

Project Selection Criteria: A Review of Literature from the Last 20 Years

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Abstract

Project selection is a critical component of strategic management and organizational development, as it directly impacts resource allocation, risk management, and overall project success. This paper provides a comprehensive review of the literature on project selection criteria over the last two decades, spanning industries such as construction, healthcare, information technology, education, and manufacturing. This study identifies key factors influencing project selection, including financial metrics, resource optimization, risk management, and alignment with organizational strategy. Specifically, in the context of the corporate environment, such generic values as success measurement by financial indicators are still dominant, as opposed to such values as sustainability and corporate responsibility which have emerged as critical in the twenty-first century. Nevertheless, the public sector tends to consider social objectives and legal requirements, which may apply multiple divisional goals. Lastly, the review provides some implications for the study on project selection and concludes that both the quantitative and qualitative methods should be adopted. This study provides valuable insights for practitioners and researchers by consolidating past approaches and identifying future trends. This study also suggests a more holistic approach to project selection, incorporating both traditional metrics and emerging priorities.

Keywords

Project management; Project selection; Selection criteria; Construction industry; Education sector

1. Introduction

Choosing right projects is core competency of project management since it defines organizational strategic objectives and impacts success rate. Project evaluation refers to the act of assessing a number of projects to possibly fund or undertake when comparing with other projects against criteria in order to make the best decision for overall project selection. It is the objective of this literature review to consolidate these studies effectively define criteria-based methodologies and tools used with respect to project selection in various fields including healthcare sector, construction sector, information & technology sector, education sector and manufacturing & operations sector. Thus, it is crucial to grasp the role and significance of choosing projects in today's commercial contexts as pivotal for an organization's performance and longevity. An effective project selection process helps an organization to harness talent and funds for the right projects, ensure that efforts are focused towards achieving organizational objectives, and to avoid bad debts, thus improving on the performance of the organization. In today's world of complex and competitive markets, it cannot be enough just to apply simple tests for evaluating projects and choosing the right ones. Many works in the past focused on the variety of methods and criteria applied to assess projects for inclusion in the portfolio in various sectors and settings. For instance, Shenhar et al. (2001), argued that the principle of improving performance and competitiveness can be achieved by integrating projects with the organizations strategic business goals. Martinsuo and Lehtonen (2007) pointed out the same idea emphasizing the strategic use of portfolio management for selection of projects, and stressed that the cause of managing is to provide a systematic and rational

process for evaluating and prioritizing the projects according to their alignment with organizational objectives and available resources.

This literature review paper Aims to bring together all the existing literature on the selection criteria for projects with extensive consideration of both the conventional and novel models. Based on theoretical concepts, qualitative and quantitative research and analysis of several case studies the present paper aims to identify major project selection criteria and future trends. It is focused at providing a concise explication of the potential determinants of project selection and at the same time to answer the questions arising in practice and to give recommendations to practitioners who want to advance their approaches to project selection. Learned theories in this paper seek to select the right project as one that has diverse facets imperative for organizational productivity. Thus, it is expected to add a valuable input in furthering the understanding and knowledge of project management while furnishing useful tips for both the researchers and practitioners in the field.

2. Methodology

The study conducted a systematic review of literature, focusing on articles published between 2004 and 2024 that explored criteria for selecting projects. The literature search was performed using academic databases, including Google Scholar, with key terms such as "project selection criteria" across various sectors.

