

# THE POWER OF ARTIFICIAL INTELLIGENCE IN PROJECT MANAGEMENT: A REVIEW AND EVALUATION STUDY

Heidrich Vicci

College of Business, Florida International University

## **ABSTRACT**

*Examining the Artificial Intelligence (AI) models can provide clear guidance for project management practice, even in outer areas that they may not have conceived. AI affords virtuous circles as symptom detection may afford novel datasets, diagnostic feedback for ML model building, and advocacy for the value and function of AI analysis of the diagnostic classifications. AI variables could also have direct predictive value as they are proposed to have some mechanism with the outcome, and AI has the potential to detect novel mechanisms. Finally, AI might use it to detect how context effects change the nature of the effects of other variables and use that to select custom actions within the nomothetic guidelines. (Sarkar et al.2022) (Wang et al., 2023) (Yathiraju2022)*

## **KEYWORDS**

*Artificial Intelligence (AI), AI models, Project Management (PM)*

## **1. INTRODUCTION**

The area of Project Management provides an application space for the utilization of technologically advanced digital social innovations like Artificial intelligence. However, to date, little attention has been paid to AI-based project management tools and techniques, which are designed around new forms of collaboration, knowledge sharing, delivering innovative and ethical management methodologies and specifications that are scalable and adapted to working environments across different cultures, organizations, and geopolitical landscapes. Artificial intelligence (AI) embedded in information systems provides more accurate information that is crucial to effective decision-making, thereby improving confidence in strategic decisions (Dacre et al., 2021).

Artificial Intelligence (AI) is critical in redefining how we conceptualize and approach the Sustainable Development Goals (SDGs). With its wide range of applications, AI can potentially enable a faster and more efficient achievement of the SDGs and offer new tools for measuring and monitoring progress toward the SDGs. AI technology is making significant strides (e.g., natural language processing, pattern recognition, forecasting, optimization, virtual agents), which are likely to be central in addressing complex and often interlinked SDGs and their associated targets that need local solutions with global relevance or vice-versa. AI also plays a crucial role in providing predictive analyses, connecting data in imaginative ways, and creating low-cost solutions to complex processes (Amisha et al., 2019)

Artificial Intelligence (AI) models have uncertain pathways and are controlled by a programmer who seeks results that conform to their conjectures, but AI backers have sold these products as providing known predictors, and advertisers have felt satisfaction when they conform to such statements. It may not be that an AI model or association could have predicted the outcome of a planned intervention, but it may put us in a better position to project the prospect of the AI model's response. Examining the AI models can guide project managers in practicing, even in outer areas they may not have conceived. AI affords a virtuous circle as symptom detection may afford novel datasets, diagnostic feedback for ML model building, and advocacy for the value and function of AI analysis of the diagnostic classifications.

AI variables could also have direct predictive value as they are proposed to have some mechanism with the outcome, and AI has the potential to detect novel mechanisms. Finally, AI might use it to detect how context effects change the nature of the effects of other variables and use that to select custom actions within the nomothetic guidelines. (Sarkar et al.2022)(Wang et al., 2023)(Yathiraju2022)

Zwikael, Rahschulte, and García Céspedes published previous workbooks on AI in Project Management (PM) ranging from a broad introduction to advanced application areas. This workbook picks up from where the last state-of-the-art concludes with a focus on comprehensive applied AI for Project Management (PM), covering all elements of AI in Project Management (PM). One workbook aims to promote the responsible and trustworthy development of AI systems and develop Project Management (PM) practitioners' AI ethics and governance skills. AI and machine learning (ML) models and methods abstract patterns from data and other descriptive models while Causal models and methods forecast future changes in "state" or future change in "pattern" using causal features and/or controlling for confounders. AI models can use causal logic to integrate field data from multiple fora or use inductive learning to detect patterns that concur across multiple times and places within the same community, even while the setting could be inherently "silver threads" without true replication (Dacre et al., 2021). (Sarkar et al.2022)(Yathiraju2022)(Perry et al.2023).

Artificial intelligence (AI) is a generic term typically referring to intelligent technologies augmenting the human ability to learn, remember, and perform meaningful activities (Leslie et al., 2024). AI systems use a group of mathematical techniques to perform tasks closely associated with human intelligence. Google, Facebook, IBM, and Microsoft rolled out their own AI technologies in the previous decade.

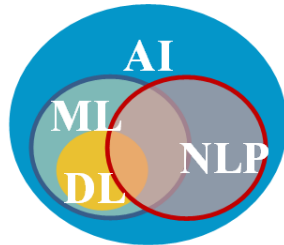
As AI benefits various domains, it requires careful ethics and governance to make it trustworthy and permissible. AI has profound implications in project management (PM). AI has been a hot research topic, yet reports on this area indicate its nascent nature, with work mentioning that AI motivation has just begun (Reza Davahli, 2020).

