

Proposal Research Title:

The Mediating Role of Project Manager's Competencies in the Relationship Between Using Artificial Intelligence and Project Constraints

A study on the Contracting Companies in the Eastern Province of Saudi Arabia

For Ph.D. Registration

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Introduction

The rapid technological changes and the continuous development of sciences impacted different industries. Whether humans like it or not, it became a fact and it would be beneficial to everyone to adopt and utilize it in the right way to catch up with all the ongoing changes. One of the technologies that got the attention of everyone is Artificial Intelligence (AI)

The evolution of AI has made it part of numerous industries. Utilizing it in project management became a hot topic within the industry which led to new trends like the smart monitoring systems of project management and the expectation of utilizing it in project management is to have positive results in project management activities. (Alshaikhi & Khayyat, 2021)

The capabilities in the AI systems of collecting data and processing them specifically with repetitive tasks allow the Project Managers to raise their capabilities in making better decisions which could be reflected in their planning strategies and other aspects of the project like Risk Management, Communications, and resource allocation. (Khatib & Falasi, 2021)

As more people are becoming interested in using AI and adopting it in different Business Lines in general and in project management as specific, it is important to understand how it might affect project managers' skills and the challenges they face in their work. AI in project management can help by taking care of routine tasks automatically, offering helpful information based on data that are being collected, and making it easier to make smart decisions. (Phaladi *et al.*, 2022)

The predictive analytics capability of AI-enabled project management systems has the potential to mitigate project constraints leading to more efficient project execution and better project outcomes. (Prifti, 2022). As the Project Managers use AI more in their projects, it will help them utilize their time and resources more efficiently and will be able to perform better compared to the traditional way of managing projects. (Dam *et al.*, 2019)

Keywords

Artificial Intelligence, Project Manager Competencies, Project Constraints.

Problem Statement

Project Management is an important part of any development, whether for Organizations or even Countries. Without properly managing the processes during the whole life cycle with the correct tools, the chances of not achieving the desired outcomes will be high. Therefore, as part of Saudi Vision 2030, a Project Management Office (PMO) was established by the Saudi Government to manage government projects. (Vision 2030)

Although AI is being widely used nowadays globally in several fields, it is not yet utilized in a wide range in the Project Management field. The Contracting sector in Saudi Arabia is no different for not yet utilizing the capabilities of AI technologies properly. Therefore, there is a need to understand the impact of AI on Project Management, specifically on the competencies of the Project Managers and the Project Constraints.

Like any other field, new technologies have impacts on Project Management in general, especially AI. Some major Multinational companies have already started to use AI to get their work done better and faster. However, it is unknown how AI is helping project managers do their jobs or how it makes it easier to finish projects on time and within budget.

Project managers need to keep up with technology, so they need new skills to work well with AI. Also, there is a need to look closely at whether AI is having an impact on the project constraints where it makes it easier in terms of dealing with them or it makes it more complicated.

This research aims to look closely at how AI is affecting project managers' skills and the usual challenges in projects which is important for the Contracting sector in the Eastern Province of Saudi Arabia, where there are many ongoing construction and services projects. This research will help companies and project managers understand

the pros and cons of using AI, so they can make better plans for the future and be ready for more technologies in their work.

Expected Added Value

The study will help the companies and individuals within the study population to understand the difference between traditional project management and AI-enhanced project management.

Research Objectives

- 1- To investigate the relationship between using AI and Project Managers' Competencies.
- 2- To investigate the relationship between using AI and Project Constraints.
- 3- To address the relationship between Project Managers' Competencies and Project Constraints.

Research Questions & Hypotheses

The study will answer the following main question and sub-questions related to using AI in Project Management in general, particularly on Project Managers Competencies and Project Constraints:

Q- How does the use of AI impact project managers' competencies and project constraints in contracting companies in the Eastern Province of Saudi Arabia?

Q.a- What are the new competencies required for project managers in the context of AI utilization in project management?

