

Optimizing Project Management using Artificial Intelligence

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Abstract

This study focuses on identifying the weakest points of project management and the possibility of where artificial intelligence can help precisely in their optimization. The results were taken from a survey where project managers of various categories were asked about the main challenges facing management today and the points where artificial intelligence can be seen as a optimization tool. In this decade, artificial intelligence (AI) has undoubtedly been one of the most influential technologies. AI has changed the way people live and work, and project management is no exception. There is always controversy about the use of AI technology. In this paper first is explained the need for companies to use AI technology and after considering the advantages and risks of AI. Also using project management based on machine learning is the optimal option. Some proposals for the implementation of AI in project management are presented. The study describes how AI systems can support project managers to become more efficient in their work.

Keywords: Optimization, Technology, Management, Project Management, Artificial Intelligence.

1. Introduction

This paper studies the role of artificial intelligence in project management including its application in project management while listing the benefits of AI integration in project management. In addition, this paper examines how AI facilitates excellence in project management. Various industries are using technology with a view to improve efficiency and effectiveness, while enabling management to be reliable, secure, and accepting. The integration of human skills and technical systems has resulted in increased performance and motivated culture thus ensuring continuous improvement. AI has various tools including Chatbots, Strategos, ZiveBox, Rescoper, ClickUp, Clarizen and PolyOne which help project managers in handling various tasks. For example, they assist the manager in the composition of the project team, as well as in assigning roles and responsibilities to individual team members. AI tools are also

useful to ensure that project managers manage effectively and adhere to deadlines. There are many benefits that project managers get from using artificial intelligence. First, AI provides support for project managers. This is because it eases the burden and pressure of project management through the application of machinery. AI is also useful in providing project managers with the accuracy of results as the tasks performed using AI have no errors. Furthermore, the use of AI helps project managers with insight and strategy. For example, an AI tool can suggest alternative or additional steps for project managers who are handling very difficult projects. In addition to assisting project managers in performing the above tasks, it also increases effectiveness and efficiency, thus increasing the product manager's productivity by increasing their creativity while increasing their emotional intelligence.

2. Project Management And Elements Of Project Management Phases

A formal definition of project management, based on the Institute of Project Management, defines the term as: "the application of knowledge, skills, tools and techniques to project activities to meet project requirements." A more tangible description is that project management is all you need to realize a project on time and within budget to provide the necessary scope and quality. Project management involves making decisions about the planning, organization, coordination, monitoring and control of a number of related activities in a timely manner. A project manager must make an exchange between cost, time and scope while ensuring the required quality. The Project Manager, therefore, often depends on tools and techniques that are quite effective not only in designing the best possible initial plan, but also capable of instantly projecting the impact of deviations to initiate the necessary corrective measures. The table presents the project management phases.

Table. 1. Elements of project management phases

Start	Planning	Organization	Control	Completion
1. Definition of the problem 2. Identification of project goals 3. Specification of goals 4. Determination of	1. Identification of project activities 2. Evaluation of time and expenses 3. Flow of project activities 4. Identification	1. Determining staffing needs 2. Recruitment of the project manager 3. Recruitment of the project team	1. Define management style 2. Organization of control 3. Preparation of the status report 4. Review of the project plan	1. Acceptance of the project by the customer 2. Distribution of the project 3. Distribution of documentation 4. Preparation of the final report

preliminary resources 5. Identify opportunities and risks	of critical activities 5. Compilation of the project proposal	4. Organizing the project team 5. Assignment of tasks	5.Changes	5.Implementati on audit
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3. Artificial Intelligence And Project Management

