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Techniques for Investment Decision Making: An Analysis of Firms in Pakistan

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ABSTRACT

Aim of the Study: This study aimed to investigate the capital budgeting decision-making techniques employed by firms in Pakistan, with a focus on the practices of the country's largest companies. The research sought to identify the methods most commonly used by firms and explore the adoption of advanced financial techniques in the capital budgeting process.

Methodology: A postal survey and cross-sectional data gathered from fifty-three sizable businesses in Pakistan served as the foundation for the study. It provided detailed information on the firms' capital budgeting practices, especially the use of discounted cash flow methods and other investment appraisal techniques..

Findings: According to the empirical results, Pakistan is gradually moving toward more advanced financial practices, as seen by the growing use of Discounted Cash Flow (DCF) approaches. Businesses frequently used Net Present Worth (NPW) and Internal Rate of Return (IRR), and many also used risk-adjusted cash flow techniques in their assessments. Only a small percentage of businesses, nevertheless, made use of sophisticated risk assessment instruments like Real Options Theory and the Modified Internal Rate of Return (MIRR). Compared to more developed nations, Pakistan continued to embrace DCF methodologies at a far lesser rate.

Conclusion: The study concluded that while there has been some alignment with global trends in financial decision-making, many firms in Pakistan still fall short of meeting fundamental requirements in their capital budgeting practices. The study suggested that firms should enhance their use of advanced methodologies, address gaps in financial expertise, and adopt more comprehensive technological tools to improve their capital budgeting processes. Further research was recommended to explore the challenges in greater depth.

Keywords: Capital, Budgeting, Investment Decision Making, Budgeting Practices, Discounted Cash Flow, NPW, IRR.

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1. BACKGROUND

It is commonly acknowledged that thorough analysis of economic trends and past performance have a significant impact on investment decisions. However, inaccurate predictions of these trends can worsen liquidity issues and have a significant effect on company profitability. Organizations must take a methodical and strategic approach to decision-making if they want to remain competitive in the market over the long run (Haddad et al., 2010). As a result, investment choices are a key component of organizational success since they promote value generation and effective resource allocation.

Capital budgeting has emerged as a crucial managerial tool in times of economic uncertainty, bolstering strategic financial planning and guaranteeing organizational resilience. This study looks at how companies can improve their investment decision-making procedures and deal with new financial issues by leveraging sophisticated analytical frameworks. Maintaining appropriate cash flow and obtaining competitive investment returns are the main duties of a financial manager. The above really drives home the point of making sure that there is a full assessment of investment projects, comparisons among them, and selection based on sound and credible procedures specifically designed to fit each project case as well as a particular organization's financial position.

Despite its important ramifications, however, little research on the effects of decision-making frameworks on project selection has been conducted, particularly regarding the relative magnitude of projects. Some of the studies (e.g. Graham & Harvey, 2001; Ryan, 2002; Farragher et al., 1999) describe the use of DCF methods in varying regions like India (Babu & Sharma, 1995; Anand, 2002; Verma et al, 2009; Cherukuri, 1996), in North America (Jog & Srivastava, 1995; Payne et al., 1999), and the British Isles (Arnold & Hatzopoulos, 2000). While these studies show the extensive use of various DCF methods in project appraisal, they often neglect what seems to be an interplay between qualitative and quantitative analytical tools (Bosch et al., 2007; Cary, 2008; Machine, 2009; Pike, 2005).

1.1 Investment Decision-Making Techniques

At the stages of planning and programming, investment decision methods are essential tools for evaluation potential investment projects. In this sense, possible investment decisions were considered by businesses as a way to assess whether the funding of a particular project would align with the efficiency and financial goals of the company regarding capital; serves as one foundational input in the strategic decision-making process.

1.2 Net Present Worth (NPW)

This Net Present Worth (NPW) method evaluates a project's profitability by comparing the initial investment with the present value of projected net cash flows of the project, adequately discounted by the required rate of return. This methodology provides a quantitative measure of a project's financial attractiveness; hence advancing the alignment of such an investment with the organization's objectives.

Formula:

$$NPW = \sum_{t=1}^{T} \frac{Ct}{(1+r)^t} - C_0$$

The positive NPW of any project indicates its profitability and acceptance since it has added to the value of the firm. On the contrary, the negative NPW means that the project is not worth pursuing and should be rejected. NPW mainly hinges on two essentials:

The discount rate that considers the risk associated with the investment and the cost of capital; The cash flows which depend on the amount and timing of inflows versus outflows during the project's life in as far as it gives information about the project's overall profitability.

