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Systematic Literature Review on Capital Budgeting Techniques

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ABSTRACT

Organizations use capital budgeting to make strategic decisions affecting long-term development, sustainability, and profitability. This study identifies sustainability considerations, environmental, social, and governance (ESG) factors, governmental policies and regulations that affect capital budgeting decisions, and key performance indicators (KPIs) frequently used to evaluate the success of capital investments. This systematic literature review (SLR) synthesizes the existing research on capital budgeting techniques. The examination includes sophisticated techniques such as accurate options analysis, simulation modeling, decision trees, and a variety of capital budgeting approaches such as net present value (NPV), internal rate of return (IRR), and payback period. Researchers, experts, and politicians aim to expand their knowledge of capital budgeting procedures and guide future studies and activities within the field.

Keywords: *Capital budgeting, Net present value, Internal rate of return, Key performance indicator*

1. INTRODUCTION

According to Buchanan (1996), capital budgeting processes are a vital financial management component and have been thoroughly studied in corporate finance literature. Financial managers typically focus on three main strategic options to maximize shareholder value: capital budgeting, dividends, and financing decisions. Making informed capital budgeting choices is essential for a corporation as it aligns with the organization's core objective of wealth maximization and requires substantial resources and long-term commitment. Capital budgeting is defined by Gitman et al. (2015) as "the process of analyzing and selecting long-term investments that are consistent with the company's goal of maximizing shareholder wealth." Similarly, Leon et al. (2008) describe capital budgeting as the process of evaluating and selecting investments while factoring in risk and uncertainty to assess the projected cash flows of a project. This consideration ensures that the selection of projects optimizes long-term benefits for the organization. Capital budgeting methods can be categorized into discounted cash flow (DCF) methods and non-

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discounted cash flow (non-DCF) approaches. Non-DCF methods, such as the payback period and accounting rate of return, do not consider the time value of money. In contrast, DCF methods, including the net present value (NPV), internal rate of return (IRR), profitability index, and discounted payback period, incorporate the time value of money, providing a more accurate assessment of an investment's value. Baker and Powell (2009) outline six key steps in capital budgeting: generating project ideas, estimating project cash flows, evaluating projects, selecting projects, implementing the chosen projects, and performing a post-completion review. Each step is critical to ensure that the projects contribute positively to the firm's long-term goals and shareholder wealth.

Comparison between the previous literature review and the present study.

Frost and Rooney (2021) Elsevier Qualitative The primary focus of this study is on efforts made by individuals to measure and "consider" the impact of sustainability on capital budget choices Majumdar and Sinha (2021). Emerald Case Study This research focuses on shadow pricing of undesired outputs and shows that the NPV becomes positive, supporting the economic-environmental sustainability of effluent treatment plants.

Sisodia et al. (2021) in *Emerald* conducted a scenario-based risk analysis on the hydroponic farming technique, which holds significant promise for enhancing food security and sustainability in the Gulf area. The study evaluated the hydroponic farm using the net present value and actual alternatives approach under five distinct scenarios. Unlike conventional agricultural methods, hydroponics offers a more resource-efficient solution by reducing water consumption and dependency on arable land, key factors in regions with scarce farmland. This innovative approach aligns with broader ESG (Environmental, Social, and Governance) trends, highlighting sustainability and long-term resource management. Furthermore, integrating hydroponic systems with peatland conservation practices underscores an investment strategy that supports ecological preservation and adds value in capital budgeting, enhancing an organization's ESG profile.

Aro-Gordon and Al-Sakiti (2021) Emerald Qualitative research focused on four themes related to capital budgeting: the application of non-financial considerations, the use of more sophisticated approaches like real options, the use of traditional capital investment methods like the payback period (PB) and net present value (NPV), and how all of these factors are related to long-term manufacturing investments and success and performance.

Majid et al. (2021) Elsevier Mix method, economic analysis (NPV & benefit-cost ratio) In temperate northern India, the study aimed to determine if hydroponic

cultivation is a suitable and feasible alternative planting approach to greenhouse soil-based lettuce development.

Pertiwi et al. (2022) Elsevier Benefit-cost analysis and interviews. This study evaluated the benefits of various ecosystem services, from peatland conservation to the correct carbon price and the value of converting peatlands to rubber or palm oil crops. Net present value (NPV), internal rate of return (IRR), and annual equivalent value (AEV) are the three indicators used in this study as BCA outputs to assess the value of peatland ecosystem services in comparison to the process of converting peatland to oil palm and rubber plantations under five different economic conditions. Monteiro et al. (2021) Springer Sensitivity analysis This study looks at the effects of certified emissions reduction certificates (CERs) on the internal rates of return (IRRs) of small hydroelectric plants under the current Brazilian clean development mechanism scenario, where CER prices have dropped to historical lows. The goal is to investigate the economic aspects of sustainable management. A spreadsheet was made based on the study's findings to model a project's cash flows and determine its internal rates of return.

