A Systematic Review of the Literature on Decision Making in Capital Budgeting

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Abstract

This study aims to systematically review the literature on decision-making in capital budgeting, focusing on influencing factors, evaluation methods, and challenges encountered in practice. The research method employs *Systematic Literature Review (SLR)* analysis with the assistance of Watase Uake, Publish or Perish, ScienceDirect, Emerald, MDPI, SSRN, Scopus, Google Scholar, and Sinta, resulting in 27 relevant articles published between 2015 and 2025 that align with the research topic. The findings reveal that capital budgeting decisions are influenced by internal factors such as managerial competence, corporate governance, and information quality, as well as external factors including economic uncertainty, regulation, technology, and sustainability pressures. Traditional methods such as *NPV, IRR,* and *Payback Period* remain dominant, while advanced approaches like *Real Options, Fuzzy Logic,* and sustainability-based frameworks are emerging. Key challenges include data limitations, market volatility, methodological complexity, and behavioral bias. The study provides practical insights for financial managers to improve investment evaluation by integrating influencing factors, methods, and challenges into a more adaptive decision-making framework.

Keywords: capital budgeting, decision-making, internal and external factors, investment evaluation methods, challenges.

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INTRODUCTION

The increasingly dynamic global economic development requires companies to make appropriate and adaptive investment decisions. In this context, *capital budgeting* plays a vital role as the primary mechanism for assessing the feasibility of long-term investment projects that directly impact the organization's growth and sustainability. Although its basic principles focus on cash flow management and profitability measurement, *capital budgeting* practices now face an increasingly complex business environment, characterized by market uncertainty, economic volatility, and increasing pressure for sustainable business practices (Smit, 2025 ; Hunjra *et al.,* 2024). This requires companies to rely not only on financial considerations but also on social, environmental, and governance factors that influence the direction of investment decisions.

From an internal organizational perspective, various studies show that *capital budgeting* decisions are influenced by factors such as managerial competence, corporate governance, and the quality of available accounting information (Nunden *et al.,* 2022; Mirza *et al.,* 2020). As emphasized by Usman et al., management as decision-makers requires various types of information to appropriately consider each type of choice and arrive at the best decision. To

assist management in making sound decisions for the business and the issues at hand, management accounting plays a role in providing information from accounting data. This perspective emphasizes that the quality of accounting information is crucial for ensuring rational, data-driven investment decisions. This makes it relevant to the context of capital budgeting, which prioritizes economic evaluation and project sustainability. However, in practice, the decision-making process is often not entirely rational. The phenomena *of bounded rationality* and behavioral bias remain obstacles to ensuring the objectivity of investment decisions, especially in companies with limited resources and financial literacy (Morales Burgos *et al.,* 2020; Cho, 2024). This raises questions about the extent to which an organization's internal capacity can compensate for the complexity of an increasingly challenging investment environment.

External dynamics such as regulatory changes, technological developments, and increasing demands for corporate social responsibility are also changing the *capital budgeting* paradigm. Companies are now faced with the necessity to consider sustainability, environmental, and governance (ESG) aspects in the investment evaluation process (Frost & Rooney, 2021; Martin, 2021). On the other hand, the emergence of new approaches such as *real options, multi-criteria decision making* (MCDM), and sustainability-based models signifies an evolution towards a more adaptive decision-making system (Alderman *et al.,* 2022; Nugroho et al., 2022; Mohamed *et al.,* 2025). However, the effective application of integrating these various approaches in the context of modern business remains an open area of study.

Although several studies have reviewed the factors influencing investment decision-making and the evaluation methods used, comprehensive studies that integrate internal and external aspects, assessment methods, and the challenges of implementing capital budgeting remain limited. Most previous studies only highlight one dimension separately, such as financial aspects, risk, or sustainability, without linking them to managerial behavior dynamics and changes in the global business environment. Therefore, a literature review is needed to comprehensively map the interrelationships between these factors, providing a complete understanding of the effectiveness of investment decisions in the digital and sustainable economy era.