## **2. LITERATURE REVIEW**

Although artificial intelligence is a wide term, it is constantly confused with various other technologies like automation and deep learning. AI, in general, appears to be the answer to this problem. AI is basically the technologies that include algorithms, systems, and agents that mirror aspects of human intelligence to perform tasks that generally require humanlike cognition. Deep learning is an advanced technique for implementing machine learning in specific domain areas. Therefore, to understand the differences between AI and deep learning, it is important to understand that deep learning is a subset of machine learning, which in turn is a subset of AI. All these technologies have been dominated and applied for project management in recent years. AI

allows for various project management work, such as project design. (Wamba-Taguimdje et al.2020)(Verganti et al.2020)(El et al.2020)

### What is AI?



#### Artificial Intelligence

- Is a big umbrella that represents the field of creating intelligent machines that can structure and function.
- Powerful in complex tasks. normally require human intelligence

#### Deep Learning

- A type of ML using artificial neural networks.
- Mimics the human brain's

#### Machine Learning

- 
- A subset of AI. Machines learn from data without explicit programming. Deep Learning (DL) is a specialized form of ML.

#### Natural Language Processing

- 
- Another subset of AI. Enables machines to understand and process human language. DL is often used in NLP tasks.

Source: Encora.com

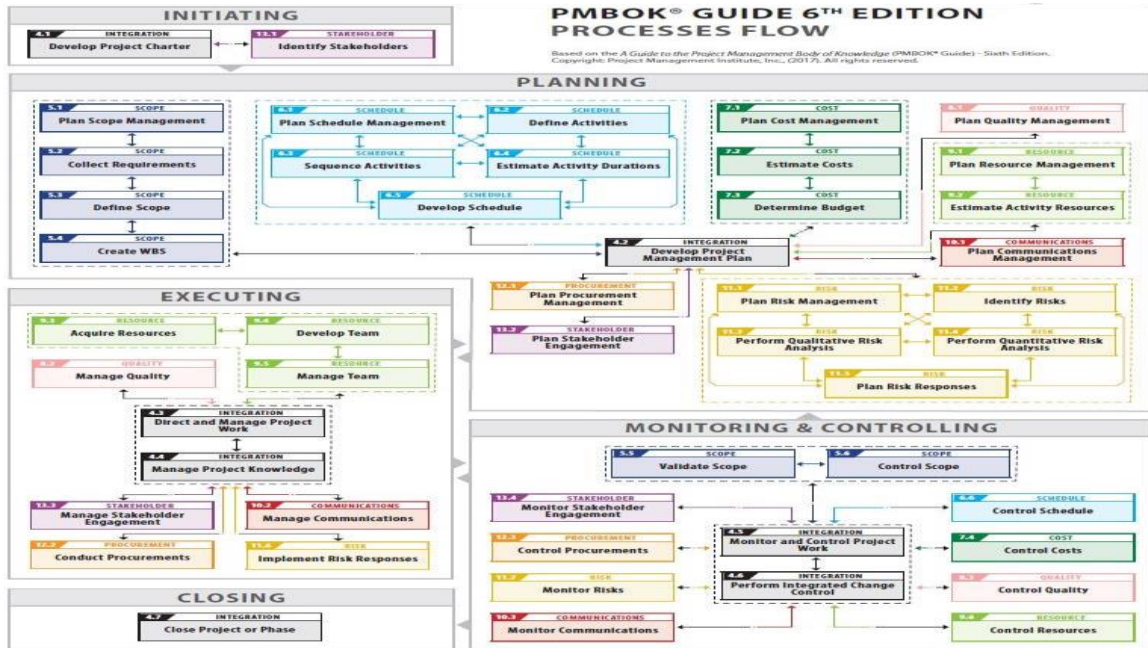
The use of AI has also expanded greatly in many fields, including project management. This review addresses the systematic and deep study of the last state of artificial intelligence in project management. The deep study provides insight into the use of AI in different processes, knowledge areas, and groups in project management. Project management experts have emphasized using AI in project management. This study finds that AI has been broadly used in project management, quality management, risk assessment, cost estimating, scheduling, and resource optimization.

AI-based models and AI techniques have frequently been combined with various other technologies for forecasting, cost measurement, scheduling, and risk assessment. Deep learning, the decision support system, and sentiment analysis are the most common AI techniques applied to the domain. Key findings, datasets, and AI techniques applied in these methods are also provided for different processes (Kamal Bin Mohd Nor et al., 2021).

A decade or so ago, Artificial Intelligence (AI) was typically associated with science fiction, as most people still thought of human-like robots, humanoid machines working and living among humans, or self-aware supercomputers taking over the world without the aid of humans. However, the rapid development of IT, internet networks, and computing power drives an unprecedented growth of AI technologies (Reza Davahli, 2020).

AI incorporates a large variety of technologies, algorithms, statistical techniques, and machine learning technologies that uncover patterns in data to enable systems to learn from data, identify trends and correlations, and make decisions automatically (Abrar Jahin et al., 2023). AI is even used to improve planning methods and proactively discover and solve subsequently anticipated problems by mimicking its problem-solving logic.

## 2.1. Current Project Management Flow



Source: Project Management Institute

This article discusses the opportunity to improve the project management flow where the information systems market plays such a considerable role. 107 solutions for support were listed in the Polish edition of the Project Management Forum 2020. Only in the future will implement production rely on the potential of solutions based on artificial intelligence. Because of the PM in the next few years, the influence of AI should be considered (Secinaro et al., 2021).

