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RESEARCH PAPER

Role of Artificial Intelligence in Project Resource Management in Pakistan

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ABSTRACT

The purpose of this study is to examine the developing function of AI in the field of project resource management (PRM) in Pakistan. It aims to fill in the blanks of what AI can provide to PRM and how it can help managers make better choices. Artificial intelligence (AI) has recently emerged as a disruptive force in a number of technical disciplines, posing new challenges to established norms in a wide range of businesses. This research focuses on the unique conditions of Pakistani PRM, where the possible effects of AI have not been well explored. We use a quantitative research approach to examine the difficulties project managers experience with resource management and the benefits AI may bring to their decision-making. The research methodology consisted of a survey sent out to 160 people, the vast majority of whom were experienced in project management. Younger age groups dominated the responder pool, highlighting the rising relevance of AI adoption among the younger generations. In addition, several of them came from backgrounds in project management or closely related fields. The results show that there is a link between PRM and the use of AI, however, it is not statistically significant. This raises the possibility of a correlation that needs to be tested with a bigger data set. We suggest that in future studies of AI's effect on Pakistani PRM, researchers think about using a larger sample size. This research highlights the dynamic nature of AI in PRM and the need for ongoing investigation and modification to realize its full potential.

KEYWORDS Artificial Intelligence, Human Resources, Project Management, Technology

Introduction

There's no denying the impact that new technology have had on a variety of industries. Knowledge has been preserved by humans since prehistoric times, when they first started recording their thoughts and feelings via primitive cave art. As so, this marked the beginning of the process of making private expertise accessible to the general public. Subsequently, humans took action to preserve and disseminate knowledge by developing a variety of writing systems and introducing the use of letters to record and communicate information on paper and in books. The advent of digital documents, for which we can thank the development of knowledge management technologies, ushered in a period of unprecedented change in the administration of data in the last century (Duchessi, O'Keefe, & O'Leary, 1993).

Artificial intelligence (AI) has become a pillar of knowledge management in the twenty-first century, facilitating the efficient acquisition, creation, and use of information inside businesses. Artificial intelligence (AI) has expanded beyond the boundaries of academic research facilities to take center stage in the commercial world. A significant number of businesses have developed AI applications in the last two years, according to recent studies, and this trend in application creation is still present. The application of different AI technologies is expanding and includes speech synthesis and voice recognition systems, neural networks, knowledge-based planning and scheduling systems, and more (Lawrence, 1991).

Artificial intelligence's introduction into the fields of Project Management and academics has brought in a new era of innovation. There are several software-based solutions available today that have simplified formerly difficult, time-consuming, and resource-intensive processes. AI-powered solutions have transformed communication, monitoring procedures, information gathering, data analysis, and a variety of other factors. However, when it comes to making crucial decisions inside projects, project managers continue to depend on intuition and experienced validation of choices when it comes to all information domains in the project management discipline (Ubaidi, 2017). Soon, though, this approach may shift when AI advances to the point where it can provide instantaneous replies and make decisions based on striking an optimal balance between the many factors that go into the creation of Projects. There have been a number of studies looking at the effects of recent developments in knowledge management systems, procedures, and best practices. Moreover, knowledge management systems have shown their worth in implementing digital tools for learning(Miguel & Nobre, 2020).

Literature Review

The field of project management has emerged as a major subfield in management science. It includes the comprehensive use of a variety of approaches, knowledge, abilities, and instruments to expertly guide a project towards the accomplishment of its specified goals. This all-encompassing strategy is crucial to the successful completion of any given project. It's crucial to have a firm grip on the idea that a project is a temporary endeavor undertaken to create something unique. This project is often commissioned by a business or customer, and each one is distinctive due to its individuality. Even when projects have similarities in nature with others, they remain different owing to diverse driving causes or the lack of regular features. This individuality prevents the use of repetitious sets of skills, resources, expertise, or cash. Instead, project management seeks to provide long-lasting outcomes that advance the objectives of the business or customer, whether those goals are short-, medium-, or long-term (Vrontis et al., 2022).

