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AI-Based Decision Support Systems in Project Management: Enhancing Efficiency and Accuracy

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Abstract

Decision-making is vital for projects in project management to be completed successfully. Project managers have been using traditional decision support systems (DSS) for a long time; however, with artificial intelligence (AI), these systems are now much more powerful. This paper examines how using AI-based systems supports project managers to increase both efficiency and accuracy. Automating repetitive jobs, giving immediate data feedback, making resource decisions wisely and improving time control make AI-based DSS useful for project management. Such systems are more accurate in judging risks, modelling outcomes and monitoring activities which decreases human errors and results in more dependable project outcomes. Even though AI DSS clearly helps a lot, some problems such as reliable data, unifying different systems, ethics and its acceptance by users must still be overcome. It reviews scholarly literature, examines usable applications and discusses possibilities and ideas for the future, covering how AI-based DSS could change project management.

Keywords: Artificial Intelligence; Decision Support Systems; Project Management; Predictive Analytics; Automation and Risk Assessment

INTRODUCTION

Project management helps organisations guide the planning, progress and control of work to accomplish defined aims such as getting the project done within the right scope, timeframe, budget and standard, in uncertain situations. Being able to decide wisely greatly influences a project's success, while failing to provide decision-makers with the right support leads to more failure [1]. According to [2], a typical modern project is full of data, involves making sacrifices between important objectives and usually results in sizable work. Project managers have to share the proper resources, set and alter the time schedule and address problems in a flexible way, regularly handling different kinds of decisions. Some organisations find it challenging to supply teams with quick access to useful data and analysis which shows that there is a growing need for systems that back human judgement [3].

Decision support systems have always been used to gather data and help managers make useful decisions. A DSS means a computerised system designed to help people make better choices by gathering and organizing information. Typically, project DSS have been anything from easy spreadsheets to specific tools made just for that purpose. Often, early versions of transportation systems relied on spending software to see predictions from different scenarios and make necessary adjustments right away [4]. With computing growing more sophisticated, DSS platforms started including several data types and analysis techniques, typically using optimisation and statistics to project results. Some of these earlier systems even included systems that highlighted where and when risks might appear during scheduling [5]. With traditional DSS, project planning and control have become more efficient, allowing managers to compare multiple options in a proper way. AI is entering project management fast, as many companies appreciate its potential to bring about big changes [6]. Surveys suggest over half of project managers are already bringing AI into their processes and many projects expect AI will become essential for project execution in the near future [7].

People who try AI first find it helps them work faster and more accurately, cope with risks and become more adaptable. AI is commonly applied in managing projects to manage calendars, prepare project documents, forecast risks and match the best resources to each project [8]. Because AI can help speed up these tasks and give decision-makers data-supported insights, it lowers the chance of errors and supports better

choices. Even though there are great benefits, obstacles are still present. The majority of project managers are not well-versed in AI and things such as the quality of data, how AI is integrated into existing systems, trust in the technology and ethical concerns are keeping many from fully using AI. Also, as people become more knowledgeable about AI and technology improves, AI-driven support in deciding will be a major part of future project management techniques [9].

Considering these changes, the paper investigates how AI-enabled decision support helps improve project management results and precision. The review assesses written works, reviews tools and examples used in industry, studies current reports and explores facts about the strengths and limitations of AI-based DSS. The paper discusses the major complications and potential risks related to using AI for decision support, also examining what's likely in this field going forward. This detailed study intends to explain how AI-supported decision making can help in project management and support researchers and practitioners wanting to use AI for improved project performance.

RESEARCH METHODS

The timely completion of projects, sound use of resources and keeping costs down are tied to how efficient a project is [10]. AI-based systems for support (AI-DSS) are now being used to greatly boost efficiency in every stage of a project. AI-DSS help project managers to do their tasks faster, look at data instantly, use their resources more wisely and better manage their time [11].

1. Making Use of Automated Systems

Many of the tasks needed in project management such as updating the schedule, controlling the budget, creating reports and documenting activities, typically eat up lots of time and effort by managers [12]. AI can manage these administrative activities largely by itself and only needs minimal involvement from people. By using intelligent tools, businesses can automatically change project schedules according to live project status, spot team dependencies and adjust resource use. Thanks to NLP, it is now easier for software to generate meeting minutes, status reports and risk logs using the project data automatically [13]. When project managers give AI tools repetitive work, they can pay closer attention to other vital activities which makes the project more efficient.

