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Artificial Intelligence and Its Impacts on Project Management

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1. Chapter 1: Introduction

Overview

Systems that allow face recognition. AI proponents believe that intelligent computers are the only way to ensure the long-term survival of the human race, while opponents of the technology, sometimes known as skeptics, are concerned ab Technology is being used across various sectors to enhance efficiency and effectiveness while making it possible for management to be trustworthy, secure, and acquiescent. Integrating human skills and technology systems has resulted in improved performance and driven culture, with everyone participating, ensuring continual progress (Munir, 2019). Project management is another field that has found applications for integrating technological and human skills (Edkins, 2017). Project management is distinguished by three pillars, which are as follows: • The presence of project managers who are competent and powerful. • Providing project managers with an atmosphere that is favorable to the completion of their work. • Ensuring that everyone across the company is held accountable. AI is increasing the capacities of humans. This dissertation investigated the advantages of incorporating artificial intelligence into project management while studying the function that artificial intelligence plays in project management, including how it may be used in project management. In addition, it investigated how AI might improve performance in project management. Project managers have access to various AI-based solutions, such as Chatbots, Stratejos, ZiveBox, Rescoper, Click Up, Clarizen, and PolyOne, to aid them in managing a variety of activities (Lahmann et al., 2018). For example, they assisted the manager in putting together the team working on the project and delegating tasks and duties to each team member (Butt, 2018). AI technologies are important in ensuring project managers efficiently manage and stick to AI AND ITS IMPACTS ON PROJECT MANAGEMENT 12 deadlines, which is another benefit of using these tools. The use of Artificial intelligence provides project managers with a variety of advantages. To begin, AI is helpful to project managers because machines lighten the load and relieve some of

the strain associated with project management. AI is also beneficial in supplying project managers with correct results since the jobs conducted using AI do not include mistakes or errors due to the absence of human intervention (McCarthy, 2007). Additionally, the use of AI assists project managers with gaining insights and developing strategies. For instance, software that uses AI suggests alternate or extra procedures for project managers working on challenging projects. In addition to assisting project managers in carrying out the activities mentioned above, it improved both effectiveness and efficiency, increasing their productivity. This is accomplished by fostering the managers' creative potential while boosting their emotional intelligence (Abduh & Soemardi, 2002). The fourth industrial revolution, more often known as Industry 4.0, is causing substantial shifts within the human race. Advances in technology are bringing about these shifts. The introduction of coal-powered steam engines marked the first industrial revolution, while the widespread adoption of electrification and automation characterized the second. Subsequently, the third industrial revolution emerged with digitization, closely tied to the rise of the internet (Brettel et al., 2014). According to Rüßmann et al. (2015), the critical aspects upon which Industry 4.0 is being nurtured and developed include technical developments in digitalization, artificial intelligence, augmented reality, big data analytics, and the internet of things, to name a few others. In this new age, there have already been successful tests of self-driving automobiles and robots that mimic human behavior in the real world. As a result of the ongoing digital volution, human-machine contact inside businesses is becoming an unavoidable reality for the future. Consequently, there has been a rapid shift in the requirements placed on the future workforce in light of the real prospect that people and robots may collaborate on specific projects. For businesses to maintain their competitiveness in a market often shaken up by the introduction of novel products and services, they need to re-evaluate their business methods. According to Albach et al. (2015), managers must adjust their firms under perpetual change, and they state that late arrivals struggle to keep up with the quick speed of changes in the industry. Therefore, the solution is to keep ahead of the curve by studying the possibilities of integrating new solutions, such as those brought on by

artificial intelligence, into day-to-day company operations. This artificial intelligence is the key to success.

1.1. Research Background

Within computer science, the subfield known as artificial intelligence is a field in which researchers aim to generate higher levels of intelligence inside computer systems (Nilsson, 2010). AI was defined by Russel and Norvig (1995) as the art of developing computers that execute activities that need intelligence when performed by humans. One possible interpretation of this definition is that it has unparalleled potential for the future of human-machine collaboration; there has been a huge increase in the amount of money invested in research and development within this sector in the last several years. In the first half of 2016, the market was responsible for funding 200 AI-related businesses for USD 1.5 billion (Pan, 2016). Artificial intelligence's practical applications are quite diverse and may range anywhere from clever personal assistants to intelligent out the unanticipated and uncontrolled adverse effects of AI (Gurkaynak et al., 2016). According to Gurkaynak et al. (2016), the three known categories (rule-based, learning-based, cognitive) are used in the scientific classification of artificial intelligence systems. Rule-based systems use a set of predetermined rules to make decisions. Learning-based systems use machine learning algorithms to learn from data and improve their performance over time. Cognitive systems aim to replicate human-like intelligence and perception, including the ability to reason, understand language, and recognize objects.

