Project Management Leadership – Does AI Change My Role? [1, 2]

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After reading this paper, readers should be able to:

- Discuss how project management can be enhanced by using AI tools while reducing the risk of decision delegation. (PS)
- Identify the Leadership roles important to project management that cannot be delegated. (PS)
- Explain how to use AI tools to reduce administrative burden and enhance your chances of project success. (WOW)

Abstract

What is project management leadership? If we consider the most important traits, can some of them be replaced by artificial intelligence? We'll explore some of the tools you can use today to streamline your administrative burden.

Will these tools replace a human in the loop managing the actual project, or just enhance their ability to lead? To answer that question, we first have to ask what we think leadership is, can it be reduced to a checklist, and what tools are available today to make those decisions?

The term "AI" covers many tasks including machine learning and deep learning. Every software vendor seems to claim it now has AI, and is the best solution. The output is still determined by processing data and looking for patterns and decisions were made during software development on priorities and guardrails.

[1] *Editor's note: Second Editions are previously published papers that have continued relevance in today's project management world, or which were originally published in conference proceedings or in a language other than English. Original publication acknowledged; authors retain copyright. This paper was originally presented at the 16th UT Dallas PM Symposium in May 2024. It is republished here with the permission of the author and conference organizers.*

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If we consider repetitive tasks, or ones that need to process vast amounts of data, the tools seem tailor made for projects. By definition, a project is a one-time event. It may be close in execution to other projects, but each is stand alone. It doesn't mean you can't learn, but it does mean there is a new path to blaze. Will we let computers make decisions? Will we require each decision to have human oversight? What if the computer (that has been programmed) makes what we consider to be a faulty decision?
Who is to blame?

As project management practices evolve, organizations are increasingly turning to innovative technologies to address the complexities of project execution. Artificial Intelligence (AI) offers a transformative approach to project management, providing intelligent automation, predictive analytics, and data-driven insights. This paper explores the role of AI in revolutionizing traditional project management methodologies.

Origin

AI has gained publicity since the release of ChatGPT and easy public availability. Numerous other tools have been developed since that time. The variety of tools is growing exponentially, but what is the actual origin date for AI? And for our purposes, how is AI defined?

Artificial Intelligence came into existence in 1950 when Alan Turing published "Computer Machinery and Intelligence". This led to the Turing Test and a way to measure computer intelligence. In 1952 a computer scientist developed a program to play checkers. The significance is this was the first program to learn to play the game independently. The term "AI" came from a 1956 conference that used this definition: "the construction of computer programs that engage in tasks that are currently more satisfactorily performed by human beings because they require high-level mental processes such as: perceptual learning, memory organization and critical reasoning".

The boom further developed in 2010 with two advances. First was data accessibility at larger scales, and the second was learning algorithms made possible by high efficiency computer graphics processors. What is the goal of AI? One definition that seems to fit well is imitating the cognitive abilities of a human being.

Some notable dates:

- **2012**: Two researchers from Google (Jeff Dean and Andrew Ng) trained a neural network to recognize cats by showing it unlabeled images and no background information.

- **2015**: Elon Musk, Stephen Hawking, and Steve Wozniak (and over 3,000 others) signed an open letter to the worlds' government systems banning the development of (and later, use of) autonomous weapons for purposes of war.
- **2016**: Hanson Robotics created a humanoid robot named Sophia, who became known as the first "robot citizen" and was the first robot created with a realistic human appearance and the ability to see and replicate emotions, as well as to communicate.
- **2017**: Facebook programmed two AI chatbots to converse and learn how to negotiate, but as they went back and forth they ended up forgoing English and developing their own language, completely autonomously.
- **2018**: A Chinese tech group called Alibaba's language-processing AI beat human intellect on a Stanford reading and comprehension test.
- **2019**: Google's AlphaStar reached Grandmaster on the video game StarCraft 2, outperforming all but .2% of human players.
- **2020**: OpenAI started beta testing GPT-3, a model that uses Deep Learning to create code, poetry, and other such language and writing tasks. While not the first of its kind, it is the first that creates content almost indistinguishable from those created by humans.
- **2021**: OpenAI developed DALL-E, which can process and understand images enough to produce accurate captions, moving AI one step closer to understanding the visual world.

AI-Enhanced Project Planning has many potential benefits and is improving rapidly.

AI technologies, such as machine learning algorithms and predictive analytics, offer valuable insights for project planning. By analyzing large datasets, AI can identify patterns, dependencies, and potential risks, leading to more accurate project plans. This enables organizations to optimize project schedules, allocate resources effectively, and anticipate challenges before they arise.

Effective resource management is critical for project success. AI-powered tools can analyze historical data and project requirements to recommend optimal resource allocations, minimizing conflicts and maximizing workforce utilization. This ensures that projects are adequately staffed with the right talent, leading to improved outcomes.