Artificial intelligence (AI), the ability of a computer or computer-controlled robot to perform tasks typically associated with intelligent beings. The term is often applied to the project of developing systems endowed with intellectual processes characteristic of humans, such as the ability to think, discover meaning, generalize, or learn from past experience. Since the development of the computer in the 1940s, it has been demonstrated that computers can be programmed to perform quite complex tasks, such as discovering evidence for mathematical theorems or playing chess, with great skill. Still, despite continuous advances in computer processing speed and memory capacity, there are still no programs that can meet human flexibility over broader fields or tasks that require much daily knowledge. On the other hand, some programs have reached the performance levels of human experts and professionals in performing certain specific tasks, so that artificial intelligence in this limited sense is found in various applications such as medical diagnostics, computer search engines and voice recognition. or handwriting. The term "artificial intelligence" has been misused and misunderstood. While for many the term AI means a conscious robot, which wants to destroy humanity; experts refer to this specific instance of AI as general artificial intelligence which is a long way to go in the future. However, there are other cases of AI used for better or worse in areas such as medicine, war, finance, espionage, etc. In relation to the field of project management, machines can copy cognitive functions related to the mind of the project manager such as decision making and problem solving. Various search engines and word recognition systems including Google and Siri among others use AI principles in performing their functions (Lahmann, Keizer, et al., 2018). However, the overall goal of AI is to develop computers and machines that are able to work in the best possible way (Vesma, 2009). This includes the use of optimization strategies, automation intelligence, and mathematical methodologies. Based on (Munir, 2019), programming AI strategies requires technological interpretation in addition to interpretation of psychology, neuroscience, and linguistics. Regarding AI implementation, being able to accurately determine the minds of project managers in a way that allows simulation using the techniques mentioned above remains controversial. This will be possible over time and the opportunity is increasing due to the development and use of microcomputers, the advancement of machine learning technology and the use of cloud computing

(Duchessi et al., 1993). The current study analyzes how AI is beneficial to project managers.

Technological field is dynamic and there is a lot of development in the field of project management. Given the importance of the tasks performed by project managers, it is important that such tasks are performed efficiently and effectively (Vesma, 2009). With technological advancement, several technological innovations have been developed to assist project managers in this regard based on (Anastasi et al., 2011). As such, this study aims to analyze how AI helps managers.

3.1 Assistance to project managers

There have been several AI applications that have been developed with a view to facilitating the work of project managers. This has resulted in new competitive constraints, which when combined with contemporary constraints complicate the exchange analysis process. Hiring various AI tools by project managers is expected to make project management easier. According to (McCarthy, 2007), the limitations and assumptions given to the project team at the beginning of the project do not change within the project life cycle is always taken for granted. This has been proven wrong ever since and all limitations and traces of assumptions should occur throughout the project life cycle, and this is where AI finds added use (Abduh & Soemardi, 2002). For example, managers are not always aware of when they may interfere with project implementation. Some of the AI tools used by most organizations include crisis panels. By observing the computer crisis panel, managers are able to identify projects that face various issues and which of the project constraints are not within the required level and projects that can be considered to be at the critical level (Tonchia, 2018).

Using AI, managers are able to identify projects that need immediate action and the specific actions that project managers need to take. This is essential in significantly reducing response time to project issues identified to be outside acceptable limits. It can be difficult for managers to determine the amount of work to be done or planned without having work restrictions. Extra work is usually done overtime regardless of technological requirements, skill requirements, and resource constraints without AI (Andrea Edkins, 2017). AI helps assist in project portfolio development that increases project probability of increasing value for the organization in addition to identifying effective resource management practices. It is worth noting that several software algorithms have been developed for this purpose (Salini et al., 2015). However, project scheduling and optimization practices remain manual and use trial and error strategies. Based on (Magaña Martínez & Fernandez-Rodriguez, 2015), the use of AI in project management helps to improve the effectiveness of schedule optimization by identifying all current and future projects of the organization in progress, compared to consideration only of a few specific projects. This assumes that everything is generally wrong or true in making assumptions. With the use of more information, some assumptions will be made.

AI utilizes sufficient database related to specific information and thus enhances problem solving and reasoning based on partial information (Butt, 2018). AI enables forecasts for the future, while offering opportunities that increase the value of decisions made. Using different AI tools with more information results in better decision results according to (Schreck et al., 2018). This requires consolidating the intellectual property of project management and obtaining information about AI tools as a starting point. Such tools include hatbots, Strategos, ZiveBox, Rescoper, ClickUp, Clarizen and PolyOne. The United States Patent and Trademark Office (USPTO) has issued a growing number of patents for AI inventions, proving that AI's innovative capabilities will revolutionize our industries and impact the global economy.

