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Evaluating Capital Budgeting Efficiency in Nepal's Beverage Industry: A Comparative Analysis of Financial Performance and Investment Decision-Making

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Abstract

Capital budgeting is a crucial financial planning process that helps organizations evaluate long-term investment projects to maximize profitability, with this study focusing on Nepal's beverages industry by analyzing two companies—Sunrise Nepal Food & Beverages Pvt. Ltd. (SNFBPL) and Birgunj Pure Drinking Water Udyog (BPDWU). The primary objective was to assess capital budgeting techniques such as Net Cash Outlay (NCO), Net Present Value (NPV), and Internal Rate of Return (IRR), alongside reviewing financing sources, cost of capital, and tool effectiveness. Using comparative analysis and chi-square hypothesis testing, the study found that SNFBPL had a higher NCO and longer Payback Period (10.03 years) but a superior NPV (NPR 55.6 million) and Profitability Index (1.225), whereas BPDWU exhibited a better IRR (15.16%) and quicker payback (6.63 years), with SNFBPL's lower cost of capital (11.26%) attributed to leverage. The findings highlight significant differences in NCO and NPV but not IRR, leading to recommendations such as optimizing cost of capital, boosting sales, and prioritizing NPV in decision-making. This study adds value by examining capital

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budgeting practices in Nepal's emerging market, offering insights for financial planning in the beverages sector.

Keywords: Capital Budgeting, NPV, IRR, Payback Period, Cost of Capital, Beverages Industry, Nepal

Introduction

Capital budgeting represents a systematic approach to evaluating and selecting long-term investment projects that align with an organization's strategic objectives and maximize shareholder value (Daming & Widyawati, 2024). As a fundamental component of corporate financial management, this process involves the careful analysis of potential capital expenditures that typically require substantial initial outlays but are expected to generate returns over extended periods. The complexity of capital budgeting decisions stems from their irreversible nature, significant resource commitments, and long-term impact on organizational performance (Clancy & Collins, 2014). These decisions encompass various forms of capital investments, including but not limited to the acquisition of new machinery, expansion of production facilities, development of new product lines, or replacement of obsolete equipment (Gichuru, Jagongo, & Ndede, 2024; Neupane, Pant, & Bhattarai, 2023). The financial implications of such decisions extend across multiple accounting periods, necessitating rigorous evaluation methods to ensure optimal allocation of scarce financial resources.

The capital budgeting process fundamentally revolves around the comprehensive financial analysis of competing investment proposals (Abdeljawad, Abu Alia, & Demaidi, 2024). Financial managers employ specialized analytical tools and techniques to assess the viability and relative attractiveness of potential projects. At its core, this evaluation focuses on the incremental cash flows associated with each investment alternative, which include all changes in the organization's cash receipts and expenditures directly attributable to the project under consideration (Mahat, Neupane, & Shrestha, 2024). These cash flows typically encompass five key components: initial capital outlays, recurring operating costs, projected revenue streams, depreciation effects, and terminal or residual values. The accurate estimation of these cash flow components represents a critical challenge in capital budgeting, as it requires careful consideration of both quantitative financial data and qualitative operational factors that may influence project outcomes.

Project lifespan constitutes a pivotal factor in capital budgeting analysis, as it determines the time horizon over which cash flows are evaluated and directly impacts the assessment of investment returns (Daming & Widyawati, 2024). Several interrelated factors influence the determination of a project's economic life, including technological obsolescence, physical deterioration of assets, and shifts in market demand for the project's outputs. Technological advancements may render existing equipment or processes economically inefficient before their physical lifespan ends, while changes in consumer preferences or competitive dynamics can abruptly reduce the commercial viability of a project. These uncertainties highlight the inherent challenges in predicting project longevity, underscoring the importance of

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incorporating flexibility and scenario analysis into the capital budgeting process to account for potential variations in project duration.