1.3 Method of Internal Rate of Return (IRR)

The discount rate at which a project's net present worth is zero is called the internal rate of return (IRR). It is defined as the rate of return at which the project's cost of investment is equal to the present value of its net cash inflows. Therefore, the IRR is a decision criterion for the financial viability of a project because it is the discount rate that makes the present value of cash inflows equal to the initial investment.

$$NPW = \sum_{n=1}^{N} \frac{C_n}{(1+r)^n} = 0$$

It is that discount rate which brings the NPV of the future cash flows of a project to zero; hence, break-even cost at which the project is financed. It means that internal rate of return is one of the vital parameters for deciding whether it is worth investing or not.

It assumes that cash flows will vary from period to period and therefore requires iterative computational methods like trial-and-error or numerical approximation techniques for arriving at an exact rate.

The decision rule for IRR is as follows:

- If the IRR exceeds the required rate of return (cost of capital), the project is considered financially viable and should be accepted.
- If the IRR is lower than the required rate of return, the project should be rejected, as it fails to generate sufficient returns to justify the investment.
- If R>KR > KR>K, accept the project.
- If R<KR < KR<K, reject the project.
  Where RRR is the IRR, and KKK is the required rate of return (P. Graham et al., 2003).

1.4 Benefit-Cost Ratio (BCR) or Profitability Index (PI)

BCR or PI measures the relationship between the present value of benefits and the initial cost of an investment.

Formula:

$$\text{BCR} = \frac{\text{Discounted Value of Benefits}}{\text{Discounted Value of Costs}}$$

A project is said to be economically feasible if its benefits are greater than its costs, as indicated by a Benefit-Cost Ratio (BCR) which is greater than 1. However, according to James C. Van Horne (2007), BCR values less than 1 imply that the project is not financially viable.

The project is also valuated according to the Accounting Rate of Return (ARR), which compares average annual profit with the original investment. This is stated in the form of a ratio between the original investment cost and average annual earnings.

The formula for the Average Accounting Rate of Return (AARR) is:

$$AARR = \frac{Average\ Annual\ Earnings}{Initial\ Investment\ of\ the\ Project}$$

This metric provides a straightforward measure of financial performance but does not account for the time value of money.

1.5 Another is Payback Method (PBM)

The payback period is the most critical standard, allowing one to calculate how long it will take for the cash inflows from a project to recoup the initial expenditure. The limitations of the payback method as a decision-making tool arise because it discards the time value of money. This is compounded by the fact that, in applying the payback period to the analysis of any strategic of singular projects, you forego some very significant factors that affect long-term profitability beyond the payback duration.

Although this method provides no indication of the general return on investment, it does provide priority to projects that recoup their initial capital expenditure over a short time frame. This limitation marks a fundamental flaw in the payback scheme, in that the latter does not delve deeper into cash flow analysis, which is essential for evaluating both conventional and strategic undertakings. To overcome these constraints, managers should implement assessment decision criteria that encompass all cash inflows/outflows, potential timing, and their magnitude, thereby ensuring more prudent investment selections (Russell et al., 2011).

1.6 The Modified Internal Rate of Return (MIRR)

The Internal Rate of Return (IRR) is generally found to have tremendous encumbrances when the signs of the project's cash flow (PCF) are frequently changing. Under this circumstance, multiple IRRs may occur which would be considered an inconvenience for the profitability evaluation of investment (Van Horne, 2007). The Modified Internal Rate of Return (MIRR) successfully represents a better indicator for investment profitability to address these deficiencies (Kierulffa, 2008).

The first reason is that MIRR does not consider IRR but thinks that then cash inflows will reinvest at the project capital cost or a predetermined reinvestment rate. And, by addressing irregular cash flows, it eliminated the problem of multiple IRRs and thus aimed for a much truer and much steadier measure of financial success for project (Chandra, 2004).

1.7 Real Options (RO)

Traditional evaluation techniques generally disregard uncertainty and decision making flexibility, both of which are considered by genuine alternatives. Real options give investment managers a way to assess scenarios that consider both financial and real assets-their options of expanding or abandoning, for example. This is diametrically opposed to more rigid approaches such as Net Present Worth (NPW) or Internal Rate of Return (IRR), which normally take no notice of the strategic flexibility inherent in investment decision (Nuno's Gull, 2007).

Real options assist dynamic capital budgeting principally because they aid the firm to timely adapt in an environment of changing market conditions for better strategic choices. Experts tend to mix NPV or IRR with real options to improve their project assessments while elevating the chance of positive results. Finally, project acceptance is determined by the comparison of the required return with these increasingly sophisticated and flexible evaluation techniques (Bennouna et al., 2010; Graham et al., 2003).