Q.b- How does the use of AI affect the project constraints?

Q.c- What are the challenges faced by contracting companies in the Eastern Province when implementing AI in project management?

The Hypotheses of these questions are:

H.1- There is a positive impact of using AI on Project Managers' Competencies.

H.1.a- There is a statistical relationship between using AI and the Project Managers' Competencies.

H.2- There is a positive impact of using AI on Project Constraints.

H.2.a- There is a statistical relationship between using AI and Project Constraints

H.3- There is a statistical relationship between Project Managers' Competencies and Project Constraints.

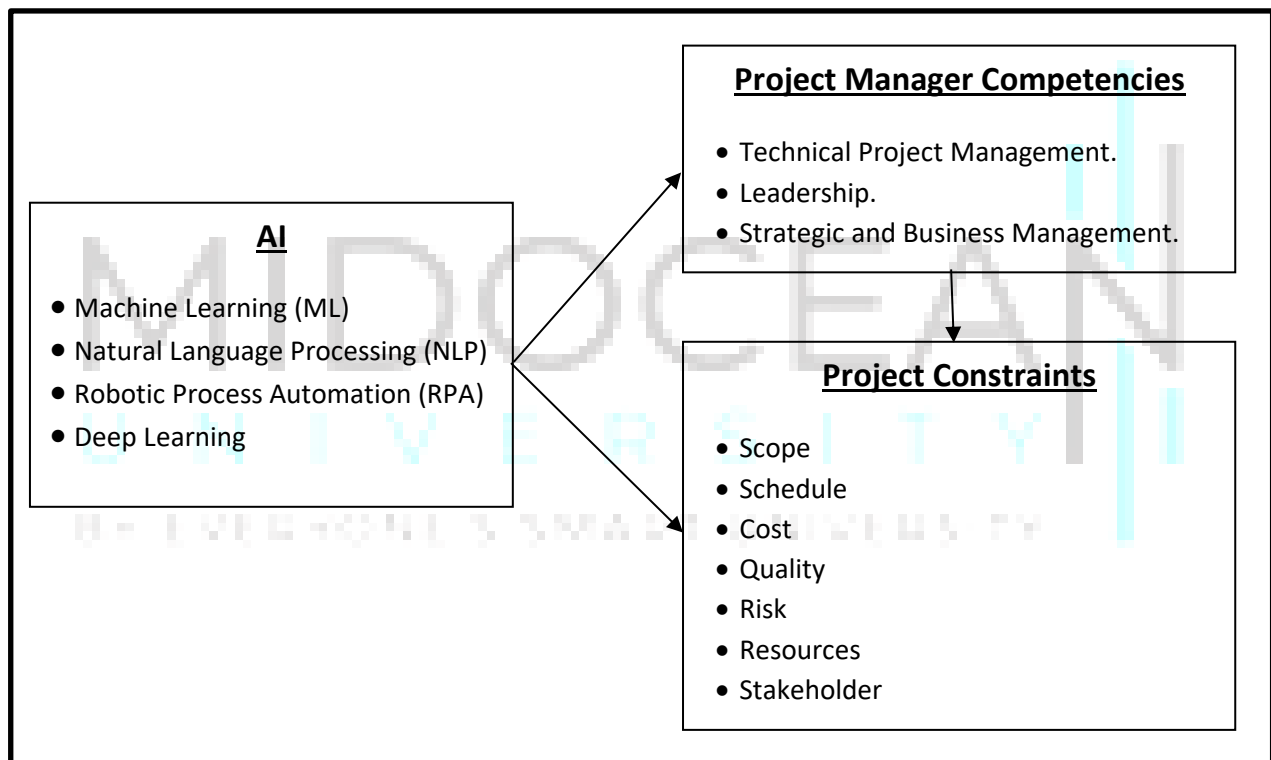


Diagram representing the Variables and their Relationships

Literature Review

No	Title	Author	Year	Related Literature	Result	Recommendations
1	Investigating AI Applications in Construction Industry: A Systematic Review	Güray	2023	The paper examines how AI helps in handling the challenges in the Construction Industry.	There is a strong linkage between Building Information Modeling (BIM), Digital Twins (DT), Machine Learning (ML), and Deep Learning (DL).	Increasing the research in the construction field specifically the case studies about the AI Technologies being used in the Construction Industry.
2	Implementation of Artificial Intelligence in Project Management and effect in working personnel	Kelepouris	2023	This research studies the impact of AI in Project Management on the Working Personal.	Implementing AI in Project Management offers opportunities for boosting efficiency and achieving better results.	Considering a phased approach by Organizations in applying AI in Project Management.

3	Project Management in the Era of Artificial Intelligence	Sahadevan	2023	This research studies the pros of applying AI in Project Management on resource allocation, Risk Management, Decision Making, and Planning.	AI improves all the different sides of Project Management including decision making and resource allocation.	• Encouraging learning and innovation within the Organizational Culture will help to improve the technologies. • Project Managers, Data Scientists, IT Professionals, and Business Leaders should collaborate to integrate AI in Project Management. • Project Management Professionals should be up to date with all the innovations and utilize the
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						capabilities of the new Technologies.