The time value of money principle serves as a foundational concept in capital budgeting, recognizing that the temporal distribution of cash flows significantly affects their economic value (Gichuru, Jagongo, & Ndede, 2024). This principle acknowledges that monetary units received in the present hold greater worth than identical amounts received in future periods, due to their potential earning capacity when invested. The mathematical process of discounting facilitates the conversion of future cash flows into their present value equivalents, enabling meaningful comparison of investment alternatives with differing cash flow patterns. This temporal adjustment mechanism forms the basis for sophisticated capital budgeting techniques such as net present value (NPV) analysis and internal rate of return (IRR) calculations, which explicitly incorporate the time value of money into investment appraisal.

The discounting process employed in capital budgeting requires careful selection of appropriate discount rates that reflect both the cost of capital and the risk profile of the investment under consideration. The discount rate serves as a critical parameter that captures the organization's minimum required rate of return, incorporating elements such as the opportunity cost of capital, inflation expectations, and project-specific risk premiums. In practice, the weighted average cost of capital (WACC) frequently serves as the benchmark discount rate, though adjustments may be necessary to account for variations in risk among different projects. The sensitivity of capital budgeting outcomes to discount rate assumptions underscores the importance of robust estimation methods and the consideration of alternative rate scenarios in the decision-making process.

Capital budgeting techniques can be broadly categorized into discounted cash flow (DCF) methods and non-discounted evaluation approaches, each offering distinct advantages and limitations. DCF methods, including NPV and IRR, provide theoretically sound frameworks that explicitly account for the time value of money and the complete cash flow stream of projects. In contrast, simpler techniques such as payback period and accounting rate of return offer more accessible but less comprehensive evaluation metrics (Abdeljawad, Abu Alia, & Demaidi, 2024). The selection of appropriate appraisal methods depends on various factors, including the complexity of the investment decision, the availability of reliable cash flow projections, and the strategic importance of the project. Sophisticated organizations typically employ multiple evaluation techniques to gain complementary perspectives on investment opportunities.

The capital budgeting process ultimately serves as a critical mechanism for aligning organizational resources with strategic priorities while managing financial risks. Effective implementation requires not only technical proficiency in financial analysis but also strategic judgment regarding project alignment with corporate objectives and risk tolerance. The dynamic nature of business environments necessitates continuous reassessment of capital budgeting assumptions and periodic review of ongoing projects to ensure continued viability. By systematically applying capital budgeting principles, organizations can enhance their

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capacity to make informed investment decisions that create sustainable long-term value while maintaining financial flexibility in the face of uncertainty. The complexity of these decisions underscores the importance of integrating rigorous financial analysis with strategic vision in the capital allocation process.

Objectives

The basic objective of the study is to analyse the Capital Budgeting (Le forecasted net cash outlay and annual cash flow after tax). Under the guideline of this leading objective, the following specific objectives are set in the study-

- To overview the beverages industries in Nepal,
- To review the Capital Budgeting Theories developed so far.
- To analyse the empirical studies on Capital Budgeting
- To find out the determinants of Capital Budgeting in beverages industries in Nepal,
- To trace out the trend in beverages industries Capital Budgeting.
- To find out the sources of financing in beverages industries,
- To analyse the cost of capital of beverages industries in Nepal,
- To carry out the ex-post evaluation of the performance of beverages industries in Nepal,
- To trace out the main technique of Capital Budgeting being used and
- To trace out the effectiveness of used technique of Capital Budgeting.

Methodology

The methodology of this study was designed to comprehensively evaluate capital budgeting practices in Nepal's beverage industry through a structured analytical approach. The research employed a comparative case study design, focusing on two strategically selected firms - Sunrise Nepal Food & Beverages Pvt. Ltd. (SNFBPL) and Birgunj Pure Drinking Water Udyog (BPDWU). These companies were chosen to represent contrasting scales of operations, with SNFBPL as a large-scale manufacturer and BPDWU as a small-scale producer, allowing for meaningful comparisons of capital budgeting approaches across different business sizes.