2. REVIEW OF LITERATURE

For defining opportunities for long-run investments that will give long-run advantages to the asset base of a company, capital budgeting and investment decisions are to consider long years (Peterson and Fabozzi, 2002). Organizations nowadays realize the importance of using post-completion audit procedures for the risk assessment of projects, including options for the possibility of failure. This method shows how important the project evaluation is and how much needs to improve in forecasting accuracy (Pike, 1996).

Among the ways used by finance managers to assess investment opportunities is through use of the Internal Rate of Return (IRR) and Net Present Worth (NPW) methods. More complex devices like discounted cash flow studies and the Modified Internal Rate of Return (MIRR) introduce complexity into decision-making and facilitate better assessment of project viability.

2.1 Cash Flow Analysis and Decision-Making in Capital Budgeting: A Long-Term Perspective

Net Present Worth (NPW) is usually calculated under the assumption of reinvestment at the cost of capital over long periods of time. The IRR framework assumes that intermediate cash flows are reinvested at the project's IRR when the cash flows have a positive NPV greater than the cost of capital. Being less vulnerable to issues like multiple sign changes of cash flow, NPW creates higher consistency in project evaluation, thereby increasing its ability to generate wealth for shareholders; this is opposed to IRR. Consequently, projects with positive NPVs are expected to help increase the firm's value and support long-term wealth maximization efforts (Ryan, 2002).

On various aspects, the advanced capital budgeting approaches and business size have been assessed. Larger companies have a higher likelihood of using sophisticated techniques that include risk, sensitivity, discounted cash flow (DCF) models, and computer-based budgeting tools. The application of such sophisticated methods, which also include cash flow volatility, inflation rate, and incremental IRR, is crucial for determining the worth of any new project (Pike, 1996; Ryan, 2002). Although there might be widespread usage of these techniques, many firms tend to make decisions using company-wide discount rates rather than using project-specific rates. Interestingly, while a smaller-sized company is more likely to adopt simpler models such as capital asset pricing model (CAPM) or profitability index, a larger corporation pays more attention to NPV and IRR methods (Graham & Harvey, 2001).

Despite the popularity of discounted cash flow approach (DCF) models, it has been criticized by some scholars for falling far short of being able to capture the strategic and intangible advantages of current investments such as competitive advantage and technological innovation.. These models are likely to lead to investment myopia that can result in less than perfect choices of capital allocation (Slagmulder et al., 1995). The choice of capital budgeting techniques is determined by the project size, the organization type, and the risk profile of projects; however, such considerations indicate that a much better understanding of decision-making frameworks is needed.

To handle these shortcomings, some theorists adopt the application of accounting profits instead of cash flows in project evaluation (Brealey & Myers, 2003). The concern is that investment decisions regularly include interest and other financing expenses in cash flow estimates that may be wrong (Berman, 1993). It is more effective and preferable that the decision-making process found integration of the inflation rate. Long-term projects not considering the effect of inflation may produce biased results. A method of handling the impact of inflation is to apply a discount rate that takes into account inflation effects, or to directly add inflation into cash flows (Bennouna et al. 2010).

The discount rate, which is essential to the precision of financial computations, is a major component of the DCF model. A weighted average that incorporates debt, equity, preferred stock, and common equity is commonly used by businesses to measure their cost of capital (Brigham & Ehrhardt, 2002). Organizations must base their desired capital structure on market capitalization in order to guarantee accuracy (Bennouna et al., 2010).

Each division within a multi-division corporation may have a unique risk profile. Investment projects should use a discount rate that is customized to the risk characteristics of the relevant market or niche in order to appropriately reflect these variances (Verbeeten, 2005; Ross et al., 2005).

2.2 Research Aims and Objectives

Investigating the methods and strategies used by Pakistani businesses while making capital budgeting decisions is the main goal of this study. The study specifically seeks to answer the following important questions:

a. How do businesses find and rank investment projects?

b. Which capital budgeting strategies do businesses employ the most frequently?

c. What factors or traits, such as Payback Period, Net Present Worth (NPW), Modified Internal Rate of Return (MIRR), or Discounted Cash Flow (DCF), affect the approaches that businesses choose?

d. How do businesses use multiple approaches to different sub-projects in their portfolios?

e. How are weights allocated in these assessments, and how are discounted cash flows and market values computed for sub-projects under various discount rates?

f. How much do decision-makers' educational backgrounds affect capital budgeting procedures?