This study aims to provide a more comprehensive understanding of contemporary *capital budgeting* practices through a *Systematic Literature Review* (SLR) approach. Specifically, this study focuses on three main objectives, namely: (1) Identifying internal and external factors that influence decision-making in *capital budgeting* (RQ1), (2) analysing the investment evaluation methods and approaches used in *capital budgeting* practices (RQ2), and (3) identifying the challenges faced by organisations in implementing *capital budgeting* amid economic, technological, and sustainability dynamics (RQ3). Through this study, it is hoped that a conceptual framework can be obtained that can serve as a basis for more adaptive, integrated, and sustainability-oriented financial management research and practice.

Literature Review

Capital budgeting is a process used by companies to assess and select long-term investment projects that are considered most profitable. This process helps management determine whether a project is feasible by considering cash flow, rate of return, and possible risks. According to de Souza & Lunkes, (2016), capital budgeting is an important part of a company's strategy because the investment decisions made will affect the growth and

sustainability of the business in the long term. Therefore, investment decisions need to be made carefully by considering financial aspects and the rapidly changing business environment.

In practice, companies use various methods to assess investment feasibility. The most commonly used methods are *Net Present Value (NPV)*, *Internal Rate of Return (IRR)*, *Payback Period*, and *Profitability Index (PI)* (Andrés *et al.,* 2015; Batra & Verma, 2017). These four methods focus on comparing the benefits and costs of a project based on financial data. However, with the development of technology and increasing economic uncertainty, many companies have begun to switch to more modern methods such as *Real Options, Fuzzy Logic,* and *Multi-Criteria Decision Making (MCDM)* (Alderman *et al.,* 2022 ; Dhalmahapatra *et al.,* 2022; Nugroho *et al.,* 2022). These methods help companies calculate various possibilities and risks more flexibly, including the social and environmental impacts of investment projects.

Decisions in capital budgeting are not only determined by financial calculations, but also by internal and external factors of the company. Internal factors include the capabilities and experience of managers, corporate governance, and the quality of information used in decision-making (Mirza *et al.,* 2020; Nunden *et al.,* 2022) . In addition, the behavior of decision-makers also has an influence. Morales Burgos *et al.,* (2020) Found that managers sometimes make decisions based on intuition or past habits, rather than just rational data. Cho, (2024) Also emphasizes that social factors such as financial literacy and culture can influence how a person assesses investment risk. Meanwhile, external factors such as changes in government policy, economic fluctuations, technological developments, and pressure to implement *Environmental, Social, and Governance (ESG)* principles also shape the direction of investment decisions (Kuroki, 2022 ; Santos *et al.,* 2021; Martin, 2021; Frost & Rooney, 2021; Mohamed *et al.,* 2025) .

Despite its importance, capital budgeting practices often face various challenges. Some of these include limitations in managerial capabilities in using modern evaluation methods, a lack of accurate data, and organizational resistance to changes in decision-making systems (Siziba & Hall, 2021; Vanini & Rieg, 2021; Almasan *et al.,* 2019). In addition, market uncertainty and environmental risks, such as unstable energy prices and changing regulations, also complicate investment analysis (Saługa *et al.,* 2021; Abdul-Salam *et al.,* 2022; Vakili *et al.,* 2022) . Another challenge is how to incorporate sustainability, social, and governance aspects into traditional evaluation methods that have traditionally focused more on financial returns. (Frost & Rooney, 2021; Hunjra *et al.,* 2024). Therefore, companies need to develop a more integrated approach by combining financial analysis, risk considerations, and sustainability values to ensure that investment decisions are more accurate and long-term oriented.