AI enables proactive identification and mitigation of project risks. By analyzing historical data and external factors, AI algorithms can predict the likelihood and impact of risks, allowing project managers to develop effective risk mitigation strategies. Real-time monitoring further enables timely intervention, minimizing disruptions to project timelines and budgets.

Effective communication and collaboration are essential for project success. AI-powered tools, such as natural language processing (NLP) and chatbots, streamline communication by providing real-time updates and automating routine tasks. These tools also analyze team dynamics to identify areas for improvement, enhancing collaboration and productivity.

What are some of the tools used for these purposes?

One popular AI tool for project resource management is Forecast. Forecast is an AI-powered project management and resource scheduling platform that helps teams efficiently manage their resources, projects, and budgets. It uses machine learning algorithms to analyze historical project data, team member skills, and workload patterns to predict project timelines, identify potential bottlenecks, and optimize resource allocation. Additionally, Forecast integrates with various project management and collaboration tools like Jira, Slack, and Trello, making it easier for teams to streamline their workflow and stay organized.

An AI tool for risk management is IBM Watson Discovery. It leverages AI and natural language processing (NLP) to analyze vast amounts of unstructured data from various sources such as news articles, research papers, social media, and internal documents to identify potential risks relevant to a business or project.

Watson Discovery can help organizations proactively identify emerging risks, monitor changes in risk factors, and provide insights to make informed decisions. It can also be customized to specific industry domains and risk categories, allowing for tailored risk analysis and mitigation strategies.

Other AI-driven risk management tools include RiskLens, which uses quantitative risk analysis techniques and AI algorithms to assess cybersecurity risks, and Alyne, which offers AI-powered risk intelligence and compliance management solutions for businesses.

Where does AI excel?

The assessment of large bodies of data and making sense of the datasets, sometimes in ways that are not rapidly apparent to anyone but a seasoned data analyst. This can help in project management by ensuring there is better prioritization of projects by selecting those that have the highest chance of success and best overall benefits.

An example of better reporting using AI would be earned value management information being assessed for project trending. Automated reporting on the overall project could display status, benefits, slippage, and other variables in real time with the correct data.

AI has an ability to use plain language to look for patterns and this would be useful with project scoping by looking at surveys and user stories to assess patterns and dependencies. The volume of data collected that needs analysis would become less of a burden with a tool that excels at large data sets. The fact that the tools are accessibility to anyone and doesn't require a specialized skillset to get an initial answer is valuable. One caveat is you need to realize someone

more experienced may get a better answer if they use better prompts and have the experience to look beyond just immediately apparent patterns.

The ability to looking at different project options rapidly and have assistance to schedule tasks is another option for these tools can provide. PMOtto is ML (machine language) enabled and learns from past time entries, project planning data, and other project information. The tool will suggest a task duration based on past work that is has access to for information. Oracle has developed a digital assistant which can provide project status updates by text, voice, or chat.

IT development can benefit from software testing that is already being used in mega projects. One example is the Elizabeth line, part of a railway project in the United Kingdom. An automation library was developed to provide various types of testing that is free from operator bias and can run 24-7. Automated system testing will soon allow early defect detection and correction in software development. If we think of time savings in development and the reduction in rework, the implications for how we develop software are immense. One example is to determine what you need for a sample size to ensure the proper volume of use, and allowable errors is calculated (and recalculated if there are changes)

Another example of leveraging datasets would be decisions on whether to make or buy, outsource or hire, and materials costs. The material costs could include a variety of delivery times and data would be used to assess scenarios for the best overall value. None of these examples are particularly complex but they can be time consuming to manually calculate. Another common use case is meeting minutes and creating action items.

Where does it currently have challenges? (and realizing this technology is rapidly improving)

However, AI adoption poses challenges, particularly regarding data privacy and decision delegation. While AI enhances decision support, certain leadership roles, such as long-term goal setting and strategic decision-making, remain irreplaceable. Project managers must exercise caution in delegating decisions, ensuring alignment with project objectives and mitigating potential risks.

A Forbes article lists six critical issues to consider when using AI. Data bias needs objective curation, testing, and monitoring. Privacy is a concern, as well as accountability. Who is responsible for the decisions? One example is healthcare and medical diagnosis. Job displacement, transparency and alignment with human values are the remaining items on the list. Each has their challenges, but each needs to be considered to accept AI for what value it can provide.

One example of data privacy is in the policy on Plaud's website. "After collecting your personal information, we will process the data confidentially through technical means, and the processed information will not be able to identify the subject. Please understand and agree that in this case we have the right to use the information that has been processed; and without disclosing your personal information, we have the right to analyze and commercially exploit the user database." In other words, once the data is processed, the company can then use the information as they see fit.