4. Risks and limitations of AI in Project Management.

Technologies are increasingly improving productivity, profitability, and business results, but there are also certain barriers and limitations to be taken care of. The main dimensions of risks according to studies are:

Table. 2. Risks and limitations of AI in Project Management

Risk dimension	Description	Impact on MP
Safety	AI technology may not follow the company's security standards.	Depending on the desired output of the project, AI may endanger the safety of human beings.
Privacy	AI cannot properly distinguish between approved and restricted data and violates the right to privacy	This can encourage the collection of personal data, unauthorized registrations and unethical decisions.
Autonomy	As AI dominates the environment, it can make people feel like "slaves" of the car.	AI at some point becomes independent, which makes Project Managers lose track of how and when to stop AI.
Data quality/availability	Incomplete and missing data reflect the statistical power of a forecast and produce estimates that lead to invalid conclusions.	Managing a group of stakeholders and various unpredictable events, AI-led projects will generally not respond appropriately to these challenges.

Employment	Repetitive and low-skilled jobs may no longer be available.	AI may not be competent to assign a task to the right person as it lacks people and social skills
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A major obstacle to AI adoption is the skills shortage and availability of experienced technical staff and training to deploy and operate AI solutions.

1. Data mismatch: exists where data sources conflict with each other at the data value level because the same data exists in different formats in multiple tables. Well-designed and well-controlled project management environment, missing or incomplete data occurs in almost all areas. Incomplete data can reduce the statistical power of a forecast and produce estimates that lead to invalid conclusions.

2. Creativity: Machines simply do not have the ability to be creative. People can think and feel, so decision making is creative and will benefit from the result. AI can help in terms of helping to determine the type of images with the style and the possible price of the client preference. But a machine can not yet compete with the human brain when it comes to originality. AI can be trained in some creativity parameters which can develop their sense of creativity

3. Hiring and retaining: Since the field is quite new in the field of project management, companies may need to invest in raising the level of their employees to meet the demands and challenges of this new way of project management.

5. Case study of project management and artificial intelligence

The first step in this research process was done using a survey which was distributed online to project managers. In this survey, the questions were divided into two categories:

1. Project Management

2. Artificial Intelligence

The survey was conducted among project managers in various enterprises mainly in various IT and telecommunication companies belonging to the most evolutionary industry of the moment to thus understand a broader perspective. The nature of the questions in the survey was defined in a wide range for project managers, some asking them to answer Yes / No, some enabling multiple choice options. The survey results were then used to identify trends in this industry. This section presents the survey results. The survey was answered by a total of 34 respondents with experience in project management in various fields from different businesses. One of the first questions (with Yes / No answer) was about defining AI systems awareness among project managers and the answer is illustrated below:

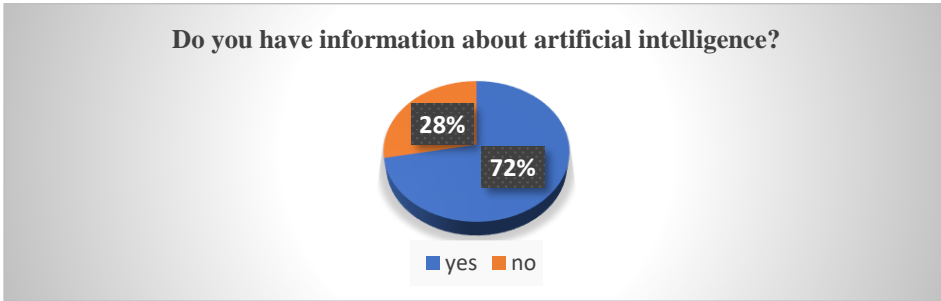


Figure. 1. Information about artificial intelligence

This statistical breakdown got an interesting change as shown in the figure below when project managers were asked if they use any AI system:

Examining the data from the answers to the two questions from the graphs it was found that out of 72% of respondents who have knowledge of AI, 12% use AI systems while 61% of project managers do not use any.