RESEARCH METHODOLOGY

This study uses a Systematic Literature Review (SLR) approach, which aims to compile literature in a structured manner to identify factors, methods, and challenges in capital budgeting decision-making. The SLR method in this study uses Watase Uake's assistance, which is visualized in the PRISMA diagram. This study limits its findings to articles available in scientific journals published during the period 2019–2025. The last six-year span was chosen to ensure that the research results reflect the latest developments and are relevant to the dynamics of capital budgeting.

Based on the initial search results through the Watase Uake website, 518 articles were obtained. At the identification stage, 184 duplicate articles were removed, 199 articles were excluded because they did not match the publication period (2015–2025), and nine articles were excluded for other reasons (e.g., not included in the Q1–Q4 journal category). After this stage, 126 articles remained for further selection. During the screening stage, 69 articles were excluded because they were not relevant to the topic, leaving 57 articles for further review. Of these, 39 articles were not accessible in full-text form. Thus, the final result of the Watase/Scopus process was 18 articles that met the criteria.

In addition, this study also involved articles from other sources obtained through Publish or Perish, ScienceDirect, Emerald, MDPI, SSRN, Google Scholar, and Sinta, which, after selection, resulted in 9 additional articles. Overall, there were 27 articles used as research objects in this study.
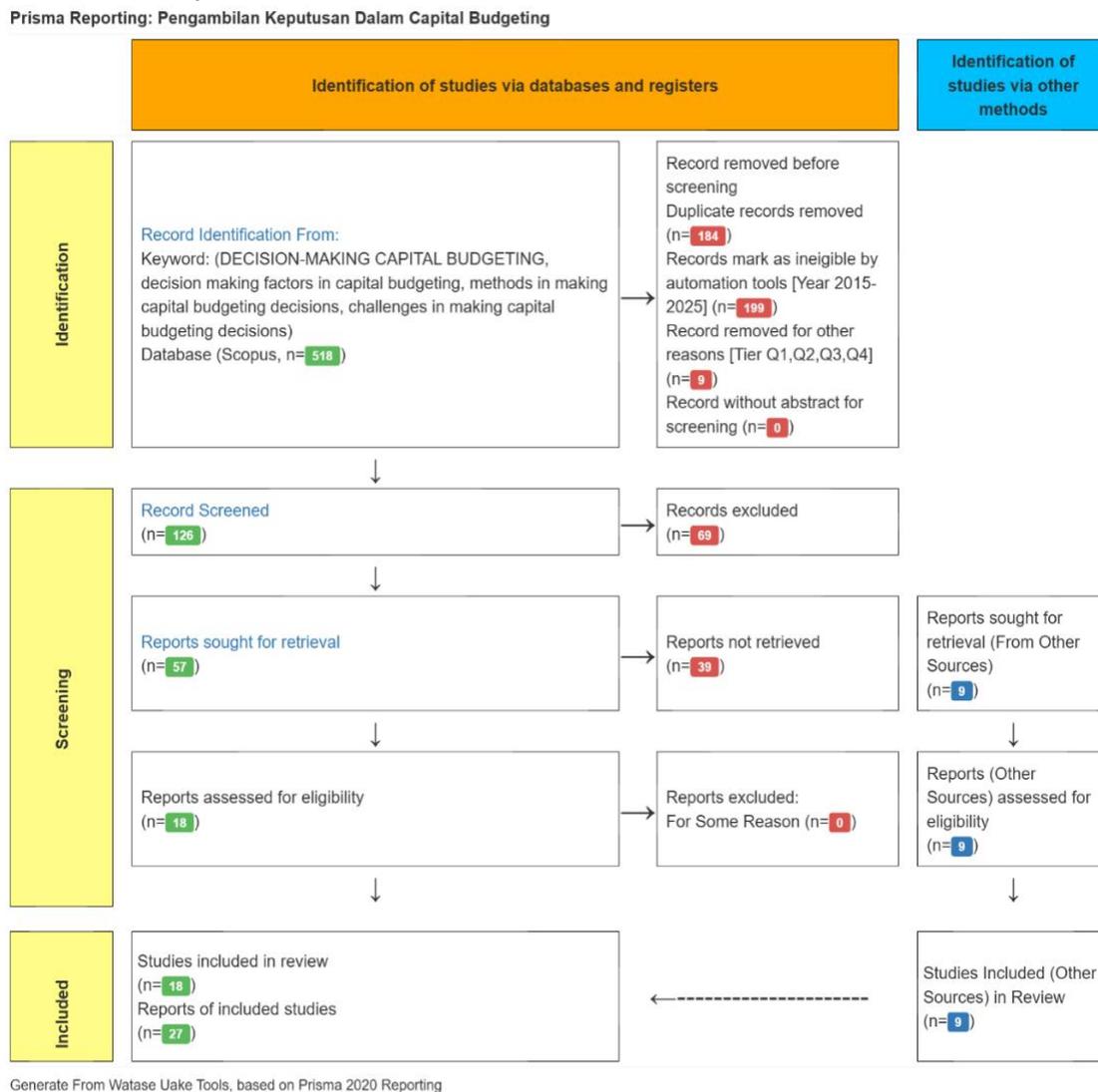