3. RESEARCH METHODOLOGY

A sample of 450 businesses was chosen for the study from among the businesses listed on the Lahore Stock Exchange. A final sample size of 294 enterprises was obtained by excluding 156 firms from this group because they were inaccessible. A standardized questionnaire that was disseminated electronically by email was used to collect data. Follow-up measures to guarantee participation included calling CEOs and CFOs, reminding them to turn in completed surveys, and, if required, making in-person visits to deliver or pick up physical copies. 53 businesses did not reply in spite of these attempts, yielding an 18.4% response rate that is consistent with other studies of a similar kind (e.g., Bennouna et al., 2010).

4. DISCUSSION OF RESULTS

With 34% of businesses continuously utilizing Net Present Worth (NPW) and 49.1% using it regularly, Table 1 shows how common NPW is as the preferred capital planning method among Pakistani businesses. 47.2% of businesses report using the Internal Rate of Return (IRR) frequently, indicating a moderate adoption rate. On the other hand, just 11.3% of businesses regularly use the Modified Internal Rate of Return (MIRR), which is rarely used. 39.6% of businesses say they always use the Payback Period (PB), while 17% say they never do. In general, 70% of businesses have not completely adopted more sophisticated assessment techniques. According to the results, 60.4% of businesses believe that NPW is the most dependable and uncomplicated method for evaluating investments.

Table: *Techniques for investment projects Variable (Evaluation)*

Name Usage Level in	**Never**	**Almost Never**	**Almost Always**	**Always**
NPW	15.1	1.9	49.1	34.0
IRR	7.5	28.3	24.5	39.6
MIRR	472	28.3	132	113
Profitability Index (PI)	15.1	17.0	28.3	39.6
Payback Period (PB)	39.6	17.0	26.4	17.0
Accounting Rate of Return (ARR)	45.3	24.5	15.1	15.1
Real Options (EO)	69.8	17.0	7.5	5.7

4.1 Statistical Practices in investment decision: A Study of Companies in Pakistan

The methods used by Pakistani businesses to make investment decisions are investigated in this study. According to the report, 39% of businesses currently use statistical analysis in their operations, and 34% more are expected to do so in the future. As part of their continuous expansion plans, about 27% of businesses take alternative projects into account.

Chief Financial Officers' (CFOs') use of sophisticated diagnostic techniques is significantly influenced by their educational background. With 50% choosing not to utilize Net Present Value (NPV) and 50% showing an equal likelihood of using Internal Rate of Return (IRR), CFOs with bachelor degrees are less likely to use advanced tools like NPV. Just 25% of CFOs who are undergraduates use IRR occasionally. The use of NPV, IRR, and Modified Internal Rate of Return (MIRR) in investment evaluations, on the other hand, is more preferred by CFOs with higher degrees, such as Master of Business Administration (MBA).

There are notable variations in capital budgeting techniques between small and large businesses (defined by a threshold of 1,000 employees). Of major organizations, 37.5% use Net Present Value (NPV) usually always and another 37.5% use it regularly for project evaluation. But only 25% of big businesses use this method seldom. On the other hand, small businesses use NPV for their investment evaluations at comparatively high rates.

It's interesting to note that 28% of large organizations completely avoid using the Internal Rate of Return (IRR). Comparatively, 16% of small businesses use IRR approaches, indicating a slight preference for this approach. On the other hand, only 14.3% of small businesses and 35.7% of large businesses regularly use more sophisticated strategies such the Modified Internal Rate of Return (MIRR). Furthermore, 60% of smaller businesses never use MIRR.

Analysis of the profitability index (PI) reveals that large businesses use it more frequently—35.7% use it very constantly, and 32.1% use it regularly. Notable acceptance rates are also shown by small businesses, with 48% regularly using PI and 20% using it nearly constantly. In both small and large businesses, payment mechanisms and discounted cash flow (DCF) techniques continue to be essential components of investment evaluation processes.

Furthermore, 40% of small businesses and 50% of large businesses choose not to use the Accounting Rate of Return (ARR). While just a tiny percentage (14.3%) of major enterprises report regularly using Real Options Theory, its applicability is almost nonexistent in small businesses. Most businesses, 80% of large businesses and 60% of small businesses, use Discounted Cash Flow (DCF) approaches. They mostly use Internal Rate of Return (IRR) (40%) and Net Present Value (NPV) (60%) in their calculations. Remarkably, 17.4% of businesses don't use any DCF techniques.

62.3% of businesses include the Weighted Average Cost of Capital (WACC) in their analysis, whilst 32.1% do not use any weights at all. About 24.5% of businesses ignore project-specific discount rates in favor of a consistent rate of return across all divisions. The chi-square test ($\chi^2 = 0.933$, $\alpha = 0.05$) and other statistical tests indicate a correlation between the size of the corporation and the varying rates of return application among divisions.

