Hindawi
Discrete Dynamics in Nature and Society
Volume 2022, Article ID 1956879, 9 pages
https://doi.org/10.1155/2022/1956879

*Review Article*

# Analysis of Factors Affecting the Success of Sustainable Development Projects with the Help of Machine Learning Tools

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Received 26 June 2022; Accepted 12 September 2022; Published 28 September 2022

Academic Editor: Reza Lotfi

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Sustainable development projects are a group of development projects created with the aim of sustainable urban growth and development. To achieve development, it is essential to pay attention to the existence of projects. The point to consider is the threat of these expensive assets by all kinds of risks, such as floods, earthquakes, wars, mistakes, and price fluctuations, during the life cycle of projects from the beginning of their idea to the end of their useful life. Hence, the main objective of the study is to analyze the criteria and factors of project success and different machine learning strategies to achieve success and predict specific construction performance. To meet that aim, the research employs the descriptive approach, and analytical and logical aspects are derived from various sources such as research articles, published materials, online websites, books, and articles. The study's results reveal that employing machine learning tools and algorithms to create a link between project success factors and criteria and prediction can bring multiple advantages, including high accuracy, ease of use, and inference for decision-making. It can be concluded that algorithmic solutions could be integrated in a manner that project managers can adequately utilize to enhance project success by eliminating potential risks and guiding the project toward attaining its objectives.

## 1. Introduction

Despite various and multiple successful projects in this area, there is no consensus about a single and comprehensive definition of project success due to different, and often contradictory, objectives of stakeholders involved in a project [1, 2]. Some studies have defined success by determining some criteria and indices, while others have introduced a set of factors affecting the success of a project. Accordingly, project-based organizations can better deal with the challenges of a project and successfully implement the project by understanding these factors [3–5]. In addition, a strategy extracted from the set of factors for project success can be used as a beneficial tool for project selection by organizations and decision-making. Project success strategies can play a significant role in managers' correct and informed decision-making [4, 5]. The present study aimed to evaluate and accurately understand the concept of project success to assess the impact of using machine learning, which is one of the artificial intelligence exact methods, on the success of construction projects.

Organizations need continuous performance improvement to maintain their existence, eliminate their weaknesses and improve their strengths [2, 5]. Prediction of success is an essential factor for organizations in addition to expanding evaluation. Showing a bright future of the project's results based on conditions governing the influential factors of the project has always been demanded by beneficiaries of the project. This is extremely important for organizations that must constantly choose from the existing opportunities, choices that must be made optimally and as the safest choice due to resource limitations [3, 6, 7]. Project success strategies can play a considerable role in managers' informed decision-making. In addition, this can help determine the deviation from the project's path to achieve the goals with the specified restrictions and warn the stakeholders of these deviations by

continuous project monitoring [4, 5]. While this tool is more accurate and used based on criteria and indices, it will be more accurate in case of planning to eliminate its defects and improve its performance [8–11]. Moreover, the construction part is a knowledge-based field surrounded by a large amount of objective, heterogeneous, and interdependent data surrounding abstract knowledge. In most cases, construction organizations fail to use the opportunity due to access to the data, although the conventional project performance and success analysis methods, which highly depend on subjective data sources or do not take variable dependencies in the data into account and are generally used in this regard [12–15].

Reviewing the recent studies, no doubt utilizing machine learning data analysis tools can significantly benefit the company by improving the performance of construction projects as one of the main indices of a successful project. Hence, the objectives of the study can be summarized as follows:

(i) Understanding machine learning project lifecycle
(ii) Recognizing the cause and impact of machine learning on project success
(iii) Identifying the benefits, challenges, and vision of machine learning in project success
(iv) Determining the factors and indices affecting project success

This present research can greatly contribute to the arena of construction studies by demonstrating machine learning as a project performance evaluation method. Moreover, the results of the study can permit construction companies to evade evidence-based knowledge and data-backed decisions to avert future construction failure.

## 2. Methodology

The present study attempted to analyze the criteria and contributing factors of project success and various machine learning approaches to attain success in critical project stages.

The present study is regarded as a developmental study. Generally speaking, development research is defined as studies carried out on the basis of knowledge. This kind of study is performed based on experiences from previous research and is performed in order to innovate and improve products. Therefore, the study is based on secondary data.

Moreover, the research is descriptive since it primarily focuses on "what" is the subject of the research. Furthermore, analytical and logical aspects have been derived from various sources such as related and updated research articles, published materials, online websites, books, and articles.