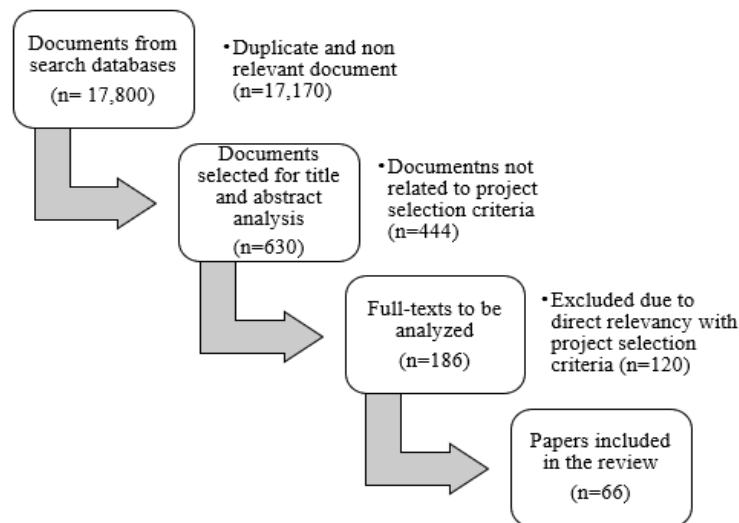


Figure 1. Selection Procedure of Articles for literature review

Papers were selected for review if they were published within the specified timeframe, discussed approaches, methods, or algorithms relevant to project selection criteria, or introduced innovative methods, structures, or strategies. Articles were excluded if they were published before 2004 or were duplicates or irrelevant to the research topic. The aggregated data has been analyzed to identify general patterns, emerging methodologies, and gaps in the existing literature on project selection criteria. To understand the latest advancements, difficulties, and potential for further study in this area, an analysis of the results was carried out. Figure 2 shows the increase in the frequency in using research in selecting criteria for project over the years. Such upward trend signifies the increasing concern and development of this area in the world and more in the last decade.

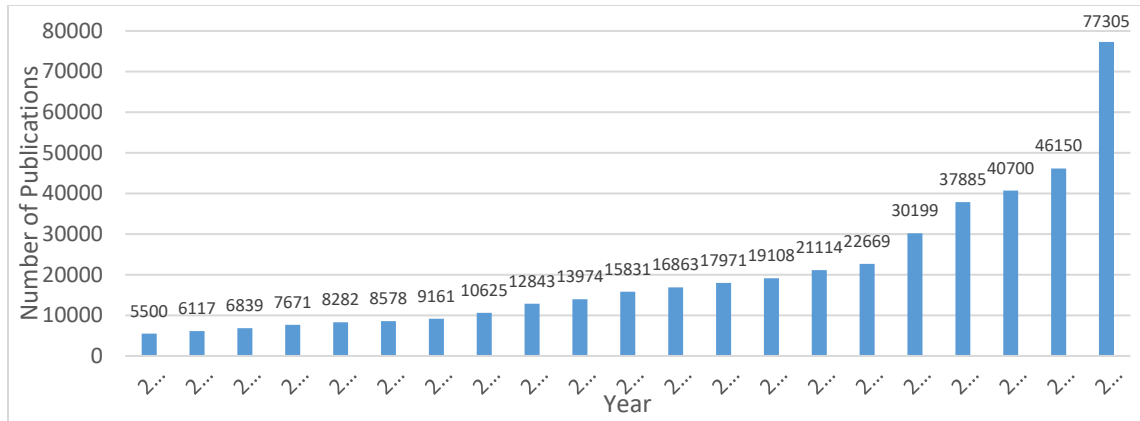


Figure 2. The number of publications on project selection criteria since 2004 (Source: Scopus)

3. Project Selection Criteria

3.1 Project Selection Criteria for Construction Sector

The construction industry is paying much attention on sustainable practices more than before and the following are numerous examples of studies done to explain different aspects of achieving this. For example, Figueiredo et al. (2021) develop a method known as Life Cycle Sustainability Assessment in construction project material selection by utilizing BIM Fuzzy-AHP so that sustainable environment, economical, and societal impacts may be considered at the same time. Kanyilmaz et al. (2022) argue that integrating metal structural component 3D printing can increase quality and give optimal resource consumptions that are beneficial for the construction industry to take up metal 3D printing technologies for better results. In Bahrain, Aljawder et al. (2024) engage in the evaluation of the applicability and importance of utilizing technology management principles and artificial intelligence for the support of lean construction practices as a sustainable development concept that is valuable for the public sector projects. Furthermore, other authors such as Agyekum and Augustine (2022). examine COVID-19 in Ghana and its effects on construction with the study finding disruption and suggesting ways measures to reduce similar impacts. Smart contracts used in the construction industry in the UK are considered based on technological, organizational, and environmental factors, which suggest the adoption of digital advances in the construction business (Badi et al. 2021).

