01-018 – Machine learning applications in project management: a systematic review and perspectives from Brazilian experts – Aplicaciones del aprendizaje automático en la gestión de proyectos: una revisión sistemática y perspectivas de expertos brasileños

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English Spanish

The growing demand for technological innovations to improve efficiency, effectiveness, and efficiency in project management, driven by the handling of large volumes of data, has positioned artificial intelligence (AI) and machine learning (ML) as key tools. This article investigates the application of ML in project management, analyzing techniques, benefits, challenges, and future opportunities. Through a systematic literature review and consultations with Brazilian experts, it was identified that, although the adoption of ML is in its early stages, there is significant recognition of its potential to transform traditional practices, improving resource allocation and delivery efficiency. Benefits include improved forecasting accuracy and cost savings. However, challenges such as lack of quality data and resistance to change are faced. It is concluded that improving infrastructure, ensuring data quality, and training professionals are essential to expand ML applications and maximize their benefits in project management.

Keywords: *Project management; Machine learning; Survey*

La creciente demanda de innovaciones tecnológicas para mejorar la eficiencia, eficacia y efectividad en la gestión de proyectos, impulsada por el manejo de grandes volúmenes de datos, ha posicionado a la inteligencia artificial (IA) y al aprendizaje automático (ML) como herramientas clave. Este artículo investiga la aplicación del ML en la gestión de proyectos, analizando técnicas, beneficios, retos y oportunidades futuras. Mediante una revisión sistemática de la literatura y consultas a expertos brasileños, se identificó que, aunque la adopción del ML está en etapas iniciales, existe un reconocimiento significativo de su potencial para transformar prácticas tradicionales, mejorando la asignación de recursos y la eficiencia en la entrega. Entre los beneficios destacan una mayor precisión en las previsiones y el ahorro de costes. No obstante, se enfrentan desafíos como la falta de datos de calidad y la resistencia al cambio. Se concluye que mejorar la infraestructura, garantizar la calidad de los datos y capacitar a los profesionales son aspectos esenciales para ampliar la aplicación del ML y maximizar sus beneficios en la gestión de proyectos.

Palabras claves: *Gestión de proyectos; Aprendizaje automático; Machine learning*

Acknowledgments:

CONFEA - CAPES - CNPq - FAPEMIG

1. Introduction

El Khatib et al. (2020) points out that, in the current context, the competitive business environment—marked by complexity and dynamism—imposes significant challenges on managing multiple projects, which are becoming increasingly robust and demanding. Given this, the authors stress that using new tools to enhance and strengthen the effectiveness of project management is essential to fostering organizations' competitive advantage.

According to Alvarez-Dionisi, Turner, and Mittra (2016), technologies such as Artificial Intelligence (AI) - especially Machine Learning (ML) techniques - have been adopted to promote more efficient processes, reduce vulnerabilities, and improve management. These techniques enable: advanced analysis of large volumes of data; optimization of resources; and risk prevention.

Identification of patterns and trends that are not easily perceptible, generating valuable insights for more effective projects.

Thus, integrating Machine Learning into Project Management becomes crucial to ensure organizational competitiveness and innovation (Kerzner, 2019).

This paper aims to investigate the application of Machine Learning in Project Management, addressing the techniques used, the benefits, challenges, and future opportunities.

The methodology is based on a systematic review of scientific literature to identify ML techniques and their impacts and gaps. These theoretical items are then submitted to the opinion of Brazilian experts through indirect consultations (questionnaires), complementing the Analysis with practical and contextualized views.

The delimitation of this research is the publications in the Scopus database and the 25 Brazilian experts who answered the questionnaire.

2. Machine Learning in project management

With technological advances and project complexity growing, organizations have adopted Machine Learning (ML) techniques to modernize management, improve forecasts, and optimize decision-making processes (Uysal, 2023).

Santos et al. (2023) point out that ML enables proactive management, offering predictive risk analysis, identifying trends and patterns, and automating repetitive tasks.

These techniques transform project management into an agile, data-driven process that increases efficiency, accuracy, and adaptability to market changes.

ML is a branch of Artificial Intelligence (AI) that uses algorithms capable of learning from past data and improving their performance without explicit programming (Mitchell, 1997). These methods identify patterns in large volumes of data and continually improve themselves (Alpaydin, 2020).