2. Making Decisions in Real Time with Help from Data

For a project manager to decide well, they must have ready access to accurate and important information. Because of this, managers who have expertise may still find it challenging to address new changes in a project. Shamim states that the effectiveness of project decisions depends on having the right information at the moment it is needed [14]. For years, people have faced challenges in making decisions due to using obsolete, incomplete or disconnected data sources which delays key tasks and increases the risk of a project failing [15]. Artificial Intelligence (AI) deals with this issue by changing how DSS systems are used. Thanks to AI's capability of real-time monitoring, analysing data and updating it, project teams get the most current and accurate information. From the moment new project data is collected, AI algorithms put it to use in dashboards where you can immediately access insights. Since machine learning can discover patterns, problems and risks early, teams can benefit from proactive actions.

AI-assisted dashboards enable project managers to anticipate potential resource, time schedule or financial problems on their projects with great reliability. Thanks to their predictive abilities such tools help organizations quickly respond when potential issues are detected [15]. AI makes it possible to act on data much faster than previously. As a result, response times are quicker and project teams can easily adjust to new challenges.

3. Organisation and Assignment of Resources

Making the best use of resources such as individuals, machines and funds, is a constant difficulty in project settings [16]. According to Almalki, artificial intelligence in DSS is able to optimise resources by including details such as skill, availability, what is most important in the project and historical data on productivity [17]. Advanced software can help managers assign resources efficiently, manage team schedules and predict future resource needs. Certain AI systems make it possible for organisations to use predictions to prepare for the resources they will need in the future. By ensuring the right resources are used when needed, AI-DSS lessens the risk of wasting resources and improve how fast projects are completed [18].

4. Effective Time Management

If the project schedule is followed, the result meets what the client wants and keeps costs under control. Usually, with traditional scheduling, it's hard to handle changes

during project execution, so schedules end up falling behind and costs increase. Thanks to AI, systems for scheduling use historical information and current updates to produce flexible project schedules. They can map how various jobs are related, review several scheduling plans and show what should be done if there are disruptions. Should there be delays in a key task, AI scheduling systems will spot the resulting chain of impacts and offer new timelines to lower the risks involved. Being able to manage this way helps project managers keep better control over the project's timeline and adapt to any changes as needed [19].

5. Using Artificial Intelligence-Supported DSS for Better Accuracy in Project Management

Adding artificial intelligence to decision support tools has greatly boosted the accuracy of managing projects, mainly in effective risk assessment, estimates, monitoring and error reduction. These improvements are supported by empirical data and industry-wide surveys that underscore the measurable impact of AI-based DSS on project outcomes [20].

RESULT AND DISCUSSION

AI is showing great promise in making risk management better in numerous fields, especially among project-based companies. AI systems now have a much higher standard of accuracy in seeing and classifying threats, compared to older techniques. For example, Soori et al. [21] pointed out that AI consistently finds risks with great accuracy in changing and uncertain project situations. Supporting this, Almalki [22] declared that using AI in agile project management increased the accuracy in finding risks to 94%, which far exceeds the results that team members would obtain from approaching the task on their own. The excellent performance results from AI handling large amounts of data, finding delicate patterns and learning from past projects. AI systems evaluate different aspects instantly, differently from manual methods that mostly depend on human decisions. According to Setälä [29], reports from a worldwide study reveal that about half of project managers are letting AI help them spot problems and suggest appropriate solutions right away. It means that people are placing greater trust in AI to aid decision-making when situations are uncertain.

AI systems also get better at predicting results as they use their previous data and learn, becoming more dependable as time goes by. Rathee et al. [26] highlighted that the reason AI in risk management is reliable is that it can link current and previous patterns. With projects becoming more complicated and urgent, AI helps by scaling and easily adapting, so that risks are spotted early and handled correctly. The changing nature of AI's involvement in project management means organizations are handling risks differently. 1. Forecasting and Outcome Prediction The combination of DSS, robotics and AI has greatly boosted both the accuracy and dependability of project forecasts. With advanced analytics, these systems allow project teams to look at lots of data and make smart predictions about possible outcomes. The DSS systems enhanced by AI can accurately predict the costs, schedule and results of projects better than old methods, as noted by Obiuto et al. [24]. Having better predictive accuracy is greatly useful in busy or fast-moving situations because mistakes can be quite costly. Agile project management has seen really significant improvements thanks to AI-driven planning tools. According to Judijanto [31], making use of AI in planning led to an on-time rate improvement of 18%.