Linguistic approaches such as the generalized comparative linguistic ELECTRE III enhances the contractor selection processes through incorporation of an expertise judgment system that enhances the decision making towards constructions (Chan and Chan 2004). Likewise, it is apparent in the Dutch construction and construction material industry as concrete aggregates obtained from demolished structures are recycled (Yu et al. 2021). Another important factor regarding AEC firms is, the factor of Building Information Modelling (BIM), which improve the design and visualization and the coordination of a project (Abbasnejad et al. 2020). It is a kind of progress in construction strategies that is vital for the improvement of sustainability and innovation; for instance, there are more design approaches to be increased to circular economy (Eberhardt et al. 2022).

Among the outcomes, one could identify the evaluation of environmental assessment based on the life cycle assessment and green building rating systems as they offer a more complex tool to quantify environmental impacts of buildings and raise the level of sustainable construction practices (Sartori et al. 2021). Likewise, the risk factors involved with Modular Integrated Construction (MIC) that will apply to all projects are aligned in their execution and their impact need to be systematically managed to eliminate threats of their realization (Wuni and Mahmud 2022). Additionally, the identification of critical delay factors is ever helpful, and valuable when it comes to the Malaysian construction projects; this is because it offers clues on what has been done well or poorly in managing the projects and how each can be handled moving forward (Yap et al. 2021). There is a wide range of topic in construction that Luo et al. (2021) bring in that starts from construction policies in China as a nation to the detailed site selection of hospitals and offshore wind farm right to identification of risk priorities for sustainability construction project. There is also an informational note on the stapling that has introduced prefabricated construction in China, with a focus on achieving the strategic development of this important country in the next years. Adalı et al. (2022) also underlined

the need of accessibility and the right site in managing healthcare services, which was discussed in their paper called “Distance-based multi-attribute decision making approach in the hospital site selection process”.

The study entitled, ‘An exploration of new and emerging risks in sustainable construction projects: Identification and categorization of risk priorities and directions for future research’ by Qazi et al. (2021) has an objective of risks in sustainable construction projects which use risk matrix along a Monte Carlo Simulation to address the issue of diversified concerns to sustainability in construction. Parsamehr et al. (2018) points out the problems that can occur when transitioning from expectations to plans in the construction field and introduces scheduling, cost and quality, and safety aspects of construction projects and examines how BIM can be of advantage in construction project management. For example, working on a global analysis of delays in construction industry, Sanni-Anibire et al. (2022) who conduct a meta-analytical review identify poor operational management and lacking preparation as some of the leading factors for delays in construction. Chan et al. (2021) identified critical success factors that could consider in assessing the construction success; minor site accidents are resulted mostly due to workers carelessness. Tang et al. (2010) have studied the risk allocation preferences toward UK PPP construction projects in this regard was preferred risks were site availability and political risks. Bilal et al. (2016) illustrates a note that Big Data and how it can be utilized to calculate project delay was also discussed; they conducted a literature survey to outline the future trends of Big Data in construction.

3.2 Project Selection Criteria for Healthcare Sector

Medical and health care has been met in many articles as a decision-making process for the application of Analytic Hierarchy Process (AHP)-as one might expect, primarily project and technology evaluation method, waiting ahead but human resource planning to use illustrations are included management (Liberatore and Nydick 2018). In addition, a number of systematic reviews have established that health care communities of practice are made to improve clinical performance and patient outcomes like the Ranmuthugala (2011) example. The National Institutes of Health (NIH) consensus development project also offered important guidelines for clinical trials in chronic GVHD that highlighted the coordinating role with the American Society for Clinical Oncology (Kitko et al. 2021). Finally, a systematic review presents the factors that determine primary Integrated Data Elements from EHR for primary care data collection projects and approaches to identify organizational factors that may influence routine data collection (Gentil et al. 2017).