4	A Qualitative Study on Artificial Intelligence and Its Impact on the Project Schedule, Cost and Risk Management Knowledge Areas as Presented in PMBOK®	Fridgeirsson, et al.	2023	The paper discusses the impact of AI on 3 out of 10 of the PMBOK 6th edition Knowledge Areas which are Cost Management, Schedule Management, and Risk Management.	AI will significantly impact Project Schedule, Cost, and Risk Management.	• Further research can give more specific results about the Impact of AI on Project Management. • Interviews with AI specialists could give exact answers on how AI can be used to help in the field of Project Management.
5	Artificial Intelligence and Its Impacts on Project Management	Nagireddy	2023	The study provides a literature review and case studies of adopting AI in Project Management and its impact.	AI has the capability of improving Project Planning, resource allocation, Risk	Further research investigating AI-based solutions is required for specific functions

					Management, and Decision-making.	from a scientific point of view.
6	The Role of Artificial Intelligence in Project Management	Odeh	2023	The paper discusses the importance of adopting AI in Project Management stating that stakeholders are expecting to see new tools and techniques for managing a successful project.	AI-supported applications can do better planning and other administrative tasks.	• Transforming from the Traditional project management approach to AI-supported applications is needed. • The Transformation process should be in phases involving people, processes, and technology.
7	Mapping Two Decades of AI in Construction Research: A Scientometric Analysis	Regona, et al.	2023	The study examined the effect of AI on enhancing productivity, sustainability, and efficiency in construction.	Utilizing Intelligent Systems shows an improvement in productivity,	Further research is required focusing on the identified challenges like the

	from the Sustainability and Construction Phases Lenses				efficiency, safety, and sustainability in the construction industry.	cost-effectiveness of implementing AI in the construction industry, ensuring fair access to AI-driven solutions, and resolving the data integration and interoperability issue.
8	The possibility of applying artificial intelligence techniques to stakeholder management in project management in the Kingdom of Saudi Arabia	Almohammad, et al.	2022	The paper focuses on utilizing AI to provide information to Stakeholders that support decision-making.	• There is an acceptance of applying AI Technology to Stakeholders Management/. • Applying AI in Project Management will help in Decision-making.	• It is important to get the assist and support from AI Specialists. • It is important to clarify the importance of AI in Project Management in Managing Stakeholders.