ML can be classified into four main categories:

- Supervised learning: uses labeled data (input plus expected output) and learns from examples, such as predicting failures in software projects (Taye & Feleke, 2022).
- Unsupervised learning: analyzes unlabeled data, identifying patterns and groupings. It can be applied to user segmentation in project management (Malik et al., 2021).
- Semi-supervised learning combines labeled and unlabeled data to improve accuracy. Kraiem, Mabrouk, and Lucas (2023) describe its use for predicting project management methodologies.

- Reinforcement Learning: The algorithm learns by trial and error, receiving feedback from the environment. It can optimize decisions in dynamic projects (Mamatha & Suma, 2021).

2.1 Systematic literature review

Based on the guidelines of Tranfield et al. (2003), this study sought to answer the following research question: “How is Machine Learning applied in project management?”

The methodology was structured in three stages:

2.1.1 Search and Collection of Publications

The search was carried out in Scopus, one of the largest scientific databases and a reference for evaluating academic impact in various areas (Meho & Yang, 2007).

Two combinations of search strings were defined in the "Search within" field, resulting in two sets of publications (Table 1). The strategy searched for articles relating to Machine Learning and Project Management, considering: variations of the term "Project Management"; the term "Machine Learning" without variations; language filters (English, Spanish, or Portuguese); additional strings (such as "and ((application) or (use) or (utilization)...") were tested, but discarded because they included many articles not related to the topic.

2.1.2 Screening of publications

The following selection criteria were applied:

- Inclusion: only scientific articles and conference papers;
- Exclusion: remove duplicates and publications without full access to the CAPES Journal Portal.

At the end of this stage, the portfolio consisted of 674 publications, all used in the bibliometric Analysis using the Bobliometrix algorithm.

The abstracts of the 674 publications were read. The selection criteria were the application of ML in project management, broken down into the presentation and use of ML techniques, their benefits, and challenges. Twenty-five publications were identified for further reading and content analysis.

The research was conducted in June 2024, focusing on studies on ML techniques applied to Project Management.

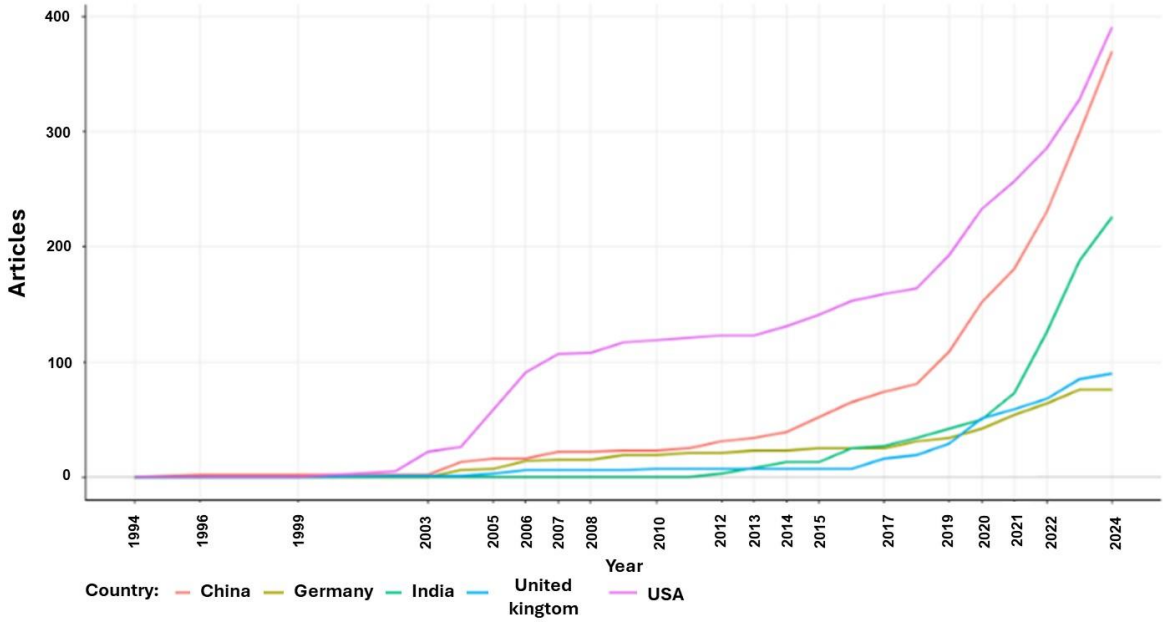
2.1.3 Analysis of Results

Bibliometric Analysis of the 674 publications, using the Bibliometrix package in RStudio (Aria & Cuccurullo, 2017), allows scientific mapping with statistical and graphical techniques.