The mental health care system in Uganda was described in detail through a survey of public sector services utilizing WHO’s assessment tool while no data was available on private-for-profit service. The mental health care system in Uganda was described comprehensively by surveying the public sector services with the WHO assessment instrument, and if no, what was missing? To maintain and improve consistency and methodological approaches of scoping reviews particularly across papers conducting scoping review of scoping reviews, Pham et al. (2015) encouraged inter-sectorial cooperation, especially since most scoping reviews were within the sector of health. Siriruttanapruk and Anantagulnathi (2004) conducted a review on occupational health and safety at workplace in Thailand and the commitment to the WHO Healthy Work Concept and initiative to create consciousness regarding occupational health promotion among workers. Karamitri et al. (2015) critically appraised the literature for knowledge management practices in healthcare, found many studies not related to the healthcare but noted down that only researches fulfilling various criteria were included. Moraros et al. (2016) also appreciated a body of knowledge that was derived from lean implementation in the automotive and manufacturing industries and evaluated patient, worker satisfaction, health, and financial implications.

Yaqoob et al. (2021) presented an outline of the prospects of blockchain in establishing the handling of healthcare abstracts, the problems to be presented, as well as existing projects that have embraced the notion. Dash et al. (2019) covered the aspects of big data management and analysis in the several fields including the healthcare stressing on the role of big data integration of biomedical data into modern healthcare. Mockford et al (2012) undertaken a systematic review of PPI in the UK NHS to identify a handle that showed that: PPI enhances the delivery of healthcare services and influence Institutional staff perceptions. The same view is supported by Ebi et al. (2020) , who also points out that the available M&E indicators enable researchers or planners to identify climate change in terms of health impacts, risk, adaptation, and resilience so that the tool has to remain adaptable for developing future health adaptation projects Thune and Mina (2016) discuss the innovation of hospitals in the health care sector to the advancement of medical care, and these scholars highlight three main streams of research that is inclined to medical innovation and technical alterations in human health care. This paper by Thokala et al. (2012), examines and categories MCDA within health technology assessment and argue about the suitability of MCDA work at several systematic levels. The authors stated

that Rojas et al. (2016) present a literature of process mining in healthcare with exploring the general: This identifies process mining projects when targeting healthcare processes and highlights considerations for applying process mining in healthcare organizations.

3.3 Project Selection Criteria for Information Technology Sector

In the introduction of ERP projects, Aloini et al. (2007) review encompasses a synthesis of literature relating to the risks of ERP projects, where it was noted that proper risk management requires both business and technology savvy project teams. It shows how such competencies help in promotion of efficient risk assessment models that different sectors. Cresswell and Sheikh (2012) have discussed the issues of using health information technology innovations in organizations emphasizing the concept of a complex interplay of factors of technical, social, and organizational natures. Or and Karsh (2009) variables in improving patient's acceptance of consumer health information technology; antecedent factors in CHIT acceptance. Study by Ngai et al. (2008) proposed critical success factors for ERP implementation, in which the goals of the ERP adoption process should be properly outlined with high level support from above.

In a similar manner, Lacity et al. (2010) provided details of the empirical source of information on IT outsourcing and highlighted the features of IT outsourcing analysis with an accent to consider its impact on different levels from the country level up to the IS staff. Similarly, in this 2008 reflection on information systems in developing countries, Avgerou(2008) recognized that these technologies require extensions of the classic technology adoption models to include the socio-economic environments surrounding them. According to Fichman (2017), there is the need for broadening the IT innovation research to accommodate the new ideas and approaches in that area with the emphasis that fast pace of working through projects is beneficial for business processes. Watson (2014) identified the broad industry implications of Information Systems, further emphasizing the need to pay adequate attention when managing such projects in their survey of information systems outsourcing literature. Cerovsek (2011) presents the BIM progress and potential matters and assign multi-perspective approach to boost BIM technology as well as professional disciplines as well as project stage.