A standard project management flow has been improved since the appearance of new technologies. However, the sector, which consists of components that are a little technologically advanced and outdated, is still very extensive. Often, tools of office storage, communication systems such as e-mails, or some databases are used where mistakes, infections, and uncontrolled management are very often. Their improvement is only temporary. However, it is not the technology that wants to remove the human but to improve the work itself at such critical stages as planning, distribution of tasks, progress monitoring, or handling key resources (Nozari et al., 2022).

Project management and artificial intelligence (AI) could be defined as a professional discipline based on project communication, organization, and resource management. In practical terms, it would look like a sequence of various, multidisciplinary tasks and activities such as idea creation and development, pro-customer's interdisciplinary support at various levels or planning and management of resources until the project is over. The key drivers of such a process are technical, temporal, human, and financial resources. The current market of management systems could be divided into 5 sectors: the problemsolving sector – designed to analyze the project management, organization of tasks, and communications, monitoring sector, related to the evaluation of the pace and quality of the project being on a high level, sector of modularity, enabling the personalization of the system depending on the requirement or progress of implementation and time management sector (Usman Tariq et al., 2021).

## 2.2. Integration of AI Best Practices



Source: Leeway Hertz

Identifying the guidelines that need to be adhered to, best practices that need to be followed, barriers that may arise, and overall outcomes that are to be expected from adopting artificial intelligence (AI) is critical to the development of AI governance.

Concrete guidelines and procedures are urgently needed to fully use this technology's benefits without risking costly errors. These guidelines and procedures that are put in place are expected can serve as a foundation for any future data science projects taking place in the company, serving to prevent wasted time, effort, and resources. (Dwivedi et al.2021)(Wirtz et al., 2022)(Bettoni et al.2021).

There are various challenges of using AI in Project Management such as the organization's resistance to change, the initial cost of adopting AI due to spending on technology infrastructure, training employees, and change management. The potential areas of changes in the workplace through AI/ML are the replacement of mundane tasks with AI tasks, the Creation of new jobs in Machine, Learning / AI, the Reallocation of tasks among humanhuman workforces, and the Creation of jobs for human-AI workforce (Alevizos et al., 2023).

AI is developing tools and techniques for project managers to help them with essential aspects of project management, e.g., risk management, setting milestones and interdependencies, scheduling, workload assignments, measuring and controlling the project's outputs, and managing resources and governance, and can make teams more productive by automating routine, repetitive, and time-consuming tasks. Artificial intelligence aims to push the advancement of project management software to handle additional decision-making responsibilities as projects grow in scope and complexity. AI applications in project management include project scheduling, optimizing resource use, risk management, and enhancing the decision-making process.

The first example of implementing artificial intelligence in project management and the metrics of its effectiveness are described based on the results of three software development projects. Resource allocation is one of the critical tasks project managers face every day. AI can build accurate project planning models using information about the project, team, available budget, schedule, and requirements for project quality. Avancini, I. M. L., & Oliveira, M. C. F. (2009)

In the considered project, tasks are a list of features required for the project, the required project execution time, the list of the projects' employees, the wage for one day of work for each employee, and the employee's qualification. The project is associated or connected with several monetary cost-related viewpoints, that is, project development cost. The personnel allocation is

especially important from the cost viewpoint. Iansiti, M., & Lakhani, K. R. (2017), Garreto, F. (2018) and Goetz, T. (2016).

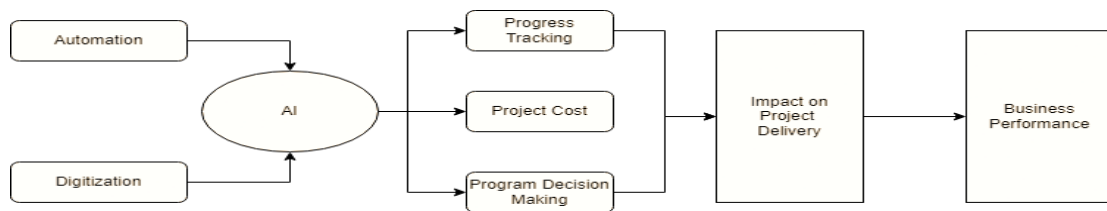
A project manager or a team manager should assign a certain number of employees to each task to accomplish all tasks on time. In a case of resource shortage, an accordingly developed schedule violates built-in execution time constraints only to the extent that is required to minimize project development cost. In project planning, it is often necessary to determine the competence level of employees who should be employed to perform tasks and the teams' degree of preparedness (professional qualification) to perform these tasks. The last point is important because only qualified employees can execute the tasks in accordance with fixed quality attributes. Keitt, T., & Gibbons, P. (2015) and Ismail, F. (2018).

There are various definitions and scopes of AI in project management. In 1946, AI was born as an academic discipline. 1956, the term "AI" was coined at the esteemed Dartmouth conference. Over the years, the field evolved and expanded to incorporate numerous subfields, theories, and technologies (Carsten Stahl et al., 2023). In a broad sense, an AI system refers to a machine, connected device, or computer program that uses algorithms or models to process data and information and perform tasks that involve human cognitive functions, like learning from experience, logical reasoning, analyzing similarities and differences, learning from examples, classification, and defining a problem, to create an automated system. The main benefit of using AI, regardless of the field of application, is that it can autonomously and automatically perform complex tasks faster, more accurately, at scale, and for an extended period. AI approaches are now used across various fields, including project management. A project, on the other hand, is an exceptional, restricted endeavor that is carried out to produce a unique good or service within three main boundaries: time, cost, and scope by integrating processes such as initiating, planning, executing, controlling, and closing. AI has the potential to radically change the way projects are managed (H. Alshammari, 2022).