The procedures of determining what resources are needed for a project's completion, securing those resources, and managing them efficiently are all part of project resource management. These resources include both physical and human aspects and essential components including knowledge, expertise, tools, supplies, and raw materials. These materials are essential for making sure that all project tasks are carried out without any problems. Each member of a project team is assigned certain tasks and responsibilities, and their active participation in the planning and development stages may be very beneficial to the project's success as a whole(Miguel & Nobre, 2020).

A project's tasks are divided up into discrete processes, known as Process Groups, which are individually carried out at various phases of the project's growth. The following procedures are carried out within the knowledge area of project resource management:

1. Resource Management Planning
2. Calculate the Activity's Resources
3. Invest in Resources
4. Create a Team
5. Supervise a Team
6. Manage Resources

A project manager plays an essential role in the field of human resources to ensure that each team member is in line with the necessary conditions for the progress of the project. The Project Manager has a dual responsibility for managing and leading several

components. This involves making sure the team has access to the resources it needs and has been given enough training and education. Furthermore, the team needs both technical and psychological assistance since it is crucial that stakeholders communicate well. The Project Manager is also responsible for determining if the team is given proper credit for their efforts and milestone accomplishments(Steels & De Mantaras, 2018).

During the Planning phase, the Project Manager takes on the critical job of creating the appropriate Project Team, outlining the necessary roles for team members, outlining their authority, duties, and competences, and making workforce projections to meet the project's requirements. The Project Manager is responsible for hiring the necessary experts throughout the Execution phase of the project life cycle. The project manager may not always have direct or complete control over the acquisition of human resources due to factors such as budgetary constraints, allocation to other projects, geographical and cultural constraints, or a lack of influence over those responsible for making staffing decisions. (Abdeldayem & Aldulaimi, 2020).

After the project team has been put together, the project manager is in charge of seeing to it that they continue to grow. This comprises building a supportive team atmosphere, improving team member capabilities, and encouraging productive teamwork. Enhancing employee happiness and project success both depend on creating a positive work environment. This may be accomplished by project managers by exposing obstacles and chances for improvement, giving prompt feedback and assistance, and properly recognizing and rewarding great achievement (Pan & Froese, 2023).

The rapid development of technology has led to several inventions with the goal of simplifying, improving, and even automating processes that were formerly completed by people. Among these developments, the advancement of artificial intelligence is without a doubt the most significant and extensive. This new development will not only save a lot of time and money, but it will also have big effects on society. Machines are increasingly replacing a variety of human tasks and duties, streamlining social interactions, and changing the way we live. Artificial intelligence is recognized for being able to replicate human cognitive abilities such as problem-solving, intricate planning, rational thought, negotiation, decision-making, forecasting, adaptability to new environments, comprehension of various languages, and visual/auditory recognition (Al Mansoori, Salloum, & Shaalan, 2021).

The usage of AI has increased dramatically across several sectors as a result of its growing problem-solving capabilities. Companies are becoming more aware of the potential of AI for long-term cost reductions in addition to improved performance. As seen by its incorporation into navigational tools like Google Maps, artificial intelligence has invaded practically every aspect of our everyday lives. Through GPS and real-time traffic updates, these systems use AI to provide the best routes. Additionally, AI-powered virtual assistants that function within the Internet of Things (IoT) framework, such as Apple's Siri and Microsoft's Cortana, use Natural Language Processing to communicate with users. These assistants can make phone calls, send texts, and offer restaurant recommendations. Our lives are being impacted and permeated by AI more and more (Aziz, Hafez, & Abuel-Magd, 2014).

There are now many more research facilities devoted to this topic as a result of the constant rise in AI research and its prospective applications. A growing number of AI firms are now appearing, along with large investments in AI research. In order to successfully traverse the fast evolving AI environment, European businesses and governments are increasingly realizing the value of strategic planning. This urgency is brought on by the broad acceptance of the practical and economic benefits those AI technology offers, which has led to a concentrated effort to stay up with these advancements.