Mignerat and Rivard (2009) highlight the usefulness of institutional perspective IS and IT and some that facets that these theories are contain, of which are: IT innovation, IS development, implementation and use and IT adoption. Having aggressively searched many articles on innovative technologies for 'smart home' for aging societies, Demiris et al. (2008), identified several projects across the world and provided an assessment of the technological frameworks and outcomes. While Manavalan et al. (2019) offer a literature on IoT applications in sustainable supply chain to understand the industry 4. On the other hand, there are none obligations but there are guidelines of how firms can assess their susceptibility or readiness for such change. Roberts et al. (2012) absorptive capacity in Information System, the approach adopted to measure absorptive capacity addresses concerns of article knowledge transfer and technological use. Lorena and Lochinvar (2016) present an analysis of smart grid technologies, with various policies, pilot, and placing IT into different electric utility structures.

3.4 Project Selection Criteria for Education Sector

Halai (2013) does a comparative analysis of private sector universities in Pakistan and the analogous public universities, based on the Higher Education Commission rankings obtained in 2012, and determines the disparity in quality of education obtainable at these universities. In the context of higher education services, Sunder (2016) definitional dimension of quality explicates the major quality themes important to it and the limitations of the important quality practices in the higher education system. Patterson et al. (2016) on the use of the systematic review to determine the efficacy of selection methods in medical education note that there is limited literature on the topic of the selection system blueprint. Karkouti (2016) provides a review of the literature on professional leadership practices and diversity in U. S. higher education and concludes that despite relatively progressive advancements in diversity, minority faculty continue to suffer from marginalization. In the NEPAD e-Schools initiative, Evoh (2007) raises issues on how this policy network has brought changes to the secondary education system in Africa through the use of ICTs; the opportunities and threats that this policy network presents in order to enhance the secondary education systems.

Per reviewed literature, Defranco and Laplante (2019) systematically review Internet of Things (IoT) in education identifying strengths and weaknesses for students, instructors, and the education system. They pointed out that Cisco played the role of participating in the start of several initiatives in IoT that focused on improving learning outcomes. This article by Ertl et al. (2008) discusses prior findings on the student learning in higher education and analyses the

sector in terms of its expansion and the impact of political overtones. Suleman (2007) focuses on employment competencies among graduates in higher learning institutions and the concepts and approaches that need to be adopted in measuring these competencies while also stressing on belief formation in learning. Baartman et al. (2007) comparisons of two frameworks of assessment quality within competence-based education indicate the necessity of stakeholders' engagement in assessment. Balamurali Hara et al. (2007) investigate the virtual laboratory of PEARL and extend it to engineering education, where there have been substantial technological advancements suitable for a large target audience.

Barakabitze et al. (2019) investigate the digital transformation capabilities of Information and Communication Technologies (ICTs) for globalizing and scaling STEM education within African educational systems, while highlighting prevailing ICT challenges and opportunities. They focus on ICT Projects in Uganda with special emphasis on their impact on the education sector. Rubrics have been used to specify learning goals and criteria for both instructors and students and are linked to improved student understanding in science education contexts (Allen and Tanner 2006). Consequently, Mikre (2011) takes stock of the roles that ICTs are likely to fulfil in education with particular reference to computers and the internet and posits that unless input factors are carefully considered-successful implementation is unlikely. Valerio et al. (2022) provide a comprehensive analysis of global entrepreneurship education, with an emphasis on the critical elements that can enable better integration and success of E&T programs within mainstream education. Jongbloed et al (2008) examined the links and interface between university and community and raised research questions that would stimulate further knowledge of these dynamics. In Pakistan, despite the prevailing global pandemic, Khan and Abid (2021) investigated the difficulties and facets of online learning in engineering institutes due to COVID-19 and underscored specifically on the need for quality assurance in e-learning. Donitsa-Schmidt and Ramot (2020) adapting Israeli Teacher Training to the 21st Century Industrial Revolution Begun by a Pandemic In line with these discussions. Ozsen et al. (2022) conducted a systematic literature review on the strategic adaptation of sustainable quality management in universities via applying the SERVQUAL model in higher education. Maaz et al. (2008) found that further between-school tracking created a social gradient in educational outcomes at age 18, with decision-making at the educational transitions favoring low SES students.