Figure 1. PRISMA Flow Diagram

RESULTS AND DISCUSSION

Table 1 shows Research Question (RQ1), which explains the factors that influence decision-making in capital budgeting. These factors are grouped into internal and external factors with various sub-factors obtained from the literature.

Table 1. RQ1. Factors Influencing Decision Making in Capital Budgeting

Factor		Sub-Factors & Supporting Articles
Internal Factors	1)	Managerial competence and experience, investment management skills, financial analysis capabilities, and managerial experience influence the quality of capital budgeting decisions (Nunden *et al.,* 2022; Alderman et al., 2022) .
	2)	Corporate governance and board diversity, board structure, gender and expertise diversity, and governance mechanisms encourage more rational investment decisions (Mirza *et al.,* 2020) .
	3)	Behavior and bounded rationality influence decision quality and risk preferences in small and medium-sized enterprises (Morales Burgos *et al.,* 2020) .
	4)	The availability and reliability of financial information, the use of managerial accounting data, and depreciation information influence public and corporate investment decisions (Almasan et al., 2019 ; Kuroki, 2022) .
	5)	The use of risk analysis techniques and strategic evaluation methods, the application of risk analysis techniques such as scenario/sensitivity analysis, is influenced by corporate strategy and manager characteristics (Huikku *et al.,* 2025 ; Vanini & Rieg, 2021) .
	6)	Technical capacity and operational efficiency, organizational technical capabilities, and cross-disciplinary coordination influence the success of investment project planning (Vakili *et al.,* 2022 ; Dhalmahapatra *et al.,* 2022) .
	7)	- Individual behavioral and socio-economic factors such as financial experience, literacy, and cultural norms also influence investment decision-making (Cho, 2024).
External Factors	1)	Economic uncertainty and market risk, price fluctuations, demand uncertainty, and environmental risk influence investment decisions and discount rates (Santos et al., 2021 ; Saługa et al., 2021 ; Abdul-Salam et al., 2022) .
	2)	Government policies and regulations, changes in fiscal policy, and public accounting affect investment evaluation criteria (Kuroki, 2022 ; Mohamed *et al.,* 2025) .
	3)	Technological developments and innovations, technological advances, clean energy, and digitalization create new opportunities and risks in project assessment (Vakili et al., 2022 ; Nugroho et al., 2022 ; Tsagkari et al., 2020) .
	8)	- Sustainability and social responsibility (CSR/ESG) considerations, stakeholder pressure to implement sustainable investments, encourage the integration of social and environmental factors in capital budgeting (Frost & Rooney, 2021; Martin, 2021; Hunjra *et al.,* 2024; Smit, 2025).