1.2. Research Problem

The primary reason for doing this research was due to the fast-paced nature of the technology sector and the significant progress that has been made in project management. Because project managers' work is so vital, this work must be carried out as effectively and efficiently as possible (Vesma, 2009). As a result of technological advances, several technical improvements explicitly aimed at assisting project managers in this area have been produced (Anastasi et al., 2011). As a result, this research aimed to investigate how AI benefits managers.

1.2.1. Theoretical Gaps

Within computer science, the subfield known as artificial intelligence is a field in which researchers aim to generate higher levels of intelligence inside computer systems (Nilsson, 2010). AI was defined by Russel and Norvig (1995) as the art of developing computers that execute activities that need intelligence when performed by humans. One possible interpretation of this definition is that it has unparalleled potential for the future of human-machine collaboration.

1.2.2. Practical Gaps

In the first half of 2016, the market was responsible for funding 200 AI-related businesses for USD 1.5 billion (Pan, 2016). Artificial intelligence's practical applications are quite diverse and may range anywhere from clever personal assistants to intelligent systems that allow face recognition. AI proponents believe that intelligent computers are the only way to ensure the long-term survival of the human race, while opponents of the technology, sometimes known as

skeptics, are concerned about the unanticipated and uncontrolled adverse effects of AI (Gurkaynak et al., 2016). According to Gurkaynak et al. (2016), the three known categories (rule-based, learning-based, cognitive) are used in the scientific classification of artificial intelligence systems. Rule-based systems use a set of predetermined rules to make decisions. Learning-based systems use machine learning algorithms to learn from data and improve their performance over time. Cognitive systems aim to replicate human-like intelligence and perception, including the ability to reason, understand language, and recognize objects.

How is AI impacting project management?

1.3. Research Significance

Various applications of artificial intelligence have been created to make the job of project managers easier.

1.3.1. At the theoretical level

It is anticipated that the use of a variety of AI technologies by project managers would render project management simpler than it has ever been before. According to McCarthy (2007), the idea that the limitations and assumptions presented to the project team at the beginning of the project do not alter during the project's lifetime has traditionally been accepted as a given. Since then, this is not the case, and now tracking of all constraints and assumptions must occur for the whole of a project's lifespan; this is where AI finds greater utility (Abduh & Soemardi, 2002). For example, executives seldom know when exactly they will be able to step in and help throughout the process of putting a project into action.

1.3.2. At the practical level

It is anticipated that the use of a variety of AI technologies by project managers would render project management simpler than it has ever been before. According to McCarthy (2007), the idea that the limitations and assumptions presented to the project team at the beginning of the project do not alter during the project's lifetime has traditionally been accepted as a given. Since then, this is not the case, and now tracking of all constraints and assumptions must occur for the whole of a project's lifespan; this is where AI finds greater utility (Abduh & Soemardi, 2002). For example, executives seldom know when exactly they will be able to step in and help throughout the process of putting a project into action.

1.4. Research Questions

The primary research questions of the study were built around the benefits and challenges of IT project management in implementing AI solutions. The research aimed to study the impacts of AI on Project Management itself.

RQ1: What are the most significant challenges that the project team members face while working on the project?

RQ2: When managing a project, do project team members use any AI-based tools? What are the current processes you follow to manage a project?

RQ3: Do project team members believe that AI agents will be effective for their daily activities? If so, what are the areas in the project team that believe AI might give more effective assistance for project management?

1.5. Research Objectives

The primary reason for doing this research was due to the fast-paced nature of the technology sector and the significant progress that has been made in project management. Because project managers' work is so vital, this work must be carried out as effectively and efficiently as possible (Vesma, 2009). As a result of technological advances, several technical improvements explicitly aimed at assisting project managers in this area have been produced (Anastasi et al., 2011). As a result, this research aimed to investigate how AI benefits managers.

1.6. Research Hypotheses

Real-world applications of artificial intelligence are already being used in businesses, where they are automating corporate operations to provide superior customer service. When it comes to commercial applications, on the other hand, the study identified an increasing number of urban legends. The assumptions made for the study are as follows. I. A single AI solution would not work for all use cases, and questions should be asked about what consumers are trying to accomplish. II. The terms Artificial intelligence and machine learning cannot be interchanged. Artificial intelligence (AI) combines robotic process automation (RPA) and machine learning. III. The importance of data cannot be overstated in comparison to that of algorithms. The design of an algorithm is dictated by the data structure they are designed to operate with, which means that, in practice, data is more essential than the algorithm itself.