Figure 1 shows that the USA, China, and India stand out with high rates of scientific publications on the subject.

Appendix 1 contains a set of 25 scientific publications for reading and analyzing the content obtained in the search for primary studies.

Figure 1: Production of scientific papers by author's country over time.



The content analysis of these selected publications was carried out based on ten main categories: the objective of the study, the object of the study, the research method used, the type of data collection, the approach to data analysis, the main conclusions, the proposal for future work, the purpose of applying Machine Learning, the Machine Learning techniques applied, the benefits, and the main challenges (Table 1).

Table 1: Results of the analysis of ML literature applied to project management.

Item	Description
Focus	• Application of Machine Learning (ML) in Project Management (56% of studies): control, optimization, and recommendation of tools. • Development of Frameworks (24%): proposals for new models or adaptations to integrate ML into project management. • Monitoring and Improving Processes (20%): predicting failures, optimizing processes, and monitoring performance.
Research method used	• Case study (44%): qualitative/quantitative analysis with real data. • Empirical study (24%): data collection to validate hypotheses (e.g., predictive maintenance) • Literature review (16%): synthesis of the state of the art in ML and project management • Not identified (16%)
Data sources	• Secondary data (40%): Information from literature or historical records. • Real project data (32%) and simulated data (8%): Practical validation of models. • Surveys/questionnaires (16%): Perceptions of professionals in the field. • Experimentation (4%): Less common but relevant for controlled tests
Predominant analysis approach	• Qualitative (78%): In-depth understanding of contexts and trends. • Quantitative (22%): Objective measurement of algorithm performance

Item	Description
Machine Learning Approaches in Project Management	A significant diversity of Machine Learning (ML) techniques was identified in Project Management. The most frequent were: • Artificial Neural Networks (28%) and linear regression (20%) stand out for their ability to process large volumes of data and complex patterns. • Other relevant techniques include Decision Trees (16%), Gradient Boosting (12%), and K-nearest neighbors (KNN) (8%), which are used for modeling and forecasting at different stages of the project cycle.
Application sector	• Construction (38%): Neural networks, Regression, and Gradient Boosting are predominant due to the need to deal with variability and complexity. • Software Development (32%): Algorithms such as Decision Trees, SVM, and KNN are more common due to their adaptation to dynamic and behavioral data.
Benefits of Machine Learning	• Increased forecast accuracy (96% of studies): more accurate forecasts and automated recommendations. • Better resource allocation (76%): support managers in optimizing resource use and allocating them more efficiently based on analytical data. • Reduction of human errors (52%): Machine learning's automation and predictive Analysis minimize the possibility of errors related to human intervention. • Cost reduction (40%): despite its benefits, the application of Machine Learning still requires high investments in technology and training, which can increase costs in the short term before generating significant returns.
Challenges identified	• Technical Barriers (28%): difficulty interpreting results from advanced techniques (e.g., Neural Networks), requiring specialized expertise, and lacking quality data or infrastructure for collection and processing. • Organizational Resistance (20%): lack of training and cultural adaptation to adopt new technologies and high initial cost of implementation, even with proven benefits in optimization and cost reduction. • Integration with Other Disciplines (12%): combining ML with traditional methods (e.g. Operations Research) is promising, but requires flexibility and standardized frameworks to ensure effectiveness.
Suggestions for future research	• Testing in new contexts (40%): Application in sectors that have not yet been explored. • Development of frameworks (28%): Practical guides for implementation. • Improving algorithms (20%): More efficient techniques for project management • Not identified (12%)

3. Practical application of ML in project management

To validate and enrich the systematic review's findings, we surveyed Project Management professionals using a structured questionnaire (13 questions divided into four thematic blocks: profile of respondents, use of ML in Project Management, challenges, and opportunities). The questionnaire was validated through a pilot test (see Appendix 2: Questionnaire).

