must be referenced in the article manuscript. Writing formulas (if any) uses Arial size 10 font, flat center, accompanied by numbering and description (Rachman & Salam, 2023).

RESULTS

Age of Study Respondents

Out of the total respondents, 208 individuals, or 94.55%, fall within the 20–30 age group, while 12 participants, or 5.45%, are in the 31- 45 age range. These figures are derived from valid responses, accounting for 88% of the respondents. There are 30 responses categorized as "Missing," which make up 12% of the total. In summary, the vast majority of respondents (94.55%) are aged between 20 and 30, with a significantly smaller portion (5.45%) in the 31 to 45 age brackets. The remaining 12% represent gaps in the age data.

Table 1. Age of Study Respondents

		Frequency (f)	Percentage (%)	Valid (%)	Commulative (%)
Valid	20-30	208	83.2	94.55	94.55
	31-45	12	4.8	5.45	100
	Total	220	88	100	
Missing		30	12		
	Total	250	100		

Source: Author Analysis (2024)

Participant Demographic

There were 210 male responses, making up 95.45% of the total, while 10 respondents, or 4.55%, identified as female. This shows that most respondents (95.45%) are male, with a small portion (4.55%) female. Of 250 respondents, 220 gave valid gender information, meaning there were 30 missing responses.

Table 2. Participant Demographic

		Frequency (f)	Percentage (%)	Valid (%)	Commulative (%)
Valid	Male	210	84	95.45	95.45
	Female	10	4	4.55	100
	Total	220	88	100	
Missing		30	12		
	Total	250	100		

Source: Author Analysis (2024)

Professional Background of Participants

The survey findings reveal that most participants had prior experience in Project Management or related fields. Expressly, 93.18% of respondents indicated they had such knowledge. Conversely, 4.09% reported needing more experience in Project Management or related initiatives. Additionally, 2.73% of participants chose the "By Chance" option, expressing uncertainty about their experience. These results underscore the extensive project management knowledge within the surveyed group, showing that most individuals in the sample had relevant experience.

Table 3. Professional Background of Participants

		Frequency (f)	Percentage (%)	Valid (%)	Commulative (%)
Valid	Yes	205	82	93.18	93.18
	No	9	3.6	4.09	97.27
	By Chance	6	2.4	2.73	100
	Total	220	88	100	
Missing		30	12		
	Total	250	100		

Source: Author Analysis (2024)**Descriptive Examination**

The descriptive statistics offer valuable insights into two key areas: optimizing human resources in projects and utilizing AI for project management. With a sample size of 220 observations, the mean score for Optimizing Human Resources in Projects is 3.4, with a standard deviation of around 0.9332. This mean score suggests that respondents view human resource management in projects favourably. The relatively small standard deviation indicates that responses are closely grouped around this mean, showing agreement among respondents.

For leveraging AI for Project Management, also based on 220 observations, the mean score is slightly higher at 3.6, with a standard deviation of approximately 1.3229. This indicates that respondents have varied opinions on the use of AI in project management. The larger standard deviation reflects a wide range of perspectives and possibly more diverse views on the adoption and effectiveness of AI in project management, highlighting the need for open discussion and collaboration.

Table 4. Descriptive Examination

	Mean	Standard Deviation	N
Optimizing Human Resources in Projects	3.4	0.9332	220
Leveraging AI for Project Management	3.6	1.3229	220

Source: Author Analysis (2024)**Correlation between Optimizing Human Resources in Projects and Artificial Intelligence**

The correlation study between optimizing human resources in projects and leveraging AI for project management yielded intriguing results. The Pearson correlation coefficient for these variables was found to be 0.097. However, the two-tailed significance threshold (p-value) was 0.152, indicating this correlation is not statistically significant.

Table 5. Correlation between Optimizing Human Resources in Projects and Artificial Intelligence

		Optimizing Human Resources in Projects	Leveraging AI for Project Management
Optimizing Human Resources in Projects	Pearson Correlation	1	0.097
	Sig. (2-tailed)	-	0.152
	N	220	220
Leveraging AI for Project Management	Pearson Correlation	0.097	1
	Sig. (2-tailed)	0.152	-
	N	220	220

Source: Author Analysis (2024)

These findings indicate a very slight positive association (0.097) between optimizing human resources in projects and leveraging AI for project management, but it is not significant enough to be considered meaningful. This suggests that within the studied context, there is no substantial evidence that changes in project human resource management are closely linked to changes in the use of AI in project management practices. Further research with a larger sample size may be necessary to determine the potential impacts of integrating AI into human resource management in project settings.

CONCLUSION

Insightful conclusions may be drawn from studying the role of AI in Pakistan's Project Resource Management. Research exploring the relationship between Project Human Resource Management (PHM) and AI in project management has provided valuable insights. This study indicates a very weak positive correlation, with a p-value for statistical significance of 0.152 (two-tailed), suggesting that the correlation is insignificant. Consequently, the data does not support the hypothesis that changes in Project Human Resource Management are associated with changes in the use of AI in project management practices within the examined context.

These findings highlight the need for caution when predicting AI's impacts on Project Resource Management in Pakistan. Although a positive association exists, it is not statistically significant. Drawing definitive conclusions about AI's role in this field based solely on this data would be premature. The potential implications of integrating AI into Pakistan's Project Resource Management are just beginning to be understood, and further research is required to grasp its impact fully.

Moreover, it is crucial to conduct additional studies that delve into the specific AI tools and techniques that could be more effective in enhancing Project Resource Management in different sectors. This future research holds the potential to provide a clearer and more detailed understanding of how AI can be optimally utilized, thereby ensuring that its integration into project management practices yields measurable improvements in efficiency and outcomes.

FUTURE RESEARCH

Future research should focus on expanding the sample size to provide more comprehensive data on the impact of AI on Project Resource Management in Pakistan. Investigating the specific AI tools and techniques that can be effectively implemented in various sectors will offer deeper insights into their practical applications. Additionally, longitudinal studies that track the integration of AI over time could reveal the long-term benefits and challenges. Further studies should also address the ethical considerations and data privacy issues associated with AI adoption, ensuring its implementation is both responsible and effective. This future research is essential to fully understand AI's potential to transform PRM and to develop best practices for its integration into project management.

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