Several best practices are emerging for integrating AI into project management. To begin with, AI's variable governance assistance can significantly improve performance. AI imitates human capacity in jurisprudence, mediation, contract analysis, and strategy. As regulation work stalls, AI can also aid in specific risk assessment to simplify ordering goods and services. Integrating any tools that use AI with data privacy protection is beneficial. To prevent costly errors, ensure awareness of the reasoning behind AI guidance and make it easy to override it. Finally, to provide accountability and prevent opacity, encourage stakeholders to use AI governance technology (Papagiannidis et al., 2023).

Given AI's large scope, it is common practice to limit its use in project management to the specific areas where it provides the best benefit. Quantitative metrics, backlog management, burn-out charts, and project delivery can all be significantly improved by AI (Khanh Dam et al., 2018). On the other hand, the initial stages of project management require human involvement. AI adoption in project management is expected to increase as algorithmic bias is eliminated and AI ethics aids in generating more trustworthy results (Reza Davahli, 2020).

In my literature review, I found an excellent conceptual framework for AI in Project Management.









(Source Krishnan and Krishnan, 2023)

- **Automation and Digitization** - AI automates routine tasks, digitizes data, and seamlessly integrates complex processes..
- **Real-Time Progress Tracking**—AI makes real—time tracking of project timelines and costs possible, enabling precise management and adjustments on the fly.
- **Enhanced Decision Making**—AI's data-driven insights assist business leaders in making informed decisions, leading to timely project completion, minimized cost overruns, and better outcome control.

### 2.3. AI Tools that can Help the Project Management Flow

ASANA	Current go-to project management tool for my tasks. Manage team and client projects in Asana.
Clickup	used it within the project manager role and as a consultant, responding to tasks and actions delegated to manager.
Monday	it does a little more than other project management tools. Alongside project management, Monday users can also manage their Sales CRM with Monday's tools.
Basecamp	you can gauge a project's performance without manually piecing together all the details.The project management tool will pull the data together and provide a warning for projects that are potentially “at risk” or “concerned.”

Meeting transcription tools that use natural language processing, voice recognition technology, speech recognition, and machine learning

						
<b>Language</b>	English	69+ languages	20+ languages	20+ languages	English	20+ languages
<b>Meeting platforms</b>	Zoom, Google Meet, Microsoft Teams	Zoom, Google Meet, Microsoft Teams, +6 platforms	Zoom, Google Meet	Zoom, Google Meet, Microsoft Teams, +5 platforms	Zoom, Google Meet, Microsoft Teams, +16 platforms	Zoom, Google Meet, Microsoft Teams
<b>Transcription minutes in the free plan</b>	300 monthly transcription minutes, 30 minutes per conversation	3 meetings	Unlimited	1200 mins/user/month	Unlimited	5 hours of transcription / month
<b>Paid plans</b>	Starting at \$10/month per user	Starting at \$10/month per user	Starting at \$20/month per user	Starting at \$19/month per user	Starting at \$8/month per user	Starting at \$15/month per user
<b>Meeting bot</b>	Yes	Yes	Yes	Yes	No	Yes

### 3. METHODOLOGY

The practical application of AI systems in project management is not mere research in information technology or project management sciences. It involves the importance of organizational theory and behavior in project management. In addition, by focusing on the potential of AI in project management, this chapter is expected to highlight the significance of AI-integrated project management. The key advantage is the capability to forecast and decrease those uncertainties that exist in PM. Algorithms and frameworks that power the intelligent aspects of AI-powered PM and the empirical norm of AI have already started a trend among organizations and practitioners (De Silva & Alahakoon, 2022). The convergence of PM and AI has the potential to transform knowledge from firms operating the most ordinary types of venture capitalism to a commercial economy. The post-post boom suggests that the two managers have similar software stacks, knowledge sets, and technology data.

Artificial Intelligence (AI) is the pivotal technology in the 21st century. It offers many opportunities to enhance and revolutionize professional procedures (Khanh Dam et al., 2018). The National Project Management System, one of the promising areas for AI integration, would gain relatively new solutions for optimizing project planning phases, project resource use, predicting project performance, collaborative execution, and control/monitoring (Alevizos et al., 2023).

Efficient integration of AI in project management would produce a project-driven organization that is more receptive to potential misfortune. AI technology is revolutionizing how we view data and comprehend our universe by its capability to reorganize vast data. AI, which can process a massive dataset faster and more efficiently, constitutes a paradigm-shifting technology.