Twenty professionals took part as experts, rigorously selected based on three criteria: a minimum of 5 years' experience in the field, practical experience with applying Machine Learning, and advanced knowledge of ML. The response period was from September 30 to October 13, 2024. Table 2 describes the profile of the experts consulted.

Table 2: Profile of the experts.

Item	Description
Distribution by sector	• Software Development: 50% • Public Administration: 15% • Construction: 10% • Manufacturing Industry: 10% • Services: 10% • Oil and Gas R&D: 5%
Level of ML knowledge	• Beginners: 65% • Intermediate: 15% • Advanced: 15%
Professional qualifications	• 70% are certified in Project Management • 65% have practical experience of applying ML to projects • 100% have more than 5 years of experience in Project Management

Analysis of Table 2 reveals that the sample reflects a differentiated adoption of Machine Learning, with a predominance in the IT sector (50%). The data suggests an urgent need for upskilling programs, considering the contradiction between:

- High seniority of respondents (100% with more than 5 years' experience)
- Low technical proficiency in ML (65% declared themselves beginners)

The participants' minimum experience of 5 years attests to their professional maturity, while their qualifications—proven by their certifications in Project Management (70%) and practical experience with ML (65%)—give validity and robustness to the answers obtained.

The questions relating to the use of ML in project management are described in Table 3.

Table 3: ML in project management.

Question	Results
In your opinion, what is the current application level of Machine Learning in Project Management?	• No application (15%) • Incipient application (50%) • Partial application (15%) • Wide application (20%)

Which Machine Learning techniques do you see being most applied in Project Management?	• Artificial Neural Networks and Linear Regression (60%):
	  • Neural Networks: Processing big data and complex patterns
	  • Linear Regression: Simplicity and predictive efficiency
	• Other Relevant Techniques:
	  • Decision Trees (30%): History-based decisions
	  • K-Means (25%): Intuitive clustering
	• Less adopted techniques:
	  • Random Forest (15%)
	  • SVM (10%)
	  • KNN (5%)
	  • 20% of respondents declared, "I don't know how to evaluate."

Question	Results
What are the main benefits of applying Machine Learning in Project Management? (Up to 3 items can be selected)	• Improved resource allocation (70%) • More efficient deliveries (60%) • Reduced costs (50%) • Increased forecast accuracy (45%) • Reduced human error (15%) Complementing this data, an expert in corporate governance and IT management highlighted additional benefits: detection and reduction of risks and fraud, improved decision-making on critical paths, and optimization of tasks and communication
In your view, what are the main challenges/obstacles to adopting Machine Learning in Project Management? (Up to 3 items can be selected)	• Lack of technical knowledge in teams (65%) • Organizational resistance to change (65%) • Shortage of quality data (60%) • Integration with legacy systems (20%) • High initial costs (10%) • Lack of knowledge of available tools (10%)
What opportunities do you see with the future integration of Machine Learning into Project Management? (Up to 3 items can be selected)	• More assertive decision-making based on data (44%) • Optimization of project execution (44%) • Automation of management processes (36%) • Personalization of management approaches (16%) • Other: More precise and assertive communication and Reduction of risks and fraud (8%)
Do you believe Machine Learning will be widely used in Project Management in the next 5 years?	• Yes (75%) • No (10%) • No opinion (15%)
Are there any other comments or observations you would like to make?	• Late adoption of ML: Machine Learning technologies have been around for years but only gained attention with the emergence of generative AI; there is pressure for use, but real interest is still limited. • Potential in the Public Sector: The government can use ML to combat school dropouts and improve preventive health management. IPM's DARA system, which uses ML for early diagnosis of diabetes, is an example cited. • Practical challenges: Data quality and the learning curve are critical to success, and human intelligence is still essential to guide and validate ML results. • Organizational Maturity: Many companies still haven't mastered the basics of project management. Limiting the effective use of ML and technology as a complement, processes, and people remain the core. • Recommended tools: Amazon Q Developer (for automation in software development) and platforms/libraries such as TensorFlow, Keras (neural networks), and Scikit-Learn (traditional ML).