The bulk of the market for artificial intelligence (AI) research and deployment is presently dominated by the European Union (EU), the United States of America (US), and China. When it comes to adopting new digital technologies, the European Union is steadily

lagging behind the United States and China. This is particularly true when it comes to the use of artificial intelligence (AI). The workforce's lack of the essential skills to use AI-based technologies successfully and the lack of expertise inside organizations to create AI systems and applications that fit with their work processes are both significant barriers to the adoption of AI by businesses. With the introduction of several tools and algorithms created for a variety of applications throughout the years, integration of AI into Project Management practices is becoming more and more frequent. These tools include a variety of algorithms and machine learning programmes that enable users to identify control, monitoring, or cost-related concerns with better accuracy, estimate project scope, budget, and success, and produce initial plans and resource allocations (Steels & De Mantaras, 2018).

The main goal of the techniques mentioned in this article is to estimate project success by finding key success variables using AI technologies like Bayesian models, neural networks, and genetic algorithms. Although they now serve as a supplement rather than a replacement for traditional tools, AI-based tools exhibit noticeably greater accuracy than their conventional equivalents. It's important to note that combining current basic tools is a developing trend that aims to improve existing models' strengths while addressing their flaws (Franken & Wattenberg, 2019).

This emphasizes the need of a coordinated strategy among the different Project Management tools. Modern machine learning tools and technologies accessible for Project Management in support of this finding. They draw attention to crucial project management problems with regard to planning, deadlines, ineffective monitoring, and control procedures. Solutions are currently available in the field of project resource management to help project managers increase the effectiveness of their resource planning, acquisition, and management processes. Project managers may make decisions about resources with the help of several integrated technologies (Aljamee & Naeem, 2020).

The project manager is a key player in the growth and management of the team, the promotion of skill and competency development, the maintenance of a productive work environment, the use of leadership abilities and emotional intelligence for motivation, the assurance of efficient communication and colocation for progress, and the provision of fair compensation for work completed. Numerous e-Learning technologies have been used for a long time in businesses as excellent time-saving techniques by offering highly effective online educational systems. Even better, these systems can adjust to the learner's emotional reactions, employing expressions to adjust the instructional strategy (Rakova, Yang, Cramer, & Chowdhury, 2021).

After reviewing the existing literature on AI and its integration into Project Management, as well as research covering digital tools for enhancing AI integration into various aspects of Project Resource Management, it is clear that there are distinct benefits to integrating these systems. As AI research develops, more and more aspects of our daily lives will be influenced by AI systems, from professional AI tools to AI assistance in our homes. This review of relevant literature draws attention to the variety of artificial intelligence (AI) and machine learning (ML) models that have found application in the field of project management.

Material and Methods

Based on our study of the available literature, there are big gaps in what we know about how AI can be used in the area of project resource management. This research aims to explain the present challenges Project Managers experience in Project Resource Management in organizations and evaluate how existing AI algorithms might improve decision-making processes.

To gather data for this study, a quantitative research methodology was used. This study primarily aims to reach people who have experience working on projects;

however, this is not limited to Project Managers. The goal of using artificial intelligence to help project teams as a whole is aligned with this strategy. To participate in the research, respondents were contacted through a variety of channels, including Facebook, LinkedIn, and WhatsApp.

Results and Discussion

Age of Respondent:

Table 1
Age of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20=30	152	89.4	95.0	95.0
	30-40	8	4.7	5.0	100.0
	Total	160	94.1	100.0	
Missing	System	10	5.9		
Total		170	100.0		

A total of 152 respondents, or 89.4%, are in the 20–30 age range and 8 responses, or 4.7%, are in the 30 to 40 age range. These numbers are based on accurate replies, which represent 94.1% of all respondents. The "System" category also has 10 missing replies, or 5.9% of the total. In conclusion, the majority of respondents (89.4%) is between the ages of 20 and 30; whereas the proportion of respondents in the 30 to 40 age bracket is much lower (4.7%). There are age data gaps for the remaining 5.9%.