Data collection involved both primary and secondary sources to ensure robust analysis. Primary data included five years (2018-2022) of financial statements obtained directly from the companies, encompassing balance sheets, income statements, and cash flow statements. Additionally, semi-structured interviews were conducted with financial managers to gain insights into their capital budgeting policies and decision-making processes. Secondary data was gathered from industry reports published by the Nepal Bureau of Standards and Department of Industry, along with relevant academic literature on capital budgeting in emerging markets.

The study applied five key capital budgeting techniques to evaluate investment decisions. The Payback Period (PBP) was calculated to determine investment recovery timelines, while Net Present Value (NPV) analysis discounted future cash flows using each firm's weighted average cost of capital (WACC). The Internal Rate of Return (IRR) was computed to identify the break-even discount rate, and the Profitability Index (PI) was used to assess return per rupee invested.

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Additionally, the Accounting Rate of Return (ARR) provided an accounting profit-based perspective on investment performance.

To validate the findings, three key hypotheses were tested using chi-square (χ^2) analysis. These hypotheses examined whether there were significant differences between the sample firms and industry benchmarks for Net Cash Outlay (NCO), Net Present Value (NPV), and Internal Rate of Return (IRR). The statistical analysis was conducted at a 95% confidence level ($\alpha = 0.05$), with Microsoft Excel used for financial modeling and SPSS v26 employed for hypothesis testing.

The study acknowledges several limitations that should be considered when interpreting the results. The small sample size of only two firms may affect the generalizability of findings across Nepal's entire beverage industry. The analysis also did not incorporate advanced risk-adjusted methods like Monte Carlo simulation, which could provide deeper insights into investment uncertainties. Furthermore, the five-year data period might not fully capture the complete lifecycle of long-term capital projects.

Despite these limitations, the methodology offers significant novelty in its approach. It represents the first application of comparative chi-square testing for capital budgeting metrics in the Nepalese context. The study uniquely integrates WACC-based NPV analysis with traditional metrics like PBP and ARR, creating a hybrid evaluation framework particularly suited for emerging market SMEs. This approach provides a replicable model for analyzing capital budgeting practices in similar developing economy contexts.

The methodological framework bridges the gap between theoretical capital budgeting principles and the practical challenges faced by Nepalese firms. By combining quantitative financial analysis with qualitative insights from industry practitioners, the study offers a comprehensive view of investment decision-making processes. This dual approach not only validates the numerical findings but also provides contextual understanding of how capital budgeting theories are applied in real-world business scenarios within Nepal's unique economic environment.

Following are the tools which are used to analyse the projects:

Table 1: CB Tools used by Nepalese Beverages Industries

CB under Certainty	CB under Uncertainty	CB under FDI
• Payback Period (PBP) • Accounting Rate of Return (ARR) • Net Present Value (NPV) • Internal Rate of Return (IRR) • Probability Index (PI) • Modified Internal Rate of Return (MIRR) • Cross Over Rate	• Senility Analysis • Risk adjusted discount Rate (RADR) • Certainty Equivalent coefficients (CEC) • Profitability Distribution • Approach • Standard • deviation	• Exchange Rate Risk • Political Risk • Country Risk

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• Discounted Payback Period (DPBP)	• Coefficient of Variation (C.V.) • Normal Probability Distribution • Decision tree.	

But during the study following tools were found to be in use-

- Payback Period (PBP)
- Net Present Value (NPV)
- Internal Rate of Return (IRR)
- Profitability Index (PI)
- Accounting Rate of Return (ARR)

Outcomes of Hypothesis

Under the study following three hypothesized were tested

First Hypothesis [Net Cash Outlay (NCO)]

H_μ : $\mu = \mu\sigma$ (ie. there is no significant difference between sample and the Standard NCO)

H_1 : $\mu \neq \mu\sigma$ (ie. there is significance different between sample and the Standard NCO)

Where,

μ=Sample Mean

$\mu\sigma$ =Standard Mean

Second Hypothesis [Net Present Value (NPV)]

H_1 : $\mu = \mu\sigma$ (ie. there is no significance different between sample and the Standard NPV)

H_1 : $\mu \neq \mu\sigma$ (ie. there is significance different between sample and the Standard NPV)

Where.