Plaud is a good example where you may not own the device but can still be recorded in meetings, on phone calls, or in open areas, all without your consent or knowledge. How can you protect yourself? Make sure you are in a trusted environment before sharing sensitive information, and check for any devices around you.

Another potential challenge is the use of the tools. Many calculations take place in the cloud, which requires consistent internet access. If you lose the internet, you lose the capability. It may not be a factor at home or in the office, but what if you are traveling?

Identify the Leadership roles important to project management that cannot be delegated.

In navigating the evolving landscape of project management leadership, project managers can leverage AI to alleviate administrative burdens and focus on strategic endeavors. By automating tasks such as financial tracking, scope estimation, and testing, project managers can allocate more time to critical decision-making and stakeholder engagement, ultimately enhancing project success.

Making decisions is important and looking at those options is something that AI can excel at providing information to use for the best possible outcome. The true assessment is the leader needs to make those decisions, or at the very least assess AI decisioning, to determine a few variables. Does the decision support the major objectives of the project and support the end goals? In other words, delegation of any decision must be done carefully to ensure the direction of the project is not inadvertently altered and changes the outcome.

One item that AI should not have delegated to it is long term goals that are more abstract and require incremental refinement. Projects that need to coordinate with other projects, or have political implications that must be considered before any decisions are made. Could each of these scenarios have AI as an accomplice for the decisions? Of course, but you have to realize that you need information that is concrete to be able to develop rational conclusions. If you are using intuition, how will AI have guardrails in order to present an option?

An additional perspective to consider is the level of confidence that is needed in a particular decision. Early budget estimates often have a rough order of magnitude, and many other items have layers of accuracy. As risks are identified and assessed, the accuracy in what they will impact is refined. You would not want to have an automated process with minimal oversight where there is a threat to human life. Financial decisions over a certain amount may be another area that demands closer oversight and a human in the loop for decisions.

An example could be developing a rail path through the mountains. A seasoned engineer in this industry has probably done this before and takes into account variables that include weather conditions during construction, weather conditions during operations, rock formations, how to solve grade requirements, and many other items I'm sure that I've missed. Each of these has a scientific component and research that would be accomplished. How does an engineer approach this task? First, they draw upon their experience, and make assumptions based on past projects. Then they may consult other trades for their opinions where they don't have as deep a knowledge base. Combining this is the next step to come up with a potential solution and they would then test it for incorrect assumptions, or any items that are not feasible to have as assumptions.

Which part of this scenario would AI not excel at in decision making? As the field rapidly evolves, the answers will move – but consider how LLMs are trained. Someone has developed the guardrails for how the decisions are made – do you want a coder making this assumptions or an engineer? The nuances of different industries may not be captured which becomes a missed opportunity for effective project planning.

What is the new evolving role for a project manager if administrative work is potentially lightened? Strong soft skills and more focus on benefit delivery and strategic alignment can be the main characteristics a PM can add value and be leading the organization.

Some examples would include a communication matrix, plan and project scope. Each of these items could have AI build initial products, but more importantly have refinements accomplished as more information is gleaned. One example might be emailing openings on project status updates. If they are not opened consistently, a follow-up to see how information should be relayed would be appropriate.

What are some examples?

If a project is running over budget, there are intangible items (one example is political) that need a human's touch, and who remains both responsible and accountable.

Crashing a schedule is another item that can bring unforeseen consequences. You need someone who looks outside just the data to determine a path forward in difficult circumstances. That

doesn't mean an initial view could not be harnessed through the power of AI, but with the high value decisions a human needs to be in the loop.

Estimating scope and burndown is a common task which requires calculations which should be based on data. It seems to be a perfect use case if the information exists to determine if we will have enough time, manpower, and materials to meet our goals.

Conclusion

The integration of Artificial Intelligence (AI) into project management processes offers significant opportunities for organizations to enhance efficiency and achieve better outcomes. By leveraging AI technologies for project planning, resource allocation, risk management, and communication, organizations can streamline operations, reduce costs, and improve decision-making. However, successful adoption requires careful consideration of organizational culture, data governance, and change management strategies. As AI continues to evolve, organizations must remain agile and proactive to harness its full potential in project management.

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Frank Murphy works as a Program Manager for a Fortune 100 company. He retired as a CMSgt after 30 years in the U.S. Air Force. During his career he traveled to the seven continents, numerous countries, and was a key part of most military operations that needed airlift. Frank completed a DBA in Management with a dissertation that focused on remote working and employee engagement. Frank teaches business strategy and project management, is a Coach and owns a small consulting business, and manages a program implementing marketing technology for a Fortune 100 company. Frank lives in the Hill Country near San Antonio where he raises chickens, rabbits, and bees – and loves the area. He can be contacted at dbafrank@outlook.com.