3.5 Project Selection Criteria for Manufacturing and Operation

Subramanian and Ramanathan (2012) in their extensive review of AHP applications in operations management in production contexts point to the usefulness of AHP method as a facilitating tool for project estimation, planning, and control. In this line, Mourtzis (2020) offers an overall presentation regarding manufacturing simulation technologies for product, process and system design and application by mentioning new directions and experiences in the industry. Baldea et al. (2017) in the chapter status, challenges and opportunities of modular manufacturing processes: pure advertisement or a solution over centralized processes, economic advantage, project time saved. the author writes about Modular manufacturing processes and highlight that deploying project in ways which are modularly organized has competitive economic advantages over centralized processes. Salah et al. (2010) focus on the Six Sigma & Lean management integration in project selection, financial benefits and the standardized operating procedures. Albliwi et al. (2014) several studies have identified the causes of project failure in Lean Six Sigma projects worldwide and across different sectors, one of which fails due to inappropriate method selection criteria or lack of knowledge during lean implementation. Albliwi et al. (2015) in a systematic review of Lean Six Sigma applications specifically within manufacturing highlight the success that Lean Six Sigma methodology has had in increasing operational effectiveness whilst reducing quality costs and improving financial performance.

Gebremariam and Marchetti (2018) argue about biodiesel production economics, where vegetable oil feedstock cost accounts for 77 % of total operating cost in the small biodiesel production facilities. Thoben et al. (2022) give an account of "Industry 4. 0" and smart manufacturing, focusing on the step-by-step integration of advanced technologies into manufacturing processes within the supply network, with illustrations from the initial Industry 4. 0 projects in Germany. Rawat et al. (2013) do review biodiesel production from microalgae, where they point out that scale up issues from lab to full scale production and identify the need to use microalgae with high lipid content. Specifically, Taylor et al. (2012) discuss sustainable manufacturing trends and research issues in general as well as the integration of the advanced control system for better levels of manufacturing. Gahm et al. thus present a review of energy efficient scheduling in manufacturing with a framework that aims at the efficiency of both the product assembly and energy production processes (Gahm et al. 2015). Meyer et al. (2011) have comprehensively assembled a literature about the biochar production technology as well as technology- technical – economical, and SAR/GHG. Thus, it stresses the

need of data availability of the biochar projects and concern with the biochar systems efficiency with regard to the successful operation of electric power facility for its 10,000 hrs. over the two years. In their study of the determinant of product and process innovations Avermaete et al (2004) describe that these 65 SMFs are from various geo strategic location context in which most of the firms operate from mature low technology location for food production InovaLoc. These authors based their outputs on the information collected from the European Innovaloc project. Jiménez et al. (2019) in their article gives an understanding of the current and emerging trends in additive manufacturing technologies based on organizational AM capability to produce relatively affordable 3D printing processes.

4. Result

Figure 3 illustrates the distribution of research papers across seven main criteria where total papers is 66, reflecting the overall scope of the study: resource optimization, risk management, financial metric, sustainability, social responsibility, legal requirement, and organization-strategy alignment. Based on the graph below, it is clear that financial metric has been the most explored theme with about 59 papers while strategic fit has attracted 52 and resource optimization 45 papers. Risk management has managed to attract relatively a moderate attention by contributing 38 papers. On the other hand, sustainability and social responsibility are explored with 33 and 30 papers, respectively. Legal requirement has minimal focus with only 21 papers showing that there is lack of extensive research on the regulatory dimension.