## 3. Results

The human desire for development and progress has always been an intrinsic demand. In fact, this factor is the source of success-related activities and achievements of human beings. Success is a degree of meeting expectations and objectives that might have financial, cultural, social, technical, and professional aspects. Today, projects are considerably increasing in most organizations, which has increased the importance of answering the question of "what is the meaning of project success?" [4, 16, 17].

*3.1. Project Success from the Perspective of Sciences.* The term "project success" in project management was first introduced in the early 1900s with three main triangles of time, cost, and quality, showing its impacts in this triangle. For 50 years, project success depended on achieving the iron triangle of time, cost, and quality. However, it went beyond that concept in the 60s and 70s, and organizational management methods were added to it [5]. Nonetheless, the project management triangle with three variables of scheduling, cost, and technical performance has become the best tool for identifying and determining the success or failure of the project. However, risk capacity and management have been identified as some of the main components of project success assessment. Project success is formed from two micros (i.e., time, quality, performance, and safety) and micro (i.e., time, satisfaction, utility, and operations) perspectives [6, 18]. According to Ashley, project success is achieving the best results in cost, scheduling, quality, safety, and satisfaction of involved people compared to what was expected or observed in practice [19–22]. Project success is an abstract concept, and it is challenging to determine whether a project has succeeded or failed [8]. Project success means that all parties involved in the project achieve their projected benefits in the end. Otherwise, the lack of benefit of one of the parties upsets the balance, which endangers the entire project [9, 23]. Since project and project management are both complex phenomena, the success criteria must also reflect this issue. This means that from the perspective of project success, both project results and project management should be considered. The success of project results focuses on the project's outcome, whether the project's result, created by the project, meets the needs of the most important stakeholders [24–26]. Therefore, its success focuses on the appropriate use of resources and appropriate management of beneficiaries. Thus, project management success includes project delivery efficiency, while project success indicates project delivery effectiveness [10]. In fact, project success involves separate judgments in three separate layers and not just one. Two of these items are related to the performance of the two main players, i.e., project manager and project owner, respectively. In contrast, the third one is related to the investment performance presented by the project from the perspective of the investor [11]. A successful project sustainably generates value. Generating value entails working with quality and creating benefits for the customer [12]. Table 1 demonstrates the course of adequate definitions of success during 1985–2020.

*3.2. Project Success Criteria and Factors.* One of the critical issues of project management is to identify the success factors of construction projects. Generally, there exist four different success factors in construction projects. The initial

Table 1: The course of effective definitions of success during 1985–2020.

| Description | Source |
|---|---|
| Everything must go as desired. Predicting all necessities and having access to sufficient sources to achieve demands in a timely manner | [1, 3] |
| Achieving outcomes more desirably than what was anticipated or at least acquiring normal results in time, cost, quality program, satisfaction, and safety of members | [4] |
| If the project is performed based on the characteristics of technical performance and mission, and if a high level of satisfaction is achieved among the key individuals of the parent company, customer organization, and project team and users. | [7, 11] |
| A project is successfully finished if: (1) it is finished on time (temporal criterion), (2) it is finished based on the desired budget (monetary criterion), (3) it primarily achieves all primary goals (effectiveness criterion), and (4) it is acceptable and used by customers who demanded it (customer satisfaction criterion). | [5, 6] |
| Project success is one of the following: (1) completion on time and with a projected budget and desirable advantages for the company, (2) production manufacturing with high design quality and consulting services, and (4) meeting the demands of beneficiaries. | [8] |
| Project success is based on five factors: (1) project is finished on time, (2) project is finished with the predetermined budget, (3) project is finished at the expected level of quality, (4) project is accepted by customers, and (5) results permit the contractor to utilize customers as references. | [9, 10] |
| Project success is a set of principles and standards completed with favorable results in comparison with several predetermined characteristics. Project success factors are processes that must go well to ensure success for the manager and the organization. | [12] |
| Project success definitions depend on the type, magnitude, complexity, and involved individuals. Some of the critical factors of the project may not be transferable to another project due to environmental variables, the proj'ct's nature, the nature of the involved organization, and the priorities of project objectives. | [2, 13] |
| The difference between the success factors and success criterion is of considerable importance. Success criteria are those which are used to judge the project's success or failure. Meanwhile, success factors are those entering the management system that indirectly or directly affects the project's success. | [3, 5] |
| The reasons for the success of projects have taken a slower path in achieving a standard or even a certain acceptable operational framework. In this regard, achieving a specific formula with an easy method seems ideal. | [14, 15] |
| Project success focuses on the appropriate use of resources and proper management of beneficiaries. Therefore, it shows the effectiveness of project delivery. | [7, 16] |
| A project is successful when its results match its goals and are achieved on time without going over budget. "Project success" consists of separate judgments in three separate layers, namely the project manager, the project owner, and capital performance presented by the project from the investor's point of view. | [17] |
| A successful project is one that sustainably generates value. Generating value entails working with quality and creating benefits for the customer. | [18] |