μ=Sample Mean

μ =Standard Mean

Third Hypothesis [Internal Rate of Return (IRR)]

H_1 : $\mu = \mu\sigma$ (ie. there is no significance different between. sample and the Standard IRR)

H_1 : $\mu \neq \mu\sigma$ (e. there is significance different between sample and the Standard IRR)

Where,

μ = Sample Mean

μ = Standard Mean

Following are the results of hypothesis.

- First Hypothesis [Net Cash Outlay (NCO)]

Tabulated (critical) value of X for 1 d. f. at 5% level of significance is 3.841 and calculated value of X= 2,951,945.89. Hence, the calculated value of chi-squire is greater than the tabulated value. So, it is significant. Thus, the difference between observed and expected frequencies is significant and cannot be attributed to give chance to fluctuations. It means there are significant difference between Actual (sample) & pre-determined (standard) NCO.

- Second Hypothesis [Net Present Value (NPV)]

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Tabulated (critical) value of X^2 for 1 d. f. at 5% level of significance is 3.841 and calculated value of X2 743,245.94. Hence, the calculated value of chi-squire is greater than the tabulated value, it is significant. Thus, the difference between observed and expected frequencies is significant and cannot be attributed to give chance to fluctuations. It means there are significant difference between Actual (sample) & pre-determined (standard) NPV.

- Third Hypothesis [Internal Rate of Return (IRR)]

Tabulated (critical) value of X2 for 1 d. f. at 5% level of significance is 3.841 and calculated value of X= 1.06. Hence, the calculated value of chi-squire is less than the tabulated value, it is not significant. Thus, the difference between observed and expected frequencies is not significant and can be attributed to give chance to fluctuations. It means. there are significant difference between Actual (sample) & pre-determined (standard) IRR.

Findings and Analysis

According to the capital employed SNFBPL is large manufacturing company in Nepal whereas BPDWU is a very small pure drinking water manufacturing company.

The NCO of Sunrise Nepal Food & Beverages Pvt. Ltd. is 247,127,526.82. Whereas the NCO of Birgunj Pure Drinking Water Udyog is 3,863,453.65. The NCO also shows the SNFBPL is the largest manufacturing company.

The cost of capital of BPDWU is 13% whereas the cost of capital of the SNFBPL is 11.26%. The cost of capital of SNFBPL is lower than BPDWU. It is because of SNFBPL is a levered firm where as BPDWU is unlevered firm. It means, the capital structure of BPDWU is debt free.

The PBP of Sunrise Nepal Food & Beverage Pvt. Ltd. is 10.0343 Years whereas the PBP of Birgunj Pure Drinking Water Udyog is 6.6338 years. The PBP of SNFBPL is higher than PBP of BPDWU. It means SNFBPL need more time to recover their investment. After the analysis of PBP, SNFBPL is risky organization than BPDWU.

The NPV of Sunrise Nepal Food & Beverage Pvt. Ltd. Is 55,645,151.27 whereas the NPV of Birgunj Pure Drinking Water Udyog is 806,152.65. The NPV of SNFBPL is 69.0255 times higher than NPV of BPDWU, which is more than the NCO. It means SNFBPL expected return is better than BPDWU.

The IRR of Sunrise Nepal Food & Beverage Pvt. Ltd. is 12.7969% whereas the IRR of Birgunj Pure Drinking Water Udyog is 15.1567%. The IRR of SNFBPL is less than IRR of BPDWU. It means BPDWU expected return is better than SNFBPL

The PI of Sunrise Nepal Food & Beverage Pvt. Ltd. is 1.2252 times whereas the PI of Birgunj Pure Drinking Water Udyog is 1.2087 times. The PI of SNFBPL is more than IRR of BPDWU. It means SNFBPL expected return is better than BPDWU.

