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# CAPITAL FINANCE DECISIONS FOR PROJECT MANAGERS – A REFLECTION ON CURRENT METHODS

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This paper evaluates some of current financial investment selection methodologies for capital projects. The process (and criteria) of capital investment decisions is reviewed. The capital budget for most organisations is prepared annually by a committee of senior managers who then present it for approval by the board of directors. Investment proposals are usually subjected to two financial tests, "payback" and "internal rate of return (IRR)". The management committee usually decides on the tests and acceptance criteria vary according to the type of project. Some shortcomings of these most frequently used current tests (Payback & IRR) are identified and it is recommended that the Net Present Value (NPV) should be used as the primary method for analysing, comparing and selecting capital projects.

*Keywords:* capital finance decisions, capital investment decisions, net present value, internal rate of return, payback

## INTRODUCTION

Capital budgeting is a required managerial tool. One duty of a project manager is to choose investments with satisfactory cash flows and rates of return. A project manager must be able to decide whether an investment is worth undertaking and be able to choose intelligently between two or more alternatives. To do this, a sound procedure to evaluate, compare and select projects is needed. This procedure is called capital budgeting (Simkins 2003a: Internet). Capital budgeting is basically concerned with the justification of capital expenditures.

## CAPITAL BUDGETING FOR PROJECTS

Any form of capital is a limited resource, whether debt or equity (short-term or long-term, common stock) or retained earnings, accounts payable or notes payable. Faced with limited sources of capital, management should carefully decide whether a particular project is economically acceptable. In the case of more than one project, management must identify the projects that will contribute most to profits and, consequently, to the value (or wealth) of the company (Simkins 2003a: Internet).

The basic steps of capital budgeting are:

- Estimate the cash flows
- Assess the riskiness of the cash flows
- Determine the appropriate discount rate
- Find the present value (PV) of the expected cash flows

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- Accept the project if:
    - PV of inflows > costs
    - Internal Rate of Return (IRR) > Hurdle rate, or
    - Payback period < policy.
- (Simkins 2003a: Internet)

## INVESTMENT SELECTION METHODOLOGIES

There are a number of tools and techniques available to evaluate the feasibility of future projects. The following investment selection methodologies will be explained and critically evaluated:

- The payback period
- Net present value (NPV)
- Internal rate of return (IRR)
- Modified internal rate of return (MIRR)

## THE PAYBACK PERIOD

The payback period measures the time (expected number of years) that it takes to recoup the cost of an investment. The cash flows are subtracted from the cost until the remainder is zero. The shorter the payback period, the better the project. Companies have some maximum allowable payback period against which all investments are compared (Mayes 2003: Internet).

A typical scenario could include:

Type of project	Maximum acceptable payback years
New product or new markets	6 years
Product or market extension	5 years
Efficiency improvements	4 years
Safety or environmental	No test

### ***Critical evaluation of the payback period***

The payback period is quick and easy to calculate. It gives a measure of the liquidity of the project. It tends to favour investments that free up cash for other uses more quickly. This would be more important for a small company, but less so for a large company.

It suffers from two primary problems that limit its usefulness in evaluating investments. It ignores the time value of money and also ignores all cash flows beyond the payback period (Mayes 2003: Internet).

The “maximum acceptable payback years” is usually determined (arbitrarily chosen) by a policy decision and not based on any economic foundation. Should a project’s payback period exceed this predetermined value, it is not recommended for consideration.

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The payback period does not consider risk differences at all. It would be calculated in the same way for both very risky and very safe projects. Using the payback period could also result in a bias towards short-term investments. This makes the acceptance of long-term projects (e.g. research and development and new projects) more difficult (Ross *et al.* 2003:220-223).

## NET PRESENT VALUE

The net present value (NPV) is the difference between the present value of the cash flows (the benefit) and the cost of the investment (Mayes 2003: Internet). NPV is a measure of how much value is created or added today by undertaking an investment. Given the goal of creating value (wealth) for shareholders, the capital budgeting process can be viewed as a search for investments with positive net present values.

$$NPV = \sum_{t=0}^n \frac{CF_t}{(1+k)^t}$$

NPV is calculated by subtracting the initial outlay (cost) from the present value of cash flows (Mayes 2003). The Weighted Average Cost of Capital (WACC) is used as the discount rate to calculate the present value of cash flows. WACC is a calculation of a company's cost of capital that weights each category of capital proportionately. Included in the WACC calculation are all capital sources, including common stock, preferred stock, bonds and any other long-term debt (Investopedia 2003: Internet).

A company's WACC is the overall required return on the company as a whole. It is the appropriate rate to use for cash flows similar in risk to the overall company (Investopedia 2003: Internet). A calculated WACC-value is used when evaluating capital investment decisions (Simkins 2003b: Internet).

### ***Critical evaluation of the Net Present Value (NPV)***

NPV discounts the future cash flows of a project by using a determined discount rate (often the WACC). It is able to determine the increase in wealth (today) that would result from undertaking a project. It enables management to compare projects of different types and to make correct capital budgeting decisions.

Should projects be independent, all projects with positive NPV should be accepted. If projects are mutually exclusive, the project with the higher (positive) NPV should be accepted. A project with a negative NPV is not a good investment, as it would decrease the value of the company and therefore also the wealth of the shareholders. NPV is the preferred approach in principle, if not always in practice.