The study's results on factors influencing decision-making in capital budgeting reveal a close relationship between an organization's internal capabilities and the external dynamics that shape investment direction. Internally, managerial competence and experience have been proven to play an important role in determining the quality of investment decisions, particularly through financial analysis capabilities and project management skills *(Nunden et al.,* 2022; Alderman *et al.,* 2022). Good corporate governance and diversity in the board of directors, both in terms of expertise and gender, also encourage more rational and transparent decisions (Mirza *et al.,* 2020). In addition, behavioral factors such as bounded rationality remain a common characteristic in the decision-making process, where intuition and personal experience often replace data-based approaches (Morales Burgos *et al.,* 2020). Individual financial experience, literacy, and social norms also contribute to shaping risk perceptions and investment preferences (Cho, 2024).

The availability and reliability of financial information are crucial aspects that determine the effectiveness of *capital budgeting* decisions. The use of appropriate managerial accounting data and depreciation information can improve the accuracy of project evaluation, while data limitations often cause bias in assessments (Almasan *et al.,* 2019; Kuroki, 2022). Furthermore, the application of risk analysis techniques such as *scenario analysis* and *sensitivity analysis* demonstrates the importance of alignment between corporate strategy and managers' ability to deal with uncertainty (Huikku *et al.,* 2025; Vanini & Rieg, 2021). The technical capacity and operational efficiency of the organization are also key supporting factors, as the successful

implementation of investment projects depends on cross-disciplinary coordination and technological readiness (Vakili et al., 2022; Dhalmahapatra *et al.*, 2022).

Externally, macroeconomic conditions and market volatility play a dominant role in influencing investment decisions and determining discount rates (Santos *et al.*, 2021; Saługa *et al.*, 2021; Abdul-Salam *et al.*, 2022). Regulations and fiscal policies also influence the direction of corporate investment, particularly in the context of public policy changes that impact project viability (Kuroki, 2022; Mohamed *et al.*, 2025) . Technological advances, clean energy transition, and digitalization expand investment opportunities while increasing the complexity of operational risks (Vakili *et al.*, 2022 ; Nugroho *et al.*, 2022; Tsagkari *et al.*, 2020) . On the other hand, increasing pressure from stakeholders on sustainability and social responsibility (CSR/ESG) aspects has encouraged companies to integrate social and environmental dimensions into their project assessments (Martin, 2021; Hunjra *et al.*, 2024 ; Smit, 2025). These findings confirm that modern investment decision-making is not only based on financial considerations but also on a balance between internal organizational factors and evolving external demands.

Table 2 presents Research Question (RQ2), which discusses the methods or techniques used in capital budgeting decision-making. These methods include both traditional and modern approaches identified from the literature, such as NPV, IRR, Payback, real options, risk analysis, and sustainability integration.

Table 2. RQ2. Methods or Techniques Used in Capital Budgeting Decision Making

Category		Sub-Factors & Supporting Articles
Traditional Methods (NPV, IRR, Payback, ARR, etc.)	1)	The use of classical methods such as *Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period, and Accounting Rate of Return (ARR)* is still common practice in companies in developing countries ; de Souza & Lunkes, 2016 ; Andrés *et al.*, 2015 ; Sureka *et al.*, 2022)
	2)	(2021) shows the evolution of traditional methods towards more complex approaches, but NPV remains dominant.
Real Options & Decision under Uncertainty	1)	The *Real Options* approach is used to assess the flexibility of investment decisions under high uncertainty (Alderman *et al.*, 2022; Smit, 2025; Abdul-Salam *et al.*, 2022).
	2)	The article also highlights the integration of risk analysis in fundamental option-based investment strategies.
Risk and Sensitivity Analysis	1)	*Scenario analysis, sensitivity analysis, and probabilistic risk models* are applied to manage risk in investment decisions (Huikku *et al.*, 2025; Vanini & Rieg, 2021; Saługa *et al.*, 2021).
	2)	Gandhi & Thomas, (2022) highlight the application of risk-adjusted capital budgeting during the COVID-19 crisis.
Integration of Sustainability and ESG (Sustainability-Based Capital Budgeting)	1)	The incorporation of social and environmental factors into project evaluation methods through *Sustainability-adjusted NPV* and *ESG-weighted metrics* (Frost & Rooney, 2021; Martin, 2021; Hunjra *et al.*, 2024; Smit, 2025) .
	2)	Study highlights how energy efficiency and carbon emissions are part of the ship investment evaluation model.
Multi-Criteria and Integrative Techniques	1)	The use of *multi-criteria decision making (MCDM)* and *fuzzy logic models* to assess project feasibility under uncertainty (Dhalmahapatra *et al.*, 2022; Nugroho *et al.*, 2022; Tsagkari *et al.*, 2020) .
	2)	An integrative approach is also applied to combine technical, economic, and environmental dimensions in investment decision-making (Mohamed *et al.*, 2025).