#### 3.1. Secondary Data Collection

There are many research studies in the literature on AI–project management. However, they are limited to the following research areas of AI–PM: AI applications in Project Management (PM), Professional project managers and Project success factors, PM in software companies, Major problems in PM, Project management standards or practices, Industry sectors comparison, Knowledge contribution of AI–project management, Development of AI models in PM, Theoretical implications for social exchange / timebased view, Organizing vision and Guiding principles. Many other areas were untouched by recent researchers in their publications. It suggested that these under-tackled areas can give fascinating insights in the future nature of PM. (Shoushtari et al.2024) (Fridgeirsson et al., 2021) (Niederman, 2021) (Nagireddy, 2023)



The application of artificial intelligence (AI) is not new in the field of Project Management (PM) (De Silva & Alahakoon, 2022). The literature shows that AI has been used since the early 1960s in project planning and scheduling. AI usage has grown in certain PM processes in the past few decades. In 2020 and 2021, some novel techniques were also released in AI in project management. Our comprehensive study results illuminate that project selection, project scheduling, project resource allocation, and project costs and finances are the most common processes in which AI usage has raised to an expandable level. (De Silva & Alahakoon, 2022)

As part of this research, the structured literature review technique will be used to identify, analyze, search, and compile information from secondary sources of scientific production, databases, and industry reports on the application of AI in Project Management (Secinaro et al., 2021).

The secondary data will be collected using digital libraries, including IEEE, Web of Science, and Springer. In addition, the methodology will analyze articles and books as sources of secondary data obtained from scholarly search engines such as Google Scholar, as well as other academic articles and research finding-based evidence from the experts of this field (Snowballing or chain-referral sampling) (Reza Davahli, 2020).

### **3.2. Gap Analysis**

Organizations only concentrate on projects being funded, and there is incomplete scope. The project manager and project team are focused solely on managing the project and cannot provide governance information to stakeholders. Not much context was provided between project planning activities and project delivery outcomes. AI is seen as a project accomplishment tool, not a broader strategic alignment approach. Although risk management is driven by a “risk-based approach,” individual allocation and categorization of the risks are manual and subjective. AI is a principle for decision-making in project management, and this is done manually. AI so far has not been used in the context of governance, metrics monitoring, and enterprise architecture. (Papagiannidis et al.2023)(Pérez-Castillo et al., 2020)(Hechler et al.2020)

The study revealed that applied AI in project management applications being reviewed have difficulty providing adaptability, flexibility, learning, improvement, and rich knowledge throughout lifecycle management (Dong, 2022). Knowledge and improvement are being used in manual intervention and not to leverage the power of data science as presented in project management contexts. An AI project tends to have the capability to grow and cope with the complexity of new knowledge domains and apply knowledge learned from other domains.

In Gap Analysis, the process involves evaluating the difference between the potential of AI in a particular context and the actual reality within a specific business or project environment (Li, 2022). Gap analysis could be conducted to evaluate the overall organization and its leadership (Agrawal et al., 2023).

### **3.3. Limitations and Challenges**

Further research should strive to provide a better understanding of the design and implementation of AI software for specific industries and areas of project management. The future development of AI is very promising. Developing new technologies based on a neural network and machine learning will allow the manager to provide programs to link external users and resources to report (Usman Tariq et al., 2021).

Developers should work to improve program functionality, ensure security and fault tolerance, and expand the functionality of the user's interaction with the software.

Future work should aim to coordinate many AI and integration systems into communication channels as part of self-regulating systems. To integrate AI systems into traditional systems, it is important to change the organization's software and its structure to acquire distributed or decentralized systems while maintaining the availability and fault tolerance that will not require AI. (Usman Tariq et al., 2021).

Artificial intelligence (AI) is actively used in project management to establish a schedule and identify potential risks during the project. AI software helps managers make decisions, monitor, and control a project. It plans a schedule of tasks, allocates resources, and makes staff work according to the schedule and budget (Alevizos et al., 2023). Another step for using AI as an integral part of the project management system is its joint work with robotic automation systems. The main challenges of using AI in project management are adapted to objective factors such as budget, geographical localization, degree of project innovation and integration, etc. Also, most authors consider challenges connected with human factors, such as lack of AI knowledge and its belief towards the system, uncertainty connected with management responsibilities and liability (Baker Sadiq et al., 2021).

#### **4. CASE STUDIES AND METRICS**

Mainstreaming AI for project management demands evaluation. AI must make project start, management, and completion faster, cheaper, more accurate, and, because of the interaction with human team members, less multidisciplinary or competitive, and more creative. Thus, evaluating technology in AI projects is complicated by the variation of project domains, the definition of project value and knowledge, and the complexity of multi-dimensional planning, resource allocation, evaluation, and control. These factors can interact in a system of agents, each pursuing the framing of value through learning the tasks most useful for reaching coherently inspiring goals. There is no consensus between academia and practitioners on project intelligence performance indicators or its relationship with project value. This goal requires a better understanding of AI contributions to project concepts and context. (Cubric, 2020)(Neumann et al., 2024)

Technological advancements in hardware and software are rendered feasible by these advancements, focusing on the AI and machine learning processing domains, shortening the time it takes to operate and creating “learning” or training circumstances. As soon as this content emerges as news, it becomes fodder for case studies through mass media channels, with impacts already looming large across the spectrum of developed and developing countries in emerging governmental policies, social consciousness, and industry philosophy. A derived case study also suggests a firm’s calculated decision to embark based on the abundance of available evidence that machines invariably outdo human beings in carrying out short courses of instructions for repetitive tasks (Kaushik et al., 2022).