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## INTERNAL RATE OF RETURN

The internal rate of return (IRR) is the discount rate that equates the present value of cash flows and the cost of the investment. Usually, the IRR cannot be calculated directly, instead a process of trial and error must be used (Mayes 2003: Internet). This rate must be an “internal” rate in the sense that it only depends on the cash flows of a particular investment and not on rates offered elsewhere (Steyn & Maritz 2003).

Therefore the IRR of an investment is *“the required return that results in a zero NPV when it is used as the discount rate”*.

$$\text{IRR: } \sum_{t=0}^n \frac{CF_t}{(1 + \text{IRR})^t} = R0 = \text{NPV}$$

The internal rate of return (IRR) is one of the investment selection methodologies at some organisations. A typical scenario could include:

Type of project	Minimum Acceptable IRR
New product or new markets	12%
Product or market extension	10%
Efficiency improvements	8%
Safety or environmental	No test

### **Critical evaluation of the IRR**

The IRR is a popular technique primarily because it is a percentage that can be easily compared to the WACC. However it suffers from a couple of flaws:

- The calculation of the IRR implicitly assumes that the cash flows are reinvested at the IRR. This is not always realistic. Suppose the cut-off rate is 12% and the IRR is calculated at 40%. Does this mean that management should immediately accept the project because its IRR is 40%? The answer is *no!* An IRR of 40% assumes that a company has the opportunity to reinvest future cash flows at 40%. If past experience and the economy indicate that 40% is an unrealistic rate for future reinvestments, an IRR of 40% is suspect. Simply speaking, an IRR of 40% is too good to be true! So unless the calculated IRR is a reasonable rate for reinvestment of future cash flows, it should not be used as a yardstick to accept or reject a project (Simkins 2003a: Internet).
- Percentages can be misleading - would you rather earn 100% on an R100 investment, or 10% on an R10 000 investment? (Mayes 2003: Internet).
- Another problem with the IRR method is that it may give different rates of return. Suppose there are two discount rates (two IRRs) that make the present value equal to the initial investment. In this case, which rate should be used for comparison with the cut-off rate? (Simkins 2003a: Internet)

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The IRR method, despite its popularity in the business world, entails more problems than a practitioner may think. It may result in multiple answers or not deal with nonconventional cash flows. It may also lead to incorrect decisions in comparisons of mutually exclusive investments.

## **MODIFIED INTERNAL RATE OF RETURN**

The Modified Internal Rate of Return (MIRR) is similar to the IRR, but is theoretically superior in that it overcomes two weaknesses of the IRR. The MIRR correctly assumes reinvestment at the project's cost of capital and avoids the problem of multiple IRRs. The MIRR is not used as widely as the IRR in practice (Simkins 2003a: Internet).

There are three basic steps of the MIRR:

- Estimate all cash flows as in IRR
- Calculate the future value of all cash inflows at the last year of the project's life.
- Determine the discount rate that causes the future value of all cash inflows (determined in the previous step) to be equal to the company's investment at time zero. This discount rate is known as the MIRR (Simkins 2003a: Internet).

### ***Critical evaluation of the MIRR***

The MIRR is the average annual rate of return that will be earned on an investment if the cash flows are reinvested at the specific rate of return (usually the WACC). MIRR is considered to be better than IRR (Simkins 2003a: Internet) because:

- MIRR correctly assumes reinvestment at project's cost of capital
- MIRR avoids the problem of multiple IRRs

## **RECOMMENDED INVESTMENT SELECTION METHODOLOGY**

As a matter of policy, investment proposals are usually subjected to two financial tests, "payback" and "internal rate of return (IRR)". The tests are usually decided on by the management committee and acceptance criteria vary according to the type of project.

These current methodologies have significant shortcomings, as described in the preceding section. Senior management should review the selection criteria on a regular basis as methodologies and tools are refined or improved.

The Net Present Value (NPV) is the difference between an investment's market value and its cost. NPV is a measure of how much value (shareholders wealth) is created or added today by undertaking an investment. This methodology enables management to compare project of different types and to make correct capital budgeting decisions. NPV has no significant flaws is recommended as the single investment selection method.

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### Reasons why NPV outperforms other measures

- It considers all relevant, incremental cash flows at an appropriate opportunity cost of capital.
- If projects have mutually exclusive cash flows, combinations of projects with the highest NPV can be chosen. IRR cannot cope with mutually exclusive projects.
- NPV shows the increase in wealth to shareholders due to value additivity principle. IRR does not.
- The market determines the appropriate discount rate for NPV values by considering the risk of the project. IRR results from a mathematical relationship,  $NPV @ IRR = 0$ .
- NPV does not shift if the sign of cash flow changes. IRR does shift which may give multiple rates as a result. (McNabb 2003: Internet)

### RECOMMENDATIONS

The capital investment selection process in place in most organisations seldom achieves the expected results. The investments tests (Payback and IRR), used to determine recommended capital projects, are flawed. They ignore the time value of money. Investment decisions are based on incomplete financial analysis and comparisons.

A decision needs to be taken to utilise the Net Present Value (NPV) as the corporate capital investment decision instrument. Given the shortcomings of the current tests (Payback & IRR) it is recommended that the Net Present Value (NPV) should be used as the preferred method for analysing, comparing and selecting capital projects.

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