4. Discussion

The application is nonexistent or incipient in the construction industry, while in software development, it is applied at all levels. Wu et al. (2022) found that software companies use ML to predict deadlines and detect bugs. Adekunle (2024), on the other hand, identifies a high potential for ML in civil construction but identifies that its use is incipient. The authors propose collaboration between academic institutions, technology suppliers, and partners in the construction industry.

The predominant ML techniques applied in project management are neural networks, which solve complex problems such as predicting several risks simultaneously. Linear Regression, on the other hand, is better for simpler tasks, such as estimating costs.

The research by Isah and Kim (2022) presents the potential application of neural networks in Korea in road projects; the authors conclude that the use of ML in the construction of road projects is incipient. Kadri & Sugara (2017) present the use of linear Regression in housing construction projects to estimate costs quickly and accurately in the planning phase. Surya (2018) describes the application of ML as a technology used to improve software development and quantify parameters that impact productivity, functionality, and software quality. Future research could focus on real value metrics (e.g., ROI in schedule optimization) and hybrid solutions that combine analytical power with explainability - an essential condition for gaining the trust of end users.

Managers must be calm in the decision-making process when prioritizing ML implementations in project management. The results suggest gradual implementation to solve specific problems, creating measurable success stories. As shown by 75% of optimistic experts, ML tends to increase its application in project management. However, its impact will be determined by the ability to align technical innovation with cultural transformation and realistic adoption strategies.

As for the benefits, the data shows that the three main benefits (resource allocation 70%, efficiency 60%, and cost reduction 50%) focus on the classic scope-time cost (Duarte et al., 2012). While professionals prioritize operational benefits (allocation/efficiency), the academic literature focuses on predictive accuracy (45% vs. 52% in the studies). This gap may indicate:

- Applicability bias: Managers value tangible results more in the short-term
- Measurement challenge: Precision metrics are more complex to quantify on a day-to-day basis

The citation of specific benefits not identified in the literature and cited by one of the experts suggests:

- Governance: Fraud detection combines ML with compliance
- Critical path management: predictive use for real-time decision-making
- Communication: NLP applications are still under-explored

The low mention of error reduction (15%) contrasts with the findings of the systematic literature review (52%), suggesting:

- Underuse of auto-ML techniques for data quality
- Lack of data governance culture in organizations
- Possible conceptual confusion between "human error" and "algorithmic bias."

The obstacles to using ML in project management appear with equal opinions (65% each): lack of technical knowledge in the teams and Resistance to change. This shows a contradiction - companies buy advanced technology but do not prepare their teams to use it. There is a big difference between the potential of the tools and what the teams can use. The solution is to put people at the heart of the implementation strategy. This identification of people as a critical

factor for implementing ML in project management was identified by Bidhendi & Azizi (2021) and Kelepouris (2023).

In 60% of cases, the lack of quality data creates a cycle, as models are bad because of bad data, resulting in poor results, which in turn reduces interest in investing in data improvements. It is essential to establish good data governance practices first, not later. Data quality is reported in the research by Munappy et al. (2022), Hjertaker & Besirovic (2022), and Priestley, O'Donnell, & Simperl (2023).

One in five professionals (20%) report difficulty integrating ML into existing systems. Many old systems simply weren't designed to work with these new technologies. In addition, the real costs of digital transformation are often underestimated. The safest course is to implement plans in stages. Niederman (2021), Mahdi et al. (2021), and Mohammad and Chirchir (2024) have reported the difficulty of integrating legacy systems into ML.

Although only 10% cite costs as a barrier, this reveals important issues: many companies do not properly calculate all the costs involved and have difficulty showing the return on investment. It is common to see organizations buying expensive tools before they even understand what problems they need to solve (Shang, Low & Lim, 2023).

Huangfu et al. (2025) warn that excessive enthusiasm for generative AI can be harmful. On the one hand, it draws attention to the topic, but on the other hand, it creates unrealistic expectations, leads to superficial implementations, and distracts from practical applications that really bring results.