Frost and Rooney (2021) Elsevier's qualitative case study, as sustainability is an organizational process, focuses on views of environmental sustainability, which will be further examined. The study looks into how organizational actors are shaped by the analytical perspective of management accounting practice and sees sustainability. Capital budgeting is a management accounting technique that is essential to managerial planning and the strategic decision-making process that goes along with it. Because sustainability is strategic, decision-making managers use it to evaluate sustainability in their regular job routines.

Majumdar and Sinha (2021) Emerald Quantitative analysis. This study will examine how capital investment projects are assessed in Lebanon, whether risk is factored into the process by Lebanese enterprises, and how political risk affects capital budgeting. Lebanese businesses often employ more than one form of investment analysis, and they are progressively using sophisticated discounted cash flow approaches with payback time.

Majumdar and Sinha (2021) Taylor & Francis Qualitative analysis (case studies). The main contention of this paper is that the capital budgeting and management practices of the case of three former Soviet republics—the Russian Federation, Moldova, and Uzbekistan—are ingrained with the legacy of the Soviet planning and budgeting traditions, which include centralized control, inadequate capital planning, and strong informal powers of political elites.

Present study SLR A comprehensive search on sustainability considerations, environmental, social, and governance (ESG) factors, the role of regulatory compliance, and key performance indicators (KPIs) in capital budgeting.

Several studies in selected sources:

Source	Selective studies.
Taylor and Francis	5
Emerald	12
Elsevier	10
Springer	7

In particular, this paper answers the following research questions:

1. How are sustainability considerations integrated into capital budgeting decisions?

2. What impact do environmental, social, and governance (ESG) factors have on evaluating investment projects? How do governmental policies and regulations affect capital budgeting decisions?

3. How does regulatory compliance shape the capital budgeting landscape?

4. What key performance indicators (KPIs) are commonly used to assess capital investment success?

How are sustainability considerations integrated into capital budgeting decisions?

According to Frost, G and Rooney, J (2021), the study focuses on people's attempts to quantify and "consider" how sustainability affects capital budget decision-making processes. It specifically looks at how managers approach sustainability in their capital budgeting choices. It has expressly recognized the demand for financial outcomes to be assessed by those who are not physically present, such as the board directors of publicly listed companies or the public sector financial controllers who can see the capital budgeting processes within the organization. When seen as providing "a verified perception of accuracy in the actual measuring procedure," this emphasis on financial results and technology may also offer organizational stakeholders visibility into capital budgeting choices (Power, 2004). This can, therefore, impede personal reflection and, as noted by Miller & Rose (1990), force supervisors and administration in charge of making decisions to limit their endorsement of sustainability projects to those acts that fall under their designated scope as financial decision-makers, while also being assisted and encouraged by management accounting technology.

The comparative analysis of Majid et al. (2021) indicated that the hydroponic systems under investigation were appropriate for growing lettuce in Northern India's moderate climate. This study has successfully assessed the overall performance of the deep-water culture and nutrient film technology systems. Comparisons based on actual yield data showed that the net present value for deep water culture was higher for both crop cycles due to the larger yields per picking and comparatively lower production expenses. Compared to hydroponic techniques, factors point to conventional soil-based growing systems having lower wealth-generating potential. Compared to soil-based lettuce farming, Maestre-Valero et al. (2018) recently discovered that hydroponic cultivation had notably higher net present values. If a method's benefit-cost ratio analysis is more significant than one and its NPV value is greater than zero, it is considered economically feasible (Hanley et al., 2009). In all growing systems, the NPV values greater than zero and the BCR values above one show the economic viability of different growth strategies. Majid and colleagues (2021). Growing lettuce and other green crops is believed to be achievable using deep water cultivation technology because of its high-quality output, convenience of use, shorter crop length, and economic viability. However, the nutrient film technology has the potential to be an effective water-saving method due to its high water usage efficiency as an environment-friendly technique.

What impact do environmental, social, and governance (ESG) factors have on evaluating investment projects? How do governmental policies and regulations affect capital budgeting decisions?