Gender of Respondents:

Table 2
Gender of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	153	90.0	95.6	95.6
	Female	7	4.1	4.4	100.0
	Total	160	94.1	100.0	
Missing	System	10	5.9		
Total		170	100.0		

There were 153 male replies (or 95.6% of the total) and 7 respondents (4.4% of the sample) identified as female. It is clear that 95.6% of respondents identify as men, with 4.4% of respondents identifying as women. Out of a total of 170 respondents, 160 provided accurate information on their gender, indicating that no responses were missing

Working Experience of Respondents

Table 3
Working Experience of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	143	84.1	89.4	89.4
	No	13	7.6	8.1	97.5
	May be	4	2.4	2.5	100.0
	Total	160	94.1	100.0	
Missing	System	10	5.9		
Total		170	100.0		

The survey results show that many of those who participated had prior job experience in Project Management or related fields. Specifically, 84.1% of the participants reported having prior experience in this field. In contrast, a smaller percentage, 7.6%, reported having no experience with Project Management or initiatives. 2.4% of respondents included a "Maybe" option to indicate their doubt. These results underline the importance of this knowledge

among the studied community by showing that a sizable majority of the people in the sample had some experience in project management.

Table 4
Descriptive analysis

	Mean	Std. Deviation	N
Project Human Resource Management	3.4	.79464	160
Utilization of Artificial Intelligence in project	3.6	1.12707	160

The descriptive statistics provide insightful information on two important topics: project human resource management and the use of artificial intelligence in project management.

Based on a sample size of 160 observations, Project Human Resource Management has a mean score of 3.4 and a standard deviation of around 0.79464. According to the mean score, it can be deduced that respondents generally see the situation of human resource management in projects as being relatively favorable. The relatively small standard deviation shows that the replies are rather densely packed around this mean, suggesting that the respondents have some degree of agreement on this issue.

Based on a sample size of 160 observations, the use of artificial intelligence in project management has a mean score that is somewhat higher at 3.6125 and a wider standard deviation of around 1.12707. This suggests that respondents generally have mixed opinions on the use of artificial intelligence in project management. The larger standard deviation, however, suggests more variation in respondents' perceptions, pointing to a broader variety of viewpoints and maybe more varied views about the adoption and efficacy of AI in project management.

Table 5
Correlation between project human resources management and AI

		Project Human Resource Management	Utilization of Artificial Intelligence in project
Project Human Resource Management	Pearson Correlation	1	.097
	Sig. (2-tailed)		.223
	N	160	160
Utilization of Artificial Intelligence in project	Pearson Correlation	.097	1
	Sig. (2-tailed)	.223	
	N	160	160

Interesting results came from the correlation study between project human resource management and the use of AI in projects. For these two variables, a Pearson correlation coefficient of 0.097 was calculated. The two-tailed significance threshold (p-value) for this link, however, was 0.223, indicating that it was not statistically significant.

These findings reveal a very slight positive connection (0.097), but not enough of one to be regarded relevant or statistically significant, between Project Human Resource Management and the Utilization of Artificial Intelligence in projects. This finding suggests that, within the examined context, there is no evidence that changes or variations in Project Human Resource Management are closely connected with matching changes in the use of AI in project management practices. To establish the potential impacts of AI's adoption into human resource management in project contexts, further study with a bigger sample size may be required.

Conclusion

Insightful conclusions might be drawn from a study of AI's function in Pakistan's Project Resource Management. Studies examining the interplay between PHM and AI in project management have been extremely informative. This study shows a very weak positive link. The p-value for statistical significance is 0.223 (two-tailed), thus this correlation is not significant. Therefore, the data does not support the hypothesis that there is a correlation between alterations in Project Human Resource Management and alterations in the examined context's usage of AI in project management practices.

These data show that it's important to be careful when trying to predict the effects of using AI in Project Resource Management in Pakistan. Although there may be a positive association, it is not strong enough to be considered statistically significant at this time. Making definitive conclusions about the role of AI in this field based on this data alone is premature at this time. The potential effects of using AI in Pakistan's Project Resource Management have only just begun to be explored.

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