Further respondents who do not use any AI system were asked if they would like to use any AI system in the future and their answer is illustrated in the graph below:

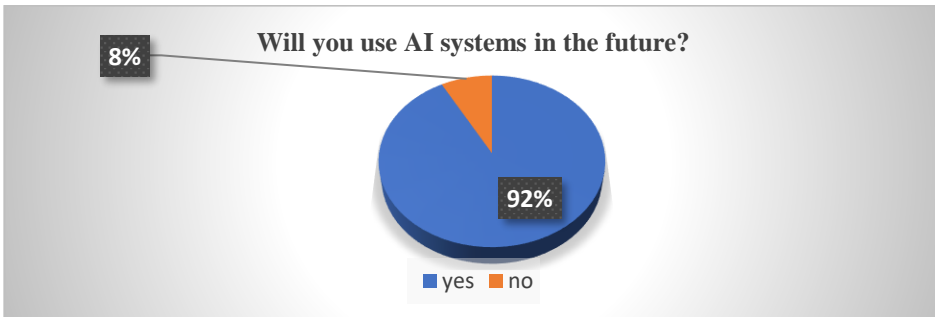


Figure. 2. Preferences to use AI in the future

In this section managers were asked about their experience in the field of project management and their answers are presented in the graph below.

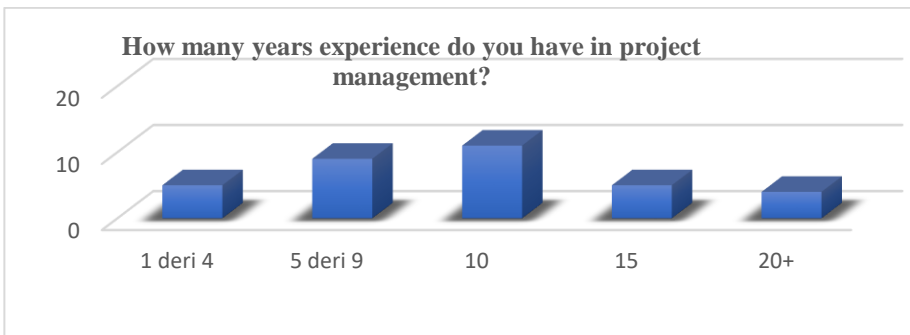


Figure. 3. Experience in Project Management

It turns out that 5 managers have less experience in the field of project management, 9 others have an average experience of 5-9 years. Most result that they have a relatively large experience of 10 years, while 4 had 15 years and 20 years had only 3 of them. 70% of respondents were IT project managers, without question this is justified by the fact that it is the most revolutionary industry of the moment. The remaining 18% and 12% respectively dealt with industrial projects and services. Based on the results it is concluded that the main challenges for project managers are risk management, project planning, budget and quality management. It usually happens that these are the weakest points in management because many factors influence. I would emphasize the fact that exactly at the weakest points of management, AI would intervene in their optimization. They are exactly the budget, project planning, risk management, quality management where Artificial Intelligence would provide support.

6. Conclusions and discussions

This paper concludes that this is the era of technological progress. Technological advancement has led to the development of big data science that uses AI as its backbone. AI is defined as a device that helps to realize different perceptions about the environment, while helping to take actions that increase the probability of achieving goals. Various fields are now applying AI.

However, the field of project management is particularly experiencing an increased AI adoption. In this regard, AI is helping to manage different projects at the same time using the limited resources available. As such, it can be concluded that AI helps project managers in many ways using different tools to perform tasks. different. Thus, AI means increasing project manager support, increasing accuracy, strategy and insight. The use of AI in project management has increased the productivity of project managers. AI has also increased the emotional intelligence and creativity of project managers by eliminating individual biases in decision making. Centrally, there are various risks that have resulted from the adoption of AI in project management. AI in project management does not replace people. Project managers are very important. However, it can be a powerful tool for a project manager who can increase productivity.

The computer analyzes all the data and finds patterns which help it to make a more accurate prediction. The analysis of the survey results reveals some more problematic aspects in project management and for which artificial intelligence systems would help in their optimization. In the future the attention should be focused on these challenges and how to solve them.

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