Approaches and methods in *capital budgeting* decision-making show an evolution from traditional practices towards more dynamic and uncertainty-oriented models. Classical methods such as *Net Present Value* (NPV), *Internal Rate of Return* (IRR), *Payback Period,* and *Accounting Rate of Return* (ARR) are still the main tools in many companies, especially in

developing countries, due to their simplicity and ease of application (Batra & Verma, 2017; de Souza & Lunkes, 2016; Andrés et al., 2015; Sureka et al., 2022) However, recent research indicates a shift towards more complex methods, as the need for risk and sustainability assessment increases, although NPV remains the primary standard (Siziba & Hall, 2021).

In the face of market uncertainty and economic dynamics, the *Real Options* approach has emerged as a method that provides flexibility in investment decision-making. This method allows companies to assess the strategic value of options to delay, expand, or terminate projects based on changing external conditions. (Alderman *et al.,* 2022; Smit, 2025; Abdul-Salam *et al.,* 2022). This approach is also combined with risk analysis, such as *scenario analysis* and *sensitivity analysis,* to estimate the impact of variable changes on investment returns. (Huikku *et al.,* 2025; Vanini & Rieg, 2021; Saługa *et al.,* 2021). Gandhi & Thomas, (2022) Add that applying risk-adjusted capital budgeting is crucial in crises, such as the COVID-19 pandemic, to maintain the resilience of corporate investments.

Beyond focusing on profitability, the integration of *sustainability* and ESG aspects is increasingly being considered in modern project evaluation methods. Approaches such as *Sustainability-adjusted NPV* and *ESG-weighted metrics* are used to incorporate social and environmental factors into financial assessments (Frost & Rooney, 2021; Martin, 2021; Hunjra *et al.,* 2024; Smit, 2025). Energy efficiency and carbon emission reduction are now important indicators in project evaluation, as explained by. Furthermore, multi-criteria techniques such as *MCDM* and *fuzzy logic* help integrate various technical, economic, and environmental dimensions into a more comprehensive assessment framework. (Dhalmahapatra *et al.,* 2022; Nugroho *et al.,* 2022; Tsagkari *et al.,* 2020; Mohamed *et al.,* 2025). Overall, the shift towards more flexible, sustainable, and risk-based methods marks an important transition in modern *capital budgeting* practices.

Table 3 shows Research Question (RQ3), which explains the main challenges in capital budgeting decision-making. These challenges include internal and external aspects faced by organizations, ranging from resource constraints to uncertainty in the business environment, as described in the reviewed literature. The decision-making process in *capital budgeting* faces complex challenges, both from within the organization and from the external environment. Internally, managers' limited competence in applying modern evaluation techniques and resistance to changing methods remain significant obstacles (Siziba & Hall, 2021; Vanini & Rieg, 2021). Behavioral factors such as *bounded rationality* also influence decision rationality, where managers tend to rely on intuition and experience rather than objective data analysis (Morales Burgos et al., 2020). In addition, limitations in data quality and a lack of integration of managerial information systems also reduce the accuracy of investment evaluations. (Almasan *et al.,* 2019; Kuroki, 2022; Huikku *et al.,* 2025) .