factor is meeting the design's objectives, referring to the contract signed with the customer. The second one is the advantage to the end users, referring to the advantage to the clients from the project end products. The third one is the advantage to the developing association, referring to the benefit achieved by the developing association as a result of performing the project. The final factor is the advantage of the national technological infrastructure and the 'company's technological infrastructure involved in the development process. The combination of all of those factors presents the general evaluation of project success [13, 17, 27]. A lack of sufficient and comprehensive understanding of a 'project's success factors complicates the 'project's control, monitoring, and performance. Therefore, it is vital to distinguish between success metrics and success factors. Success criteria are those factors based on which the success or failure of a project is judged. Meanwhile, success factors are those entering the management system that can lead to project success directly or indirectly [8, 27]. Success factors are environmental, realities, and affective factors that can affect the project's outputs. These factors can accelerate the pace of a project or cause problems for the project. They can lead to the project's failure but cannot be considered a basis for project evaluation [5]. Project success factors are components that must go well to guarantee the manager and organization's success [13]. In a study by Nguyen et al., five key success factors were extracted from 20 factors, which included competent project manager, providing sufficient financial resources until the end of the project, competent and multi-disciplinary project team, commitment to the project, and access to resources [28–30]. Evidently, there is a connection between project quality and project performance. Therefore, people must focus on quality to have project success. In addition, organizations must focus on teams, organization, project management, product, environment, as well as related technical factors and resources to succeed [15]. American scholars have identified the following factors for project success: satisfaction of beneficiaries, the realization of project goals, not going over the project budget, finishing the project on time, added value, having access to the required quality, and professional satisfaction of the project team [16]. Given the growth of construction projects, many studies have focused on the success factors of these projects

in the past few years. Since there is still no consensus about the matter, the opinions of researchers from various countries are evaluated. By analyzing these ideas, we reach relative results: (1) time, cost, and quality are the main criteria for project success, and (2) satisfaction of beneficiaries, especially customers, is considered the second criterion of project success [17]. Project success criteria that are extremely important include value, team success, quality, commercial interests, and constraints [12]. Table 2 presents the evolution of success criteria over different decades.

Considering Table 2 and identifying the success criteria of projects according to the type of projects by managers, employers, and executives can provide a good framework for evaluating and reviewing project outputs for them. Moreover, understanding the success factors of projects can help manage the proper allocation of resources throughout the life cycle of the project.

*3.3. Review and Collection of Project Success Criteria and Factors.* There should be a distinction between the two concepts of success criteria and success factors. First, the criteria for success must be identified, and then success factors should be determined to increase the probability of project success. The basis of the information gathering step was the data collected from the library, digital, and other resources related to the literature on the subject. Accordingly, it was crucial to evaluate success criteria to predict success and to assess the level of realization of factors required for success. Overall, 23 criteria and 47 factors were identified for success following and collecting data from library resources and interviewing at least 110 experts in the field. A final review was conducted due to the similarity or at least conceptual commonality of several items or low importance of some of them to purify the criteria and factors. It is also notable that numerous different factors were extracted from literature. Therefore, each factor should have at least conceptual overlap with other factors. On the other hand, it must have sufficient comprehensiveness to convey concepts. In other words, some of the factors mentioned in several previous studies can be divided into several groups, leading to misinterpretation by the audience. Therefore, each factor must be correctly grouped to have a common border with other factors. This consensus led to summarizing 23 criteria and 47 factors into 16 and 33 critical criteria and factors, respectively, based on expert opinion following the 'country's domestic conditions. Tables 3 and 4 represent the final criteria and factors obtained to achieve project success.

*3.4. Machine Learning.* A computer program is said to learn from experience E concerning some class of tasks T and performance measure P, if its performance at tasks in T, as measured by P, it improves with experience $E$ [18–22]. Machine learning allows computer programs to identify and obtain data from the real world and implement many assignments based on the new information [19]. Machine learning of computer programming is to optimize the performance criteria using example data or past experience [20]. Machine learning is a discipline of computer science, the goal of which is to teach computers to learn with no explicit programming [21, 31, 32].