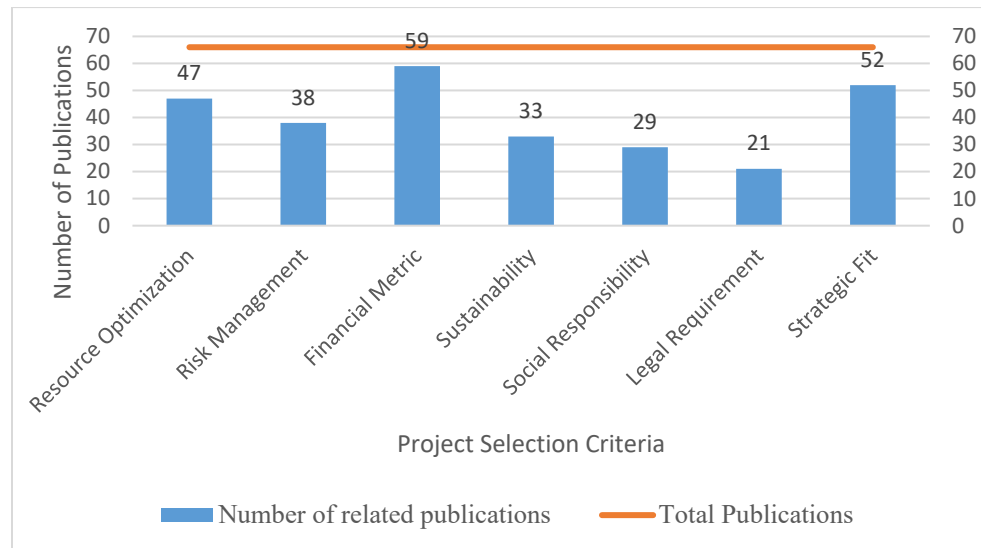


Figure 3. Project selection criteria in different publications

5. Conclusion

The synthesis of literature on the compilation of project selection criteria disclosed the complex factors involved in choosing projects across sectors. Every analyzed article demonstrates like priorities such as achieving project objectives, efficient resources management, and effective risks management. Yet, extrapolations of the objective financial measurements as the major criteria in project prioritization still persist with increased incorporation and emphasis on strategic fit and risk analysis as the criteria that embrace the project selection approach comprehensively. Incorporating the selection of projects in the corporate world, the key criterion that tends to be most commonly used is return on investment and more importantly its relation to the strategic plan. It is common to find peoples using such methods as cost-benefit analysis and net present worth calculations. However, recent development suggests the consideration of green and sustainable aspect, as well as social responsibility as a criterion of the selection. On the other hand, the public sector evaluation criteria include those that consider social outcome, public interest and the regulatory requirements. Here, strategies such as the multi-criteria decision analysis strategy are applicable to address similar and at times competing objectives. The technology industry best illustrates these trends because it prioritizes innovation, the development of new products and services, and rapid market saturation in a manner that is not as common in other industries. Common key success factors in this field include technology, possible innovation, and correspondence with the preferred technological tendency in the project's implementation. Project management structures are indeed flexible, with methodologies such as agile and lean dominating the business environment, which

focuses on constant work and progress in small steps. On the other hand, the sector of healthcare concerns with possible outcomes, rules and ethic, and effective expenses. Important considerations in this area include scientific evidence on effectiveness, risks and adherence to health standards at the regional and national levels. This is because organizations will need to be able to sharpen and evolve the project selection processes as organizations move in an uncertain and complex environment. Further studies should investigate the role of data analytics, artificial intelligence, and machine learning in improving project selection to provide better and faster decisions. Thus, such changes allow organizations to be more prepared in order to guarantee the accomplishment of strategic goals and increase organizational performance

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