Research indicates that computing power enhances domain-centric operations, including evaluating company performance with only a limited amount of personal data. In this context, case studies and performance metrics have gained remarkable significance (Dzhusupova et al., 2023). It is also crucial for companies to grow in the wider context through integrating impressive and appropriate strategies (EpieBawack et al., 2022). Considering these points, incorporating metrics to business strategy this case study has been designed with the strategic work in mind. Since the publication of metrics and case studies in the academic literature has played a prominent role in legitimating the knowledge domain, this article could be valuable in

terms of promoting exposure. By establishing a research agenda using a set of metrics and case studies to build a laureate foundation in case study research and establish a sincere desire for the community, this footing could be highly prominent in character to improve the ability for one to process datasets and case studies for the work at hand. The intellectual foundation of the knowledge domain informs us that a carefully scrutinized endeavor to document cases and produce evidence from these cases has significant advantages.

Reviewing a case, AI can drive sales by, for instance, identifying which customers are most likely to buy and then presenting the products they are more interested in as the first proposal, all while adapting recommendations and sales pitches across devices at all the times. And that's crucial in times of social distancing, when gathering evidence on consumer behavior is always more challenging. AI can also help balance demand and supply, enable companies to manufacture consumer goods in more efficient processes, meet consumer goods requirements, technologies, health, and numbers of economic problems, and even optimize price and give pricing elasticity estimates. As the experiment demonstrates, profit maximization is rarely the same as revenue maximization, depending on price elasticity. Maybe by pricing more smartly, and in some applications, it can also increase the margin in percentage more without unbalancing the budget for demand or revenue, translating into dog eats dog in terms of gains.. in easier words, since companies can use the meanwhile opportunely to collect profit, and make end eternal their technology. AI also can process digital data that without it are unstructured, in that nobody at Tech's ever goes to fix it more by the one-off view. In fact, with more organized information, it's indispensable to spend more time and who can be have to coordinate someone else's organization and his environment rise and fall. (Haleem et al.2022) (Campbell et al.2020) (Kasem et al., 2024).

The second case is Amazon's integration with AI solutions to cope with demands and improve sales strategies, which is the AI-driven recommender system. These models are designed to understand user intentions and recommend the most relevant products (V. Pawar et al., 2022). These are found to increase sales, profitability, and customer satisfaction. These have also decreased the number of clicks necessary to make a purchase decision from 5 to around 3 (EpieBawack et al., 2022). Then there are the fraud detection systems that automatically detect bank fraud operations by analyzing transactions. Companies have saved millions and billions of dollars in fraud-related costs thanks to such systems. That, of course, would not be possible without AI systems that learn how to detect a scam by themselves. Many banks and financial institutions nowadays rely on machine learning models to build such systems(Zheng et al., 2021).

The Case Studies and Metrics presented in this literature demonstrate the diversity and impact of AI technologies on various industry domains. These applications play a significant role in the productivity and success of various projects, regardless of the project domain.

The existing efforts are mainly warning about this 'use with care' guidance rather than using it to advance the field through the development of AI systems, better project management, or organizational learning. (Cui et al., 2023)(Busch & Amarjargal, 2020)(Lee et al., 2020)(Ponio et al.2022).

## 5. CONCLUSION

In conclusion, the rise of AI and machine learning is expected to continue in project management, which itself has experienced a fair amount of disruption with the growth of agile and hybrid processes and evolving stakeholder expectations. Whether it is the automation of portfolio analysis to studies of changes in costs or time, the prospects for project management

are promising – certainly, AI-driven methods can perform computations quicker, providing a platform from which several new things can be done. However, there are some criticisms of AI machine learning as being a ‘black box’ and certainly, it can be difficult to work out what is going on where AI can sometimes perform random mechanism learning where the learning seems to be “better than it has any right to be”. But AI has been in a period of quick development the past decades it would be worrying if it was a field where results could be estimated reliably. All of this requires a new set of skills for the project manager. For example, understanding data and data analysis are not what they were 10 years ago, and using simple statistics such as means and standard deviations won’t really cut it anymore. By using new technologies, project managers can use AI to identify opportunities as systems can look at information and look for patterns that are currently not evaluated and, therefore, likely represent cost or schedule impacts that are being ‘missed’. (Hannemann, 2024)(Mohite et al.2024) (John et al.2023) (WambaTaguimdje et al.2020)

(Usman Tariq et al., 2021) (T. Mezgebe et al., 2023)(Rožman et al., 2022) Artificial intelligence (AI) has started to transform all sectors of society, including project management. With large amounts of data being gathered on projects, managers can now make better decisions using these technologies. The data can be from multiple sources or systems, including the existing project management system (PMS) and more detailed granular information (Tezel et al., 2014; Jo et al., 2002). Fast, accurate decisions are possible with AI, and project management should see several benefits where operationally, it can both automate processes and learn to improve as new data patterns are recognized (Ghasemi et al., 2019). In this essay, AI and Project Management are reviewed, focusing on common tasks in project management, including time, cost, quality, and human resource management.