*3.5. Use of Artificial Intelligence Tools in Project Success.* In a research field, the use of artificial intelligence subsets in predicting project success has created a broad range of goals. To better understand this, they will be divided into groups of those attempting to predict project success and those attempting to identify critical success factors.

*3.5.1. Identification of Critical Success Factors.* These algorithms have been identified in the literature assessment to recognize critical success factors (CSF) as: (1) neural networks, (2) fuzzy cognitive maps (FCM), (3) genetic algorithms, and (4) the Bayesian model [22].

*3.5.2. Determining Project Success.* In addition, some articles have attempted to predict project success for the duration of the project life cycle in its initial stage or any other time of the project. These algorithms can be found for the prediction of project success as follows: (1) Bayesian model, (2) evolutionary fuzzy neural inference model (EFNIM), (3) neural networks, (4) machine learning with support, (5) genetic algorithm, (6) K-clustering, (7) bootstrap neural networks, and (8) adaptive neural networks [22].

*3.6. Using Machine Learning in Project Success.* Martínez and Fernández-Rodríguez [22] pointed out that artificial intelligence and machine learning 'methods' performance was better than traditional techniques regarding estimating the project performance due to their ability to deal with project uncertainty and today's complex environment effectively. Among the studied artificial intelligence algorithms, machine learning has the potential to improve conventional classification methods for use in construction significantly. Data mining and machine learning are promising methods for revealing invisible patterns in a large volume of data, which can be used for predicting future behaviors. The results obtained for project delay anticipation help managers classify risks related to the execution stages. Additionally, those results can contribute to the delays' detection and primary sources before their occurrence. They cannot minimize outcomes but can measure progress to success [23]. Machine learning algorithms work by learning from historical data in a way that easily complements expert opinion [24]. Over the past few decades, there have been significant advances in predictive modeling techniques and concepts of machine learning, statistics, and computer science that are valuable to researchers and organizational practitioners [25]. In a study, various machine learning methods were used and compared to predict the key performance indicator (KPI) of the project in critical project stages. Moreover, a framework was presented to measure and predict a set of qualitative KPIs by using various machine learning techniques [26]. Moreover, a machine learning method was used to generate a model that could

Table 2: The evolution of success criteria over different decades.

| Success criteria | The 1960s | The 1970s | The 1980s | The 1990s | The 2000s | The 2010s |
|---|---|---|---|---|---|---|
| Project | — | — | — | Scope, type, complexity, size, and project life cycle | Type, scope, clear goals, and actual budgeting | Type, scope, clear goals, and budgeting |
| Project management | Scheduling feedback | Schedule monitoring, control, scheduling, and review | Scheduling, communications, cost estimation, funding, financial support, and reasonable needs | Feedback, communication, decision impact, and planning monitoring | Scheduling control, management actions, scheduling, control, decision-making, and communication | Scheduling control, control, decision-making, and control of all project management actions |
| Public management and organizational aspects | Senior management support | Public management support | Senior management support, public management efficiency, and organizational aspects | Organizational structure, safety and quality programs, and senior management support | Flexible management, change management, and organizational structure | Change management, organizational structure, and risk management |
| Procurement, purchase, and preparation | — | Resource allocation | — | Preparation and maintenance procedures | — | Precise control of resource allocation |
| Environment | — | — | — | Social, political, and technical | Economics, political, physical, social, technical relations of industries, education from past experiences, and organizational culture | Learning from past experiences, organizational culture, and environmental factors |
| Individuals | — | Project management | Customer profile, individual capabilities, project management, project team quality, and individual strength | Project management experience, commitment, competence, ability, authority, customer power, customer type, customer/consumer conflicts, team spirit, level of service, and contractor team components | Customer experience, size, quality expectations, continuity duration, team leader planning, organization, dynamics, control capabilities, customer approaches, stakeholder management, and contract flexibility | Customer experiences, stakeholder expectations, team leader planning, organization, control capabilities, stakeholder management, team spirit, team success, and business interests |