Pertiwi et al. (2022) A benefit-cost analysis was performed to determine the carbon price and assess the ecosystem services of peatlands with three potential land uses: conservation, clearing for oil palm plantations, and rubber plantations. The internal rate of return for the conservation option was consistently higher than that of the planting choices. The study results by Pertiwi et al. (2022) suggest that the conservation option will be more enticing than planting choices when the discount component is high. The sensitivity analysis of the study with more significant discount rates also demonstrated that the conservation option will ultimately prove to be the most effective option for maintaining peat land because of the high degree of future uncertainties. Politicians and local governments may find it helpful to know the values of carbon pricing for various types of ecological services associated with peat fields when making decisions about conversion or conservation. Benefits from other ecosystem services must be considered if benefits from the entire ecosystem (including carbon benefits) are equal to or greater than those from the conversion of peat lands for industrial crops (Zengin & Ünal, 2019). It is critically necessary to value these ecosystem services under different land use scenarios to give decision-makers a comparable foundation for conserving or converting peat land. Gunawan (2018) suggested that government policies and initiatives to maintain peat lands for long-term sustainability can be influenced by a comprehensive cost-benefit analysis

of every ecological service. Ecosystem Services BCA has also gained popularity to encourage resource owners to conserve natural resources by offering financial incentives (Konstantinova et al., 2019; Naime et al., 2020; Pinke et al., 2018).

Mollah et al. (2021) examine the current capital budgeting procedures using data from 39 sample-listed companies in Bangladesh's DSE. The findings showed that nearly two-thirds of CFOs evaluate investment projects using the net present value (NPV) technique, with the IRR and PBP methods closely behind. According to survey results, the most crucial consideration when selecting a capital budgeting approach is the "importance of the project." The research indicates that the main obstacle to capital budgeting procedures for most respondents is Bangladesh's high fixed-cost component. Generally, risk variables were modified by either decreasing cash flows and increasing the discount rate or doing both. The dangers of unexpected inflation, commodity price risk, interest rate risk, GDP or business cycle risk, term structure risk, and foreign exchange risk were among these factors. Bangladeshi businesses primarily employ the discount rate to manage the risks associated with foreign exchange, interest rate fluctuations, and unforeseen inflation.

(Majumdar & Sinha, 2021) demonstrated in their study that centralized control over the underlying capital budgeting processes and the informal powers of political leadership significantly impact regional and local governments' goals of engaging in capital budgeting and planning along with proper maintenance, improvement, and development of public infrastructure. Political risk is high on the respondents' attention in several ways, according to Bakri's 2021 findings, as political unrest in Lebanon influences numerous capital budgeting choices. Since the conclusion of the civil war, political risk has been a defining characteristic of the Lebanese environment, and it seems to influence business investment decisions. This study discovered similar results: PB is employed instead of the NPV technique when political risk is thought to be high. Mao (1970) and Brigham (2016) propose that the PB technique can estimate a project's riskiness, making it a valuable addition to NPV.

What role does regulatory compliance play in shaping the capital budgeting landscape?

High risk, uncertainty, and complexity are hallmarks of the twenty-first-century corporate environment. Investors, policymakers, and regulators face ongoing political, technical, and financial risk and unpredictability challenges. Graham and Sathye (2017) examined how national culture affected the selection of capital planning techniques and emphasized the impact of project size, complexity, and political, legal, and social uncertainty on these processes.

Initiatives for capital budgeting can be strengthened or even complemented by societal preferences and staff. These consequences appear gradually. G. Frost & J.

Rooney (2021) In any case, significant additional expenses linked to projects deemed more sustainable in the face of budgetary constraints necessitate more internal and external organizations' support to give preference to a project that is thought to be more environmentally friendly. Put another way, valid organizational structures, shared knowledge, and social norms are necessary to foster shared cognition. To help ensure a shared vision that prioritizes sustainability, the capital budget decision-making practices adopted with this structure must consider the quantitative and qualitative rules and norms used to evaluate and contrast the attributes of knowledge made visible through shared perceptions of "flawed" accounting management narratives. Any modifications carried out with the assistance of organizational resources may be implemented to give "traces that can be mobilized and accumulated" for use by stakeholders in charge of capital budget performance "at an organizational distance" in addition to local managers Rose (1991).

Frost and Rooney's (2021) study argues that to consider sustainability, capital budgeting procedures must consider non-financial information and assessment criteria. The study also highlights the critical role that organizational norms related to sustainability and strategic leadership play and the variations in people's perspectives on incorporating sustainability factors into capital budgeting choices. These elements significantly impact organizational efforts to quantify and, when significant financial imperatives exist, "improve" the influence of sustainability in capital budget decision-making procedures.