					• Using AI in Project Management can help specify the causes of delay. • Utilizing AI in Project Management can help in identifying future risks.	• Providing training to Stakeholders about AI. • Benefiting from other countries' experiences in utilizing AI in Project Management.
9	Knowledge management processes based on artificial intelligence in construction projects: an applied study in the Kingdom of Saudi Arabia	Alghamdi & Aldharman	2022	The paper discusses the impact of using AI on Knowledge Management processes in Construction Projects from the opinion of Contractors in Saudi Arabia.	• Applying Knowledge Management through AI Applications has an impact on the Construction Industry. • There is a relationship between	Enhancing the use of Knowledge Management Processes based on AI to resolve the problems that are related to progressing delay in the construction projects in Saudi Arabia and

					Knowledge Management Processes and AI Applications in Construction Projects.	taking care of the Financial side.
10	Adoption of Artificial Intelligence for Optimum Productivity in the Construction Industry	Victor	2022	The purpose of the study is to connect the benefits of AI with its practical applications in the construction industry by examining some case studies.	• Utilizing Touchplan application increases the predictability and profitability of project outcomes. • Utilizing Touchplan application saves time on projects by reducing rework in executing the projects.	• Increasing the allocated funds for scientific research in the construction sector. • Investigating AI systems for aspects other than planning like Engineering Design and Facility maintenance. • Invistegsting individual

						demographics like gender geography and culture to understand the challenges presented by these factors. • Investigating the Government Programs and Policies that affect on adaptation rate of an organization.
11	An investigation into the Impact of Artificial Intelligence on the Future of Project Management	Alshaikhi & Khayyat	2021	The paper investigates the importance of AI and its impacts on Project Management. It also emphasizes that AI, Machines, and Robots can automate tasks	Technologies and AI can run the machines and robots and perform some tasks but they can't replace humans.	• A skilled Project Manager is required to be able to utilize AI properly and achieve the desired outcomes of utilizing

				and tools, but they need humans to manage.		AI in Project Management.
12	Impact of Artificial Intelligence in South African Construction Project Management Industry	Makaula, et al.	2021	The purpose of this paper is to explore the influence of AI technology across various project lifecycle stages, intending to develop an integrated framework for construction management.	AI is important in the Construction industry and it can be used in several stages within the Project Lifecycle.	Innovated Technologies should be utilized in the Construction Sector, especially in Africa.
13	Research on the Application of Intelligent Construction Site in Construction Site Management	Zhang	2020	The paper discusses the use of Information Technology making an intelligent worksite to manage the workers and the site and to have more efficient management than the traditional management style.	It is important to utilize information technology in solving the problems in the construction industry with quality management and the utilization of intelligent construction sites.	• Adopting Information Technology to manage Personal and Construction Sites and implementing intelligent worksite concepts. • Implementing Training, Teaching,

						and Technical methods addressing quality and safety issues in construction sites. • Implementing BIM Technology. • Applying real-time management and control to improve efficiency.
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Although research about AI in different fields is the trend nowadays. However, research is scarce in the field of AI that is related to Project Management, especially in Saudi Arabia. Therefore, this research will be a reference for future research related to AI in Project Management.

Based on the literature review, no research in the scientific community studies the impact of AI on Project Manager's Competencies and Project Constraints specifically on the Contracting Sector in Saudi Arabia. Therefore, this study is expected to explain the importance of AI to Project Managers, company owners, and decision-makers.

The Literature review will serve as a reference that the researcher can refer to in order to know where the other researchers reached to help minimize the research gap by checking their outcomes and recommendations and trying to cover the areas that were not covered.

Research Methodology

Due to the nature of the study and the need to provide an accurate description and comprehensive analysis, The researcher will use the Descriptive Analytical Methodology.

The research will be limited to the Contracting Companies that are geographically located in the Eastern Province of Saudi Arabia due to the huge number of Contracting Companies within the Eastern Province and the location of the researcher which will give him an advantage to visit the companies whenever there is a need.

The Quantitative Analysis approach will be employed to analyze the data which will be collected through questionnaires and will utilize SPSS and Microsoft Excel to process the collected data and produce the information.

The produced information will be discussed with respect to the hypotheses of the study considering the Correlation Coefficient, Regression Coefficient, and other statistical information.

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