predict the safety performance based on leading indicators regardless of the number or type of leading indicators available [27]. In another research, the goal was to find ways to increase executive efficiency and the use of novel project management technologies by integrating them with artificial intelligence technologies. To solve these problems, the causes of lack of success or unsuccessful management of project were assessed in the area of the extreme increase in project management information flow, the criteria of the effect of materials on project results were prioritized, and artificial intelligence was categorized in their use for project management. Therefore, artificial intelligence tools and technologies can effectively help the management of complex projects with large data flows [28]. The goal of predictive models developed by machine learning is to improve performance by increasing the prediction of KPIs. The project results can be improved if the predicted results are unfavorable and corrective measures are taken. Therefore, it will be difficult to evaluate model predictions. Accordingly, it can be learned that machine learning concepts are a good way to understand the performance and success of a project [29]. Project delay is one of the most important challenges of construction, which is attributed to the complexity of the sector and the interdependence of its inherently delayed risk sources. Machine learning is an ideal technique for dealing with such complex systems. This study aimed to identify and develop machine learning models to accurately analyze project delay risks and prediction by using objective data

Table 3: Final project success criteria.

| Symbol | Project success criteria |
|---|---|
| C1 | Completion of the project with the approved budget |
| C2 | Completion on time |
| C3 | Maximum achievement of safety indicators |
| C4 | Compliance with quality standards |
| C5 | Satisfaction of all stakeholders aulfilmentent of their demands (employer, consultants, contractors, employees and personnel, customer and users, and people) |
| C6 | Alignment with the environment |
| C7 | Gaining commercial and other benefits |
| C8 | Alignment with organizational goals and strategies |
| C9 | Minimal changes in organizational culture resulting from the project in the organization |
| C10 | Increased level of knowledge in the organization |
| C11 | Creating motivation for future projects |
| C12 | Minimal impact of the project from environmental factors (political, economic, and cultural) |
| C13 | Stability of management strategy |
| C14 | Achieving specific project goals |
| C15 | Minimal changes in project scope |
| C16 | All participants' similar perceptions of project success |

Table 4: Final project success factors.

| Symbol | Final success factors |
|---|---|
| F1 | Provision and allocation of financial resources |
| F2 | Emphasis on goals (time, cost, and performance) |
| F3 | Forming the right team (finding the right people, providing the necessary resources and motivating the overall understanding of the project) |
| F4 | Teamwork (cooperation, confidence, and trust) |
| F5 | Selection of suitable contractors (history, financial capacity, competence, and commitment) |
| F6 | Selection of suitable consultants (history, financial capacity, competence, and commitment) |
| F7 | Attracting workshop manpower |
| F8 | Creating clear and logical goals |
| F9 | Change management and readiness to accept changes in the system |
| F10 | Delegation of authority by senior managers (giving sufficient authority) |
| F11 | Support by senior managers (in times of crisis) |
| F12 | Behavioral and professional skills of managers and engineering team |
| F13 | Managers' attitudes based on the views of the private sector or the public sector |
| F14 | Adequacy of related knowledge and experience in the employer organization |
| F15 | Existence of executive history in organizations |
| F16 | Existence of appropriate organizational structure at each stage |
| F17 | Continuous, transparent, accurate, and fast communication |
| F18 | Proper and timely rotation of information and correspondence |
| F19 | Existence of appropriate reward and motivation systems |
| F20 | Existence of appropriate educational structures in the project life cycle |
| F21 | Transparency of project specifications (teacher and executive plans) |
| F22 | Alignment with organizational strategies |
| F23 | Clarity and speed in providing technical solutions |
| F24 | Financing reference (national, provincial, and private) |
| F25 | Providing quality materials, equipment, and machinery |
| F26 | Existence of executive history of the application of new technologies |
| F27 | Existence of experience in using the quality control system |
| F28 | Inflation rate |
| F29 | Familiarity with government laws and regulations and their observance (e.g., safety and environment) |
| F30 | Familiarity with the geographical conditions and climate of the project |
| F31 | Awareness of the project (needs, wants, activities, and acceptance criteria) |
| F32 | Existence of planning process throughout the life of the project, scheduling, risk management, and resource planning |
| F33 | Existence of a control system throughout the project life cycle (evaluation, comparison, providing accurate, and meaningful information) |

sources. Accordingly, the delay risk factors and sources were identified first, and multivariate datasets of previous projects' time performance and sources of delayed risk were prepared. Afterward, the complexity and interdependence of the system were discovered through the analysis of exploratory data. Ultimately, the work presented here benefited from machine learning's power to facilitate evidence-based decision-making [30]. A machine learning approach can be presented to predict the project performance based on various criteria of entrepreneurial orientation and entrepreneurial attitude of individuals to analyze and predict project success [31]. A study proposed guidelines for applied machine learning (AML) for the construction industry. This study is a part of the development of a machine learning-based construction simulation tool, the goal of which is to use historical data for automation or facilitation of construction activities, such as opportunity selection, design optimization, construction estimation, and project execution in line with project success [32].