The ARR of Sunrise Nepal Food & Beverage Pvt. Ltd. is 46.371% whereas the ARR of Birgunj Pure Drinking Water Udyog is 20.92%. The ARR of SNFBPL. is more than IRR of BPDWU. It means SNFBPL expected retum is better than BPDWU.

With a view point of NPV, PI and ARR, the expected return of SNFBPL seems to be sound in comparison to BPDWU.

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The findings of this study highlight the varying effectiveness of capital budgeting techniques in Nepal's beverage industry, reflecting the financial realities of firms with different scales and operational structures. SNFBPL's higher NPV and PI suggest strong long-term profitability, likely due to economies of scale and brand positioning, while its extended payback period indicates significant upfront investments. In contrast, BPDWU's superior IRR and shorter PBP underscore the efficiency of smaller, focused investments, though its higher cost of capital reveals potential financing constraints. These differences emphasize that no single capital budgeting metric is universally optimal; instead, firms must balance multiple criteria based on their strategic priorities and risk tolerance.

The divergence between NPV and IRR outcomes aligns with existing literature on capital budgeting conflicts, particularly in projects with differing cash flow patterns. While NPV is theoretically preferred for its absolute value measure, IRR remains popular in practice due to its intuitive percentage-based interpretation. This study reinforces the importance of using NPV as the primary decision tool, especially in leveraged firms like SNFBPL, where cost of capital significantly impacts valuation. However, the persistent use of PBP and ARR by both firms suggests that liquidity and accounting profitability remain pragmatic concerns for Nepalese businesses, possibly due to limited access to long-term financing or conservative management practices.

The study's limitations, including its small sample size and exclusion of risk-adjusted techniques, present opportunities for future research. Broader empirical studies could explore how macroeconomic volatility—such as currency fluctuations or policy changes—affects capital budgeting in Nepal's import-dependent beverage sector. Additionally, integrating advanced methods like Monte Carlo simulations or real options analysis could provide deeper insights into risk management. Nevertheless, this research contributes to the sparse literature on capital budgeting in emerging markets, offering actionable insights for firms aiming to refine investment strategies amid resource constraints and competitive pressures.

Conclusion

The study reveals critical insights into capital budgeting practices within Nepal's beverage industry, demonstrating how investment appraisal techniques influence financial decision-making. Sunrise Nepal Food & Beverages Pvt. Ltd. (SNFBPL) and Birgunj Pure Drinking Water Udyog (BPDWU) exhibit contrasting financial profiles, with SNFBPL showing higher profitability (NPV, PI) but slower investment recovery (PBP), while BPDWU offers a superior IRR and quicker payback. The significant differences in NCO and NPV, but not IRR, suggest that while discounted cash flow methods (NPV, IRR) are essential, non-discounted metrics (PBP, ARR) still play a role in investment decisions. The findings highlight the importance of aligning capital budgeting techniques with firm size, leverage, and market conditions to enhance long-term financial sustainability.

Recommendations for Firms

To optimize capital budgeting efficiency, SNFBPL should focus on reducing its payback period by improving operational cash flows and exploring cost-saving measures, while BPDWU could

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benefit from leveraging debt to lower its cost of capital. Both firms should prioritize NPV over IRR in decision-making, given NPV's superior alignment with shareholder value maximization. Additionally, adopting sensitivity and scenario analysis could help mitigate uncertainties in cash flow projections, ensuring more resilient investment strategies.

Policy and Future Research Implications

Policymakers in Nepal should encourage financial literacy and standardized capital budgeting frameworks for SMEs to improve investment planning. Future research could expand this study by incorporating more firms, integrating risk-adjusted discount rates (RADR), or examining sector-specific challenges like supply chain disruptions. Cross-industry comparisons would further enrich understanding of capital budgeting efficiency in emerging markets, aiding both academia and practitioners in refining financial decision-making models.

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