Externally, energy price fluctuations, market volatility, and economic uncertainty are the primary sources of risk in the project evaluation process. (Santos *et al.,* 2021; Saługa *et al.,* 2021; Abdul-Salam et al., 2022). Vakili *et al.,* (2022) Highlight that advanced risk analyses, such as scenario and probabilistic analyses, have not been widely applied, leaving organizations ill-prepared to deal with external changes. In addition, dynamic government policies can affect project feasibility and long-term investment direction (Mohamed *et al.,* 2025; Kuroki, 2022) .

Another challenge arises from the need to integrate sustainability and ESG principles into traditional financial evaluation frameworks. The imbalance between profitability and sustainability objectives remains a key issue (Frost & Rooney, 2021; Hunjra *et al.,* 2024; Smit,

2025). The adoption of new technologies and clean energy systems also poses coordination challenges and requires significant investment in infrastructure and technical expertise (Nugroho *et al.,* 2022; Tsagkari *et al.,* 2020; Dhalmahapatra *et al.,* 2022). Overall, the success *of capital budgeting* depends on an organization's ability to strengthen its analytical capacity, improve the quality of information, and develop an adaptive approach to global risk dynamics and sustainability.

Table 3. RQ3. Challenges in Capital Budgeting Decision-Making

Challenge Factors	Sub-Factors & Supporting Articles	
Organisation & Internal	1)	Limitations in managers' competence in using modern evaluation techniques (Siziba & Hall, 2021) .
	2)	Internal resistance to changes in investment calculation methods (Vanini & Rieg, 2021).
Data & Information	1)	Limitations in the quality of financial data and accurate depreciation information (Almasan *et al.,* 2019 ; Kuroki, 2022) .
	2)	Lack of integration of managerial information systems in decision-making (Huikku *et al.,* 2025).
Risk & Uncertainty	1)	High market uncertainty, energy prices, and unpredictable environmental risks (Santos *et al.,* 2021; Saługa *et al.,* 2021; Abdul-Salam *et al.,* 2022) .
	2)	Limitations of applying advanced risk analysis in practice (Vakili *et al.,* 2022) .
	3)	Limitations of managerial rationality and the influence of behavioral biases on investment risk evaluation (Morales Burgos *et al.,* 2020).
Regulations & Policies	1)	Frequent changes in government regulations that affect project viability (Mohamed *et al.,* 2025; Kuroki, 2022).
Sustainability & ESG	1)	The challenge of integrating sustainability, CSR, and ESG aspects into traditional methods that are still dominant (Frost & Rooney, 2021; Hunjra *et al.,* 2024; Smit, 2025).
Technology & Operations	1)	The complexity of adopting new technologies, clean energy, and digitalization in investment evaluation (Nugroho *et al.,* 2022; Tsagkari *et al.,* 2020) .
	2)	Limitations in cross-disciplinary technical coordination in large projects (Dhalmahapatra et al., 2022).

CONCLUSION

The results of the systematic review indicate that various internal factors, including managerial competence, corporate governance, financial information quality, and organizational technical capacity, influence decision-making in capital budgeting. It is also affected by external factors, such as economic uncertainty, government regulations, technological developments, and sustainability demands.

From a methodological perspective, *capital budgeting* practices still rely heavily on traditional approaches such as NPV, IRR, and Payback. However, they have evolved towards more adaptive methods, including *real options*, risk analysis, and sustainability integration through a multi-criteria approach.

The main challenges faced include limited managerial competence, low data accuracy, high external risks, and the complexity of integrating ESG principles with technological innovation. Therefore, future research needs to focus on developing digital technology-based *capital budgeting* models and *big data analytics* to make future investment decisions more adaptive, sustainable, and responsive to global dynamics.

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