The systemic and interconnected challenges require integrated approaches that combine training, adjusting expectations, and targeted ML investments. People need to be prepared, data needs to be organized, infrastructure needs to be planned, and realistic expectations need to be set about what the technology can deliver. Overcoming these challenges requires a change in mentality, seeing ML not as a quick fix but as a gradual strategic action (Shang, Low & Lim, 2023; Latendresse et al., 2024).

Experts point out that Machine Learning (ML) can bring strategic benefits to project management, with opportunities for:

- Data-driven decision making (44%): helps to reduce human bias and increase accuracy in critical decisions. It can be applied, for example, to forecasting delays and costs based on historical data and identifying patterns to prioritize corrective actions.
- Optimizing Project Execution (44%) improves resource allocation and increases operational efficiency. It is applicable in optimization algorithms for schedules, task distribution, and detection of bottlenecks in real-time.
- Automation of Management Processes (36%): reduces manual work, boosting productivity gains. It can be used for automatic progress reports, risk classification, and intelligent alerts.
- Personalization of Management Approaches (16%): dynamic adaptation to different project and team profiles. ML models to recommend methodologies (agile, traditional, hybrid) or analyze behaviors to improve stakeholder management.
- Other Opportunities (8%): more assertive communication using NLP (Natural Language Processing) to improve reporting and alignment; reducing risks and fraud by detecting anomalies in contracts and budgets.

The need to prioritize applications with a direct impact (decision-making, optimization) can accelerate ML maturity, such as:

- Focusing on use cases with clear ROI (e.g. schedule optimization).
- Integrating ML into existing tools (e.g. MS Project plug-ins, Jira).
- Test low-code solutions for automation and data analysis.
- Train teams to interpret ML results, not just operate tools.

As for the outlook on Machine Learning Adoption in Project Management over the next 5 years, the vast majority of experts (75%) believe that ML will be intensively used in project management by 2029, indicating:

- Growing maturity: Organizations are overcoming initial barriers (data, training);
- Proof of value: Success stories in optimization, forecasting, and automation validate the technology;
- Competitive pressure: Companies that do not adopt could be at a disadvantage.

There is also a minority skepticism (10%) who doubt adoption due to persistent complexity:

- Difficulty in integrating ML into existing processes;
- Traditional sectors such as construction may adopt ML at a slower pace;
- Generic solutions using current tools may not solve problems specific to all sectors.

Research by Uysal and Akturk (2024) concludes that the application of ML is growing in project management.

Respondents showed a lack of knowledge (15%), which suggests a lack of clarity about the pace of technological evolution and doubts about applicability in less data-driven contexts.

The implementation of ML may be driven by the demand for efficiency to reduce costs and deadlines (e.g., resource optimization). In addition, tools are becoming more accessible, such as low-code and integrated platforms (e.g., Power BI + ML) and generative AI, such as chatbots for management (e.g., automatic reports and risk analysis).

Table 4 describes the experts' responses by sector.

However, some risks could slow down expansion, particularly: lack of quality data in less digital sectors, cultural Resistance to replacing traditional methods, and initial costs for SMEs.

Table 4: Sector forecast.

Industry	Adoption Level (2029)	Key applications
IT/Software	High (90%)	Automation, bug prediction
Healthcare	Medium-High (70%)	Cost management, team allocation
Construction	Medium (50%)	Schedule optimization, risk prevention
Government	Low-Medium (40%)	Tendering, transparency

5. Conclusions

The application of Machine Learning (ML) in project management is growing, but its application in different sectors is uneven. In the software industry, advanced techniques such as neural networks for bug prediction and process automation are widespread. In contrast, in the construction industry, it is incipient and mainly limited to simple linear regression models for cost estimates. This disparity reflects structural differences: Organizations are born digital with a data-driven culture; on the other hand, traditional sectors face barriers such as fragmented data and resistance to innovation.

ML techniques show clear specialization in their uses. Neural networks stand out in solving multidimensional problems, such as integrated risk forecasting, while traditional statistical methods focus on specific tasks. Notably, 20% of respondents do not know which techniques

they use. This suggests a training gap that could lead to mistaken implementations. Paradoxically, even with 75% of experts predicting widespread adoption in the next five years, the obstacles remain substantial: 65% point to a lack of technical knowledge and cultural Resistance as greater than the technological challenges themselves.