1.7. Research Model

The current research study utilized the qualitative approach to learn the impacts of Artificial Intelligence (AI) on Project Management methodologies. Qualitative

researchers operate under the assumption that people's actions hold deeper meanings beyond what may be apparent on the surface. According to Willig and Rogers (2017), probing into these meanings can offer a greater understanding of pertinent social and psychological processes. This methodology investigates how individuals comprehend and give meaning to their experiences and how their interpretations intersect with broader social and cultural narratives. This study aimed to understand the impact of AI on project management utilization in organizations. Chapter Three of the study presents a synopsis of this project's research methodology and design. It delves into the research paradigm, methodology, design, sample, materials, instruments, and data collection and analysis procedures. Additionally, this chapter briefly touches on the significance of data trustworthiness and ethical considerations.

1.8. Research Methodology

Qualitative methodology is an effective research approach for investigating complex phenomena that cannot be easily quantified, such as the social and cultural implications of AI and the challenges of project management. This methodology explores subjective experiences and meanings, providing a more nuanced understanding of these phenomena (Willig & Rogers, 2017). In the context of AI research, qualitative methodology can be used to examine people's attitudes and beliefs about AI and the ethical and societal implications of AI adoption (Bryman, 2016). Qualitative research can also help identify potential biases and limitations of AI algorithms and systems (Kitchin et al., 2015). Similarly, qualitative methodology can be applied to project management research to explore the social and cultural dimensions of project success and failure. For example, researchers can use qualitative methods to investigate the impact of cultural differences on project teams' communication and collaboration (Geraldi et al., 2011). Additionally, qualitative research can help identify factors contributing to project failure, such as poor stakeholder engagement and communication (Kerzner, 2013). When conducting

qualitative research, it is essential to consider data trustworthiness and ethical considerations (Willig & Rogers, 2017). To ensure data trustworthiness, researchers must demonstrate that their findings are credible, transferable, dependable, and confirmable (Lincoln & Guba, 1985). Ethical considerations must also be addressed, such as obtaining informed consent from research participants, ensuring confidentiality and anonymity, and avoiding harm to participants (Willig & Rogers, 2017). An exploratory design was utilized to provide a theoretical perspective for this study, as limited research was conducted on combining artificial intelligence, information technology, and project management. This gap in the literature is filled by using the qualitative research paradigm. According to Creswell and Creswell (2018), the exploratory design model is advantageous when there is little prior research or theory. It involves collecting data through various methods and analyzing it through techniques such as coding and clustering. The study emphasized the importance of reflexivity throughout the research process, as the study biases and assumptions can shape the interpretation of the data. This study has been carried out by analyzing empirical data from project managers working for various firms via questionnaires and interviews. The scope covers factors such as the identification of issues that project managers confront in the course of their daily operations, the assessment of the awareness and utilization, if any, of artificial intelligence systems, and the subsequent creation of use cases for the prospective inclusion of AI systems into the project management lifecycle. This study does not include the scientific or technological development of AI systems; instead, it focuses only on the theoretical evaluation and empirical analysis of the possible managerial and operational effects of AI systems on project management. This research has also been restricted to the subjective data from project managers regarding the organizational environment in which they were functioning at the time this study was conducted. The data collected were deidentified, and all names of individuals, organizations, or other participants in discussions were removed. In conclusion, qualitative methodology is valuable for investigating AI's social and cultural implications and project management challenges. By exploring subjective experiences and meanings, qualitative research can

provide a more comprehensive understanding of these phenomena. However, researchers must be mindful of data trustworthiness and ethical considerations to ensure the quality and integrity of their research findings.

1.9. Scope of The Study

Project management Artificial intelligence (AI) refers to incorporating a system that can manage a task independently of any support from a human being. Making use of the potential of AI does not imply automating activities; instead, it requires concluding a variety of insights, which results in the formulation of process suggestions, the conclusion of project-related matters, and the disclosure of team insights (Schreck et al., 2018). For instance, because of advances in technology, in the not-too-distant future, there will most likely be a certain kind of technology that can match the appropriate level of expertise and responsibility with the appropriate level of resources. The departments of human resources have been investing more money in technology in recent years, intending to make their recruiting procedures more efficient. The Technology Acceptance Model (TAM) was first proposed by Fred Davis in 1986 in his seminal paper - A Technology Acceptance Model for Empirically Testing New End-User Information Systems: Theory and Results (Davis, 1986). The main purpose of the TAM is to provide a theoretical framework for understanding and predicting user acceptance and adoption of new technologies. It specifically focuses on end-users' attitudes toward using technology and how these attitudes influence their behavioral intention to use it. Since then, the model has been widely used in information systems and technology research to understand how users adopt and use new technologies. The TAM is based on the idea that user acceptance of technology depends on two main factors: perceived usefulness and perceived ease of use (Davis, 1986). Perceived usefulness refers to the degree to which a user believes a particular technology will help them perform their tasks more effectively. On the other hand, perceived ease of use refers to the extent to which a user believes the