## REFERENCES

- [1] Sarkar, A., Gordon, A. D., Negreanu, C., Poelitz, C., Ragavan, S. S., & Zorn, B. (2022). "What is it like to program with artificial intelligence?" arXiv preprint, arXiv:2208.06213.
- [2] Wang, H., Fu, T., Du, Y., Gao, W., Huang, K., & Liu, Z. (2023). "Scientific discovery in the age of artificial intelligence," *Nature*.
- [3] Yathiraju, N. (2022). "Investigating the use of an artificial intelligence model in an ERP cloud-based system," *International Journal of Electrical Electronics and Computer*, Vol. 7, No. 2, pp. 1–26.
- [4] Dacre, N., Kockum, F., & Senyo, P. K. (2021). "Transient information adaptation of artificial intelligence: Towards sustainable data processes in complex projects."
- [5] Perry, N., Srivastava, M., Kumar, D., & Boneh, D. (2023). "Do users write more insecure code with AI assistants?" In *Proceedings of the ACM SIGSAC Conference on Computer and Communications Security*, pp. 2785–2799, November.
- [6] Leslie, D., et al. (2024). "AI ethics and governance in practice: An introduction."
- [7] Davahli, M. R. (2020). "The last state of artificial intelligence in project management."
- [8] Wamba-Taguimdje, S. L., Wamba, S. F., Kamdjoug, J. R. K., & Wanko, C. E. T. (2020). "Influence of artificial intelligence (AI) on firm performance: The business value of AI-based transformation projects," *Business Process Management Journal*, Vol. 26, No. 7, pp. 1893–1924.
- [9] Verganti, R., Vendraminelli, L., & Iansiti, M. (2020). "Innovation and design in the age of artificial intelligence," *Journal of Product Innovation Management*, Vol. 37, No. 3, pp. 212–227.
- [10] El Khatib, M., Alabdooli, K., AlKaabi, A., & Al Harmoodi, S. (2020). "Sustainable project management: Trends and alignment," *Theoretical Economics Letters*, Vol. 10, No. 6, p. 1276.
- [11] Kamal Bin Mohd Nor, A., Pedapait, S. R., & Muhammad, M. (2021). "Explainable AI (XAI) for PHM of industrial asset: A state-of-the-art, PRISMA-compliant systematic review."
- [12] Jahin, M. A., Naife, S. A., Saha, A. K., & Mridha, M. F. (2023). "AI in supply chain risk assessment: A systematic literature review and bibliometric analysis."
- [13] Secinaro, S., Calandra, D., Secinaro, A., Muthurangu, V., & Biancone, P. (2021). "The role of artificial intelligence in healthcare: A structured literature review."

- [14] Nozari, H., Szmelter-Jarosz, A., & Ghahremani-Nahr, J. (2022). "Analysis of the challenges of artificial intelligence of things (AIoT) for the smart supply chain (case study: FMCG industries)."
- [15] Tariq, M. U., Poulin, M., & Abonamah, A. (2021). "Achieving operational excellence through artificial intelligence: Driving forces and barriers."
- [16] Dwivedi, Y. K., et al. (2021). "Artificial intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy," *International Journal of Information Management*, Vol. 57, p. 101994.
- [17] Wirtz, B. W., Weyerer, J. C., & Kehl, I. (2022). "Governance of artificial intelligence: A risk and guideline-based integrative framework," *Government Information Quarterly*.
- [18] Bettoni, A., Matteri, D., Montini, E., Gładysz, B., & Carpanzano, E. (2021). "An AI adoption model for SMEs: A conceptual framework," *IFAC-PapersOnLine*, Vol. 54, No. 1, pp. 702–708.
- [19] Papagiannidis, E., Enholm, I. M., Dremel, C., Mikalef, P., & Krogstie, J. (2023). "Toward AI governance: Identifying best practices and potential barriers and outcomes," *Information Systems Frontiers*, Vol. 25, No. 1, pp. 123–141.
- [20] Dam, H. K., Tran, T., Grundy, J., Ghose, A., & Kamei, Y. (2018). "Towards effective AI-powered agile project management."
- [21] De Silva, D., & Alahakoon, D. (2022). "An artificial intelligence life cycle: From conception to production."
- [22] Alevizos, V., Georgousis, I., Simasiku, A., Karypidou, S., & Messinis, A. (2023). "Evaluating the inclusiveness of artificial intelligence software in enhancing project management efficiency—A review."
- [23] Shoushtari, F., Daghighi, A., & Ghafourian, E. (2024). "Application of artificial intelligence in project management," *International Journal of Industrial Engineering Operations Research*, Vol. 6, No. 2, pp. 49–63.
- [24] Fridgeirsson, T. V., Ingason, H. T., Jonasson, H. I., & Jonsdottir, H. (2021). "An authoritative study on the near future effect of artificial intelligence on project management knowledge areas," *Sustainability*.
- [25] Niederman, F. (2021). "Project management: Openings for disruption from AI and advanced analytics," *Information Technology & People*.
- [26] Nagireddy, S. R. (2023). "Artificial intelligence and its impacts on project management."
- [27] Papagiannidis, E., Enholm, I. M., Dremel, C., Mikalef, P., & Krogstie, J. (2023). "Toward AI governance: Identifying best practices and potential barriers and outcomes," *Information Systems Frontiers*, Vol. 25, No. 1, pp. 123–141.
- [28] Pérez-Castillo, R., Ruiz, F., & Piattini, M. (2020). "A decision-making support system for enterprise architecture modelling," *Decision Support Systems*.
- [29] Hechler, E., Oberhofer, M., & Schaeck, T. (2020). *Deploying AI in the Enterprise: IT Approaches for Design, DevOps, Governance, Change Management, Blockchain, and Quantum Computing*.
- [30] Dong, W. (2022). "AIOps architecture in data center site infrastructure monitoring."
- [31] Li, L. (2022). "Reskilling and upskilling the future-ready workforce for industry 4.0 and beyond."
- [32] Agrawal, A., Singh, V., & Fischer, M. (2023). "LeanAI: A method for AEC practitioners to effectively plan AI implementations."
- [33] Baker Sadiq, R., Safie, N., Rahman, A. H. A., & Goudarzi, S. (2021). "Artificial intelligence maturity model: A systematic literature review."
- [34] Girasa, R., & Girasa, R. (2020). *Artificial Intelligence as a Disruptive Technology: Economic Transformation and Government Regulation*, pp. 23–67.
- [35] de Laat, P. B. (2021). "Companies committed to responsible AI: From principles towards implementation and regulation?" *Philosophy & Technology*.
- [36] Kelley, B. J. (2023). "Wage against the machine: Artificial intelligence and the fair labor standards act," *Stanford Law & Policy Review*.
- [37] Proksch, M., Paliwal, N., & Bielert, W. (2024). *The Secrets of AI Value Creation: A Practical Guide to Business Value Creation with Artificial Intelligence from Strategy to Execution*.
- [38] Al-Nakeeb, A., et al. (2024). "Digital transformation and disruptive technologies: Effect of cloud computing and DevOps on managing projects," In *Technology Innovation for Business Intelligence and Analytics (TIBIA) Techniques and Practices for Business Intelligence Innovation*, Cham: Springer Nature Switzerland, pp. 39–62.
- [39] Wang, L., & Zhao, J. (2020). *Strategic Blueprint for Enterprise Analytics*, Springer.