The increase in stability is mainly because the system identifies possible predicaments, including material shortfalls, reduced resources and scheduling mismatches ahead of time. By studying information from the past and the present, AI models help forecast disturbances and enable project managers to handle them early. DSS systems help build more secure and flexible enterprise planning plans as a result of AI. This makes it possible for leaders to view several scenarios, determine potential risks and decide on the best plan using data support. According to Nweje and Taiwo [20], due to better visibility into the work and more understanding of events, organizations using these tools are more adaptable to sudden issues. As a result, planning for the future makes decisions more well-thought-out, resources are better distributed and how the project is controlled improves. All in all, linking DSS, robotics and AI is helping project forecasting and planning to be more flexible, accurate and suitable for today's difficult project challenges.

1. Enhancements Related to Project Monitoring

The introduction of AI tools into project management has greatly improved how projects are monitored. With the help of AI, project leaders get instant insights to closely monitor important performance numbers. Almalki [28] clarifies that applying AI to monitoring a project increases the ability to spot differences between the schedule, budget and planned deliverables.

Thanks to this greater precision, project managers are better able to oversee the project and respond swiftly to any problems. Using current data and dashboards, managers can watch over all vital project details at any time, like task completion, team workload, how much money has been spent and how resources are being used, as mentioned by Tanim and Ahmad [29].

They allow for prompt and practical management by showing live information in a clearly arranged way. If these data points are checked in real time, AI systems can recognize certain irregularities that might mean there are potential delays, budget overruns or resource problems. When the system spots any unusual activities, alerts are triggered immediately so managers can take action and prevent the issue from worsening, as explained by Adeniran et al. [30].

It is beneficial that AI in project monitoring allows data from different project management applications to be brought together. Integrating response templates unites important data, allowing everyone to see the health of the project. According to Zangana et al. [31], adopting all these elements together ensures project status reports are more accurate, complete and on time.

Because of its centralized and instant view, AI plays a big role in better decision-making and lessens the risk of errors. AI-powered systems offer project teams the tools necessary to maintain transparency, better coordinate their efforts and accomplish project goals in an efficient manner.

2. Reduction in Human Error

Reducing human error is one of the major strengths of AI DSS technologies in project management. Involving people in large or repetitive work can sometimes lead to mistakes that weaken the quality of decisions. These technologies replace humans in tasks like data entry, scheduling and producing reports, resulting in reliable and predictable data **[21]**. According to Kumar **[18]**, adopting automation in various

activities helps to maintain the accuracy of data and also makes operations more efficient because AI can do these jobs quicker and with fewer errors. Projects with many risks and complicated processes depend on reliable data for informed decisions.

There is a general agreement that when tasks are automated by using AI, the possibility of errors in data decreases and the quality of data improves. In addition, AI can spot inconsistencies with data as soon as they come up. With these alerts, the project team can resolve issues quickly so small mistakes do not become big problems in the project **[18]**. The benefits of these skills go beyond making jobs easier. By letting AI handle regular and risky tasks, project managers can focus on higher-value and more important roles in their jobs, according to Almalki **[22]** and Kumar **[18]**. As a result, expert systems can make faster and more accurate decisions and prevent overwhelmed and anxious thinking during intense periods.

Basically, using AI with DSS allows data to be more accurate and gives managers the chance to act thoughtfully and lead the way forward. As a consequence, companies experience projects that are more durable and do not have many errors.