With only 34% of businesses adopting scenario analysis and 30.2% using sensitivity analysis, risk analysis is still underutilized. Only 17% of businesses use risk-adjusted discount rates, while methods like simulation and decision tree analysis are rarely used.

Investment evaluations are dominated by quality-based methods, with standardized procedures being used by 69.8% to 75.5% of enterprises. About 75.5% of businesses perform post-audit evaluations of capital budgeting choices, while 84.9% of businesses use investment manuals.

4.2 Uses and Application

Firms in Pakistan typically exhibit a significant gap between the theoretical application of investment decision-making models and their practical implementation. While many companies use Discounted Cash Flow (DCF) methods, essential components of this approach are often applied incorrectly. This gap in practice presents an opportunity to enhance the investment decision-making process. There is a need for companies to improve their decision-making frameworks by incorporating more advanced techniques such as Net Present Worth (NPW), Internal Rate of Return (IRR), and Modified Internal Rate of Return (MIRR), as well as considering Real Options Theory.

Additionally, companies should account for varying levels of uncertainty across different divisions and departments by applying multiple discount rates for projects, rather than relying solely on a single discount rate based on financing sources. Market prices or target weights should be incorporated into the discount rate calculation to reflect more accurate project evaluations. Firms also need to focus on investing in educated and trained staff to ensure the correct application of these methods.

Furthermore, adopting a standardized model for decision-making, conducting economic trends analysis, and utilizing information systems for capital budgeting processes will provide firms with a more robust decision framework. Importantly, companies should incorporate inflation into their capital budgeting models to ensure accurate, long-term investment projections.

4.3 Constraints

Practical constraints have an impact on a number of the study's conclusions. First, respondents may have given answers that reflect desired results rather than actual practices, which could lead to response bias and provide a problem for the survey data. Second, even though this group is thought to be typical of the general public, the study is restricted to a small sample of businesses that operate in Pakistan. Additional insights might be obtained by broadening the focus to include businesses in different geographic areas, especially if common application techniques were investigated.

Third, the study mostly uses conventional survey techniques, which make it easier to compare it to earlier studies. Nevertheless, no prior research has explicitly addressed this topic in the Pakistani setting, where businesses could profit from investigating novel methods to investment choices. Fourth, with a focus on Discounted Cash Flow (DCF) approaches, the study's scope is restricted to specific elements of capital planning. It is recognized that advanced DCF applications are essential for managerial decision-making.

The results of this study provide credence to the notion found in previous studies that managers make logical choices. Future studies should focus on how DCF approaches are used in real-world situations, especially when it comes to organizational case studies. Future research could also use in-depth interviews and focused groups to look more closely at these techniques. Country-specific elements including tax laws, erratic governmental rules, energy crises, inflation, and terrorism might potentially be taken into account in future research. To offer more thorough insights into Pakistani investors' decision-making, these elements must to be incorporated into risk-adjustment models.

5. CONCLUSION AND RECOMMENDATIONS

The capital budgeting procedures of Pakistan's advanced organizations are examined in this research, which provides some important insights into the strategies these companies use. Despite being largely accepted in the literature as the most favored and trustworthy strategy, the corporate sector in Pakistan has not consistently adopted Discounted Cash Flow (DCF) approaches. More sophisticated methods, like Real Options Theory and the Modified Internal Rate of Return (MIRR), which reflect recent developments in capital planning, are applied less often and with mediocre success.

Despite the fact that most businesses use capital budgeting methodologies, there is room for improvement given how precisely and sophisticatedly they are used. In particular, sophisticated techniques with significant potential to improve decision-making processes, such as MIRR and genuine choices, are not widely

used. Furthermore, there are still issues with administrative processes, obtaining highly skilled financial analysts, integrating contemporary information systems, estimating costs accurately, and using methods like the Weighted Average Cost of Capital (WACC), which accounts for subsidiary operations and project-specific uncertainty.

This study offers a modern viewpoint on capital budgeting procedures in the twenty-first century while also highlighting the contextual and geographic constraints of Pakistan's business environment. The report provides recommendations for enhancing these procedures by addressing typical mistakes seen while applying DCF approaches. Even while conventional techniques are still widely used, there is a good chance that more sophisticated strategies like MIRR and real choices will be adopted. To close current gaps in Pakistani corporate practices, future studies should increase the sample size and examine these topics in greater detail.

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Conflict of Interest

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