- [40] Cui, J., Shen, X., & Wen, S. (2023). "A survey on legal judgment prediction: Datasets, metrics, models, and challenges," *IEEE Access*.
- [41] Busch, J., & Amarjargal, O. (2020). "Authority of second-tier governments to reduce deforestation in 30 tropical countries," *Frontiers in Forests and Global Change*.
- [42] Lee, H., et al. (2020). "Sustainable water security based on the SDG framework: A case study of the 2019 Metro Manila Water Crisis," *Sustainability*.
- [43] Ponio, G., Rashed, Y., van Hassel, E., & Verhoeven, P. (2022). "Modelling regulatory capture in the port sector: A case study in the Philippines," *Case Studies on Transport Policy*, Vol. 10, No. 2, pp. 1005–1013.
- [44] Afzal, F., & Crawford, L. (2022). "Student's perception of engagement in online project management education and its impact on performance: The mediating role of self-motivation," *Project Leadership and Society*.
- [45] Zen, Z., & Ariani, F. (2022). "Academic achievement: The effect of project-based online learning method and student engagement," *Heliyon*.
- [46] Belwal, R., Belwal, S., Sufian, A. B., & Badi, A. (2020). "Project-based learning (PBL): Outcomes of students' engagement in an external consultancy project in Oman," *Education and Training*.
- [47] Almusaed, A., Almssad, A., Yitmen, I., & Homod, R. Z. (2023). "Enhancing student engagement: Harnessing 'AIED's power in hybrid education—A review analysis," *Education Sciences*.
- [48] Zhan, Z., Shen, W., & Lin, W. (2022). "Effect of product-based pedagogy on students' project management skills, learning achievement, creativity, and innovative thinking in a high-school artificial intelligence course."
- [49] Hannemann, I. H. S. (2024). "A comparative study of traditional and data-driven approaches in project management performance."
- [50] Mohite, R., Kanthe, R., Kale, K. S., Bhavsar, D. N., Murthy, D. N., & Murthy, R. D. (2024). "Integrating artificial intelligence into project management for efficient resource allocation," *International Journal of Intelligent Systems and Applications in Engineering*, Vol. 12, No. 4s, pp. 420–431.
- [51] John, M. M., Olsson, H. H., & Bosch, J. (2023). "Towards an AI-driven business development framework: A multi-case study," *Journal of Software Evolution and Process*, Vol. 35, No. 6, e2432.
- [52] Mezgebe, T. V., Gebreslassie, M. G., Sibhato, H., & Bahta, S. T. (2023). "Intelligent manufacturing ecosystem: A post-COVID-19 recovery and growth opportunity for the manufacturing industry in Sub-Saharan countries."
- [53] Rožman, M., Oreški, D., & Tominc, P. (2022). "Integrating artificial intelligence into a talent management model to increase work engagement and performance of enterprises."

## AUTHOR

**Dr Heidrich Vicci**, with over 30 years of international IT management experience, I have a proven track record of successfully developing teams, processes, and technologies. My expertise spans various industries, including consumer product manufacturing, global logistics, distribution, technology, telecommunications, food and beverage, and transportation, resulting in significant growth.

My role has consistently involved identifying and responding to business needs through the formulation and execution of IT strategies and roadmaps. I've expertly defined strategies, established organizational structures, and navigated businesses toward their goals. A key part of my approach is ensuring that technological investments align with business objectives. This is achieved through transformation, automation, and integration efforts. I have a Bachelor of Science in Computer Science from the University of Maryland Global Campus and an MBA and Doctor's degree from Florida International University.