3. Problems Faced

Though AI-driven support helps projects become more accurate and efficient, using these systems is not always easy. Any problems related to technology, management, ethics or regulations must be handled for an organization to succeed and continue long into the future.

a. Data Issues and Their Availability

A significant challenge in using AI-supported DSSs is their dependence on quality data. How useful an AI model is depends on access to clean, properly set up, and relevant data. Absent this information, the results of these systems are not always correct and cannot produce useful suggestions [7]. It is often the case that data in real project environments does not meet these requirements. Hazeem and AlBurshaid explain that data from projects is often stored in many different places, is missing part of the details, or is saved in unconnected formats [12]. It is difficult for AI tools to run smoothly on information that is not standardized. If data is poor, it can result in many different problems. With poorly organized or inconsistent data, the responses from AI — including predictions, suggestions, and risk analyses — may be wrong or misleading. As a result,

people become less sure about the system's accuracy and about the conclusions drawn from it. If timely and accurate insights are vital in a project, such irregularities may hold back progress, result in costly mistakes, or weaken trust in the management team.

Access to near real-time data is missing and this is vital for monitoring projects as they evolve and for making decisions right away. When events are mainly collected and reported manually, the time between their occurrence and when they are recorded is frequently much longer [19]. Because of this, AI fails to offer much value when projects are managed both proactively and reactively. In order to solve these issues, firms should give priority to making project data uniform, digital, and immediately available. AI can only make a real difference in managing projects with reliable data once DSS are designed correctly.

b. Connecting with Existing Platforms

Using AI for decision making in current project management systems can be tough, mainly for larger companies stuck with old systems. Because of this, many of these systems lack the abilities for strong computation, working with large data, or interacting with others needed by modern AI tools [3]. Therefore, using AI-driven DSS with older project management software tends to cause inefficiencies, too many expenses, and a slow process. As well as being technical, these challenges are met with opposition from firms and from the people working within them. Long established IT systems may be avoided for upgrade due to worries about them working with other systems, transferring information and security-related issues. At the same time, project managers and staff can be resistant to using technologies that disturb their usual tasks or that are hard to pick up. Poor change management can greatly harm the way AI initiatives work [7].

Achieving successful AI-driven DSS usually calls for a large scale digital transformation within the organization. It means adapting or replacing old systems, educating workers to use AI-powered tools, and modifying how decisions are made within the company to make them based on real-time data. Modern equipment and infrastructure upgrades may be required because AI systems need to run at quick and large scales [2]. While investing in these steps brings many benefits for the future, they can be costly, take plenty of time, and create methodical issues. Overall, project management organizations need to get ready for the technology and ensure their teams are ready for change when adopting AI-based DSS. To have a smooth and effective

transition, organizations should use a planned method that involves talking to stakeholders, training staff, and updating the system.

c. Ethics and Privacy

Due to the large amounts of project and employee data AI-based DSS process, handling privacy and ethical issues becomes very important [27], [21]. People are requesting information about who holds data, if people agree to it being used, and how algorithms make decisions. People are starting to worry that biased data can cause AI to recommend wrongly, such as when judging the performance of a team or who is responsible for a risk. Predictive analytics can accidentally place confidentiality at risk, mostly occurring when working with third-party suppliers or sharing data with clients. As a result, organizations should create strong data governance policies and adhere to regulations such as those set by GDPR or their industry.

Although AI has much to offer, many professionals on project teams might resist using them because they are not acquainted with AI [14]. People may not want to make the move because they worry their job might be replaced, do not trust AI, or are unsure about machines making decisions. Oftentimes, making AI a success means changing the company's culture, encouraging digital skills, involving stakeholders, and making clear how AI helps and where its boundaries are in decision-making. Furthermore, without strong leadership and strategic alignment, AI initiatives can fail to gain traction or deliver meaningful impact.

CONCLUSION

Using AI, decision support systems are improving efficiency and making projects more accurate for project managers. Handling routine activities, allocating resources wisely and assessing risks more efficiently while cutting down on errors, these systems let you manage project outcomes more evenly and successfully. Still, gaining these benefits fully depends on addressing data quality issues, integrating systems, thinking ethically and getting employees on board. Going forward, we expect more use of generative AI, flexible learning methods and closer integration with project management software. When AI technology improves, AI-driven DSS will probably be essential for project managers, providing them with real-time support and advice suited to each project. Organisations need to buy AI tools and also work on the skills, policies and

mindset needed to keep up with new technologies. They will be ready to lead project management as it moves toward a focus on data and smart choices.

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