Morales et al. (2020) study that disparities in how capital budgeting choices are approached also appear to be influenced by government support for small businesses and entrepreneurial endeavors. Certain company owners in Canada stated that they were helped, for example, in creating their business strategies by the government or nonprofit groups. The Mexican sample did not report this; instead, it supported the notion that capital budgeting decisions differ between developed and developing nations, with some interviewees complaining that they are singled out by government agencies and forced to pay exorbitant business taxes and needless registration fees (Kengatharan, 2016). The Mexican entrepreneurs in the sample rely more on family and internal finances than Canadian entrepreneurs, which has resulted in delays in capital investments in most cases (Chittenden & Derregia, 2015).

Similar scraps of evidence were discovered in the context of concentrated solar power generation by Sisodia et al. (2021). The study concluded that government assistance is essential for the new advancements in sustainability. Government assistance programs protect investors' interests and have a knock-on effect on the economy. Additionally, Souza et al. (2019) stress the significance of sound strategy and legislative backing for investments in alternative agriculture systems, which are required to draw domestic and foreign capital for the world's markets.

What key performance indicators (KPIs) are commonly used to assess capital investment success?

The results of Alles et al. (2021) study showed that various significant factors, such as the SMEs' age, ownership structure, and decision-maker experience, affect SMEs' capital budgeting techniques. These results highlight considerable policy ramifications for Sri Lanka's SME sector development. Capital budget management should be emphasized in government and regulatory bodies' policies as a necessary competence for decision-makers. It is recommended that small business owners implement policies in their establishments to improve both financial literacy and overall organizational effectiveness.

Alles et al. (2020) state that both nonfinancial and financial considerations can impact the choice of capital budgeting approaches. The decision-makers demographics are among the nonfinancial determinants. However, Katabi and Dimoso (2016) noted that business-related factors such as industry, firm establishment, growth in sales, number of employees, and kind of business are critical when selecting capital budgeting methodologies.

Alkaraan (2020) stated that a suitable management control system is a crucial component of giving strategic investment decision-making processes sufficient strategic direction. According to the study by Alles et al. (2021), cost, time, and knowledge are the main variables linked to SMEs that neither adopted capital budgeting procedures nor used inadequate capital budgeting strategies. Government organizations might use this information to pinpoint and identify SMEs that most require advice and support to make wise investment decisions that will increase profits. Governmental organizations might create initiatives to provide support and training, focusing on needy SMEs. It was discovered that the primary factors influencing an SME's choice to give up capital budgeting procedures were cost, time, and knowledge.

2. CONCLUSION

Sustainability considerations are increasingly integrated into capital budgeting decisions as organizations recognize the role of environmental, social, and governance (ESG) considerations in creating long-term value. More and more capital budgeting choices are being made with long-term value development in mind rather than immediate profits. Sustainable investments are viewed as drivers of competitive advantage, resilience, and stakeholder trust over the long run, leading to better financial performance and shareholder returns. Assessing the economic costs and benefits of sustainability projects, including potential savings from energy efficiency improvements, waste reduction, and risk mitigation.

Integrating sustainability considerations into capital budgeting decisions is essential for organizations to create long-term value, manage risks, meet stakeholder expectations, and contribute to a more sustainable future. By integrating environmental, social, and governance (ESG) aspects into investment decisions, companies can drive positive economic, ecological and social outcomes while securing their competitive advantage in a rapidly changing business landscape.

Governmental policies and regulations play a critical role in shaping capital budgeting decisions by imposing compliance costs, providing incentives, influencing market conditions, and addressing societal and environmental concerns. Companies must carefully analyze the regulatory landscape and consider the impact of government policies on investment projects to make informed decisions that align with their strategic objectives and regulatory obligations. By incorporating regulatory considerations into capital budgeting processes, organizations can mitigate risks, capitalize on opportunities, and contribute to sustainable and compliant business practices.

3. FUTURE DIRECTION

1. Using advanced analytics and artificial intelligence (AI) techniques can enhance sustainability considerations in capital budgeting. Predictive analytics can help forecast future sustainability risks and opportunities, while AI algorithms can optimize capital allocation by considering a broader range of sustainability factors.

2. With increasing uncertainty around climate change and other sustainability challenges, scenario analysis becomes crucial in capital budgeting. Future directions involve scenario planning techniques to assess the resilience of investment projects under different future scenarios, enabling better decision-making in the face of uncertainty.

3. Future capital budgeting techniques may emphasize governance factors more, particularly with the rise of corporate governance reforms and shareholder activism. Integrating governance metrics into investment decision-making processes could become more systematic, focusing on board diversity, executive accountability, and ethical business conduct.

4. Future trade policies may address global challenges such as climate change, resource scarcity, and supply chain resilience. Capital budgeting decisions may need to account for potential changes in trade dynamics, including shifts in trade agreements, tariffs, and trade barriers.

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