## 4. Discussion

This study can be divided into three main areas of project success, machine learning, and its use in project management. Therefore, the following results are summarized. The result of the first section showed that projects exist to achieve the strategic goals of their respective organizations. Notably, the importance of project results is related to achieving success and achieving the goals of relevant organizations as well as gaining the satisfaction of their stakeholders. Studies conducted on project success can be divided into two sections; research that seeks to assess the success of projects and research that is formed to predict project success. The first class of studies is often developed to more accurately understand the concept of success, determine the criteria for success and present solutions to evaluate the success of projects. The second class of studies is performed on project success to present a project success prediction model. Among the research proposed for future studies, new artificial intelligence methods, especially machine learning, are the newest and most widely used methods for predicting the project's future. Some of the advantages of this method include high accuracy, learning ability, the ability to adapt to conditions and uncertainties, the ability to self-assess, simplicity but at the same time high strength, and no need for heavy mathematical operations. According to the study's results, project managers must use novel techniques to predict the project performance and success due to the limitations of conventional approaches. Even though managers still need to evaluate the success of a project based on time, cost, and quality, it is crucial to identify factors that determine the project performance from the perspective of a person. In this respect, the current research proposed new criteria that affect the project performance. In addition, we identified the most effective project performance factors for the success of construction projects. For instance, the technical aspects of a building are of great importance and are incredibly suitable for forecasts. While external factors and technical aspects of a building are significant for the success of a project, human factors can have the most impact on the project performance. Our findings provided a new insight for researchers in the field of project management to understand the effect of project success factors that directly affect the project performance.

## 5. Conclusion

To sum up, all the notable findings and results of the present research can be summarized as follows:

(1) Given in the literature, success was identified as a multifaceted and complicated concept, and different people have different perceptions of it. This can be said because no consensus regarding the idea of success can be achieved among all stakeholders of a particular project.

(2) According to library studies and expert opinions and employing tools, including interviews and electronic questionnaires, we identified 16 and 33 criteria and factors for project success, respectively, while considering domestic conditions.

(3) Factors, including role, type, position, goals and stakeholders' approaches, and several other elements result in variations in the priorities and weights of each of those sixteen criteria amongst project stakeholders. Each stakeholder provides their definition of project success according to the importance and priority of standards related to the position and role of their organization in the project, which leads to multiple definitions of this term.

(4) Using machine learning tools and algorithms to connect project success factors and criteria and prediction can lead to many advantages, such as high accuracy, ease of use, and inference for decision-making.

According to the study's results, artificial intelligence tools, such as machine learning, are more accurate than conventional instruments. Nonetheless, they are still used as a complement to traditional tools. These tools can highly benefit project managers in project monitoring and control. Nevertheless, some of the evaluated models had weaknesses, demonstrating that project managers should still use allocation judgment and compare results with conventional tools before making the necessary adjustments. Best results when integrating AI tools with project-specific tools, such as CAPP, which allows real-time analysis, and PDRI, which allows you to evaluate how a project is defined in its early stages before a project starts, can allow us to provide solutions that project managers can use to prevent possible risks based on previous experiences.

Algorithmic solutions should be integrated in a way that project managers and their teams can sufficiently use them to improve project success by reducing possible risks before their occurrence and guiding the project toward achieving its goals. The current research contributed to construction studies by showing machine learning as a project

performance evaluation method. The causes of delays and excessive cost increases are significant in the construction industry, while the goal is to optimize and increase productivity. Success or failure factors are described in detail that can be used in prediction using machine learning methods. Overall, such intelligent platforms affect the practical situation by addressing the need to convert multidimensional historical data of completed projects to the value of large corporations. Such a value enables construction companies to avoid evidence-based knowledge and data-backed decisions to prevent future construction failure. It can be concluded that machine learning concepts are a suitable method for understanding the project performance.

Thus, the suggestions below are recommended for future outlook:

(1) Proposing a model of success prediction by utilizing machine learning tools;

(2) Determining predictive models by recognizing the related success factors;

(3) Presenting a model for specific projects;

(4) Offering a model by simultaneous integration of evaluator models and success prediction models.

## Data Availability

The data are available upon request.

## Conflicts of Interest

The authors declare that there are no conflicts of interest.

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