technology will be easy to learn and use. With the increasing use of Artificial Intelligence (AI) in project management, it is important to consider how the TAM can be applied to study the impacts of AI on project management. One of the key factors in the TAM is perceived usefulness, which refers to the extent to which a user believes that technology will help them perform their tasks more effectively. In the context of AI in project management, perceived usefulness could refer to how AI can assist with tasks such as project scheduling, risk assessment, and resource allocation. For example, an AI system that can analyze project data and generate optimized schedules could be seen as highly useful by project managers (Zhang et al., 2021). Another important factor in the TAM is perceived ease of use, which refers to the degree to which a user believes that technology will be easy to learn and use. In the context of AI in project management, perceived ease of use could refer to how easy it is for project managers to interact with AI systems and integrate them into their workflows. For example, an AI system that has a user-friendly interface and can easily integrate with existing project management software could be seen as highly easy to use by project managers (Venkatesh et al., 2003). In addition to perceived usefulness and ease of use, the TAM also considers other factors that may influence user acceptance, such as social influence and cognitive instrumental processes. Social influence refers to the impact that the opinions and behaviors of others may have on a user's decision to adopt a technology. In contrast, cognitive instrumental processes refer to the mental processes a user goes through when evaluating the benefits and costs of using technology (Venkatesh et al., 2003). In the context of AI in project management, social influence could refer to how other project managers' or industry experts' opinions and experiences can influence a manager's decision to adopt AI tools. Cognitive instrumental processes could refer to project managers' mental processes when weighing the benefits and risks of using AI tools in project management (Zhang et al., 2021). Overall, the TAM provides a useful framework for studying the impacts of AI on project management. By considering factors such as perceived usefulness, perceived ease of use, social influence, and cognitive instrumental processes, researchers can better understand how AI tools are adopted and used by project managers and the potential benefits and

risks of using AI in project management. According to Helsgaun (2008), businesses that use AI in their recruiting procedures are anticipated to enjoy a 20 percent boost in employee performance. This prediction is based on the findings of a study that was conducted in 2008. On the other hand, Auth et al. (2019) believed that using AI in recruiting leads to a 4% increase in revenues while simultaneously resulting in a 35% reduction in employee turnover rate. This is essential to significantly reduce the amount of time employees waste sitting around doing nothing. Using AI, project managers can examine the output of their teams' members and frequently allocate work depending on the capabilities of each team member. This eliminates the need for the project managers to put in additional effort. AI is also beneficial in developing a knowledge management ecosystem, which is vital in saving information that can be used even after an employee has left the firm. This is another situation in which keeping this knowledge is essential. According to (Passenheim, 2002), AI is also helpful in aggregating behavioral patterns in the workplace while centralizing employees' knowledge.

1.10. The Suggested Project Structure

Real-world applications of artificial intelligence are already being used in businesses, where they are automating corporate operations to provide superior customer service. When it comes to commercial applications, on the other hand, the study identified an increasing number of urban legends. The assumptions made for the study are as follows. I. A single AI solution would not work for all use cases, and questions should be asked about what consumers are trying to accomplish. II. The terms Artificial intelligence and machine learning cannot be interchanged. Artificial intelligence (AI) combines robotic process automation (RPA) and machine learning. III. The importance of data cannot be overstated in comparison to that of algorithms. The design of an algorithm is dictated by the data structure they are designed to operate with, which means that, in practice, data is

more essential than the algorithm itself. Artificial intelligence lacks an essential characteristic of human employees and brings unique qualities, such as empathy and judgment, which machines do not possess. V. Anticipate a change in both culture and capabilities. The widespread use of AI in workplaces will increase the number of jobs handled by apps that are part of a system of record. VI. AI is a disruptive technology that can potentially transform project management practices and processes. VII. The adoption of AI in project management is likely to increase in the future. VIII. AI can improve project outcomes by enhancing efficiency, accuracy, and decision making. IX. The benefits of AI in project management outweigh the potential risks and challenges. X. Project managers and other stakeholders are open to adopting and integrating AI into project management practices.

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