The perceived benefits differ significantly between theory and practice. While academic literature emphasizes predictive accuracy (in 52% of studies), professionals value immediate operational gains more - a 70% improvement in resource allocation and a 60% improvement in delivery efficiency. This divergence suggests better communication about how predictive models translate into tangible results. Emerging use cases, such as fraud detection and personalization of methodologies, indicate promising paths that have not yet been explored.

The methodology is based on a systematic review of scientific literature to identify ML techniques and their impacts and gaps. These theoretical items are then submitted to the opinion of Brazilian experts through indirect consultations (questionnaires), complementing the Analysis with practical and contextualized views.

Future research could focus on real-value metrics (e.g., ROI in schedule optimization) and hybrid solutions that combine analytical power with explainability—an essential condition for gaining the trust of end users.

Managers must be calm in the decision-making process when prioritizing ML implementations in project management. The results suggest gradual implementation to solve specific problems, creating measurable success stories. As shown by 75% of optimistic experts, ML tends to increase its application in project management. However, its impact will be determined by the ability to align technical innovation with cultural transformation and realistic adoption strategies.

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Use of Generative Artificial Intelligence

No generative artificial intelligence was used in preparing this communication

Communication aligned with the Sustainable Development Goals

Annex 1 - Scientific publications selected for primary study

Publicações
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Annex 2 - Questionnaire used for consultation with experts

Section 1: Respondent profile

1. Position/Function:* (Open response field)
2. Area of activity:*

- ○ Software development
- ○ Construction
- ○ Manufacturing
- ○ Public Administration
- ○ Health
- ○ Other: (Open answer field)

3. Do you have certification in Project Management?*

- ○ Yes
- ○ No

4. Length of experience in Project Management:*

- ○ Less than 5 years
- ○ 5 to 10 years
- ○ 10 to 15 years
- ○ More than 15 years

5. Do you have experience of applying Machine Learning to projects?*

- ○ Yes
- ○ No

6. Level of Familiarity with Machine Learning:*

- ○ None
- ○ Beginner
- ○ Intermediate
- ○ Advanced

Section 2: Using Machine Learning in Project Management

7. In your opinion, what is the current level of application of Machine Learning in Project Management?*

- ○ No application
- ○ Incipient application
- ○ Partial application
- ○ Wide application

8. Which Machine Learning techniques do you see being applied most in Project Management?* (Check up to 3)

- ○ Linear Regression
- ○ Logistic Regression
- ○ Decision Trees
- ○ Random Forest
- ○ Support Vector Machines (SVM)
- ○ K-Nearest Neighbors (KNN)
- ○ K-Means
- ○ Naive Bayes
- ○ Artificial Neural Networks
- ○ Gradient Boosting (XGBoost, LightGBM, etc.)
- ○ Dimensionality Reduction Algorithms (PCA, LDA)
- ○ Don't know how to evaluate
- ○ Other: (Open answer field)

9. What are the main benefits you see in applying Machine Learning to Project Management?* (Mark up to 3)

- ○ Increased forecast accuracy
- ○ Reduced human error
- ○ Improved resource allocation
- ○ More efficient deliveries
- ○ Reduced costs
- ○ Other: (Open response field)

Section 3: Challenges and Opportunities

10. In your view, what are the main challenges/obstacles to the adoption of Machine Learning in Project Management?* (Mark up to 3)

- ○ Lack of technical knowledge in the team
- ○ High cost of implementation
- ○ Difficulty integrating the technology into existing systems
- ○ Resistance to change on the part of the team
- ○ Shortage of quality data
- ○ Other: (Open response field)

11. What opportunities do you see with the integration of Machine Learning into Project Management in the future?*

- ○ Optimization of project execution
- ○ Automation of management processes
- ○ More assertive decision-making based on data
- ○ Personalization of management approaches
- ○ Other: (Open response field)

Section 4: Final considerations

12. Do you think Machine Learning will be widely used in Project Management in the next 5 years?*

- ○ Yes
- ○ No
- ○ I don't know how to evaluate

13. Are there any other comments or observations you would like to make on the subject? (Open response field)

If you are interested in receiving the results of this survey, please enter your e-mail address: (Response field open)