

CAPITAL BUDGETING

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1. Introduction

In order to examine the decision process and to answer the question: '**How do we make a decision?**', we have first to discuss the circumstances in which a decision needs to be made. We can specify *two necessary conditions for a decision situation*: the existence of alternatives and the existence of an objective or goal.

The existence of alternatives is necessary for, if there are no alternatives amongst which to choose, then there is no need for a decision. This condition can be specified further in that not only must alternatives exist, but they must be seen to exist by the potential decision maker.

The second necessary condition for a decision situation arises from the fact that actual process of 'making a decision' is liable to cause the decision maker to expend both time and effort. Rationally he will be unwilling to do so unless he expects that some of the perceived alternatives will be preferred to others in relation to attaining the desired objective. Thus the existence of an objective is the second necessary condition; without it, there will be no purpose in making a decision.

The investment decision is the decision to commit the firm's resources (capital, people, know-how, and so on) to particular projects with the intention of achieving greater financial and other benefits in future years. These assets may be tangible, such as buildings, plant and equipment and land, or intangible, such as investment in patents, brands, know-how and people.

Capital budgeting is the term given to the process by which organizations reach capital investment decisions.

A good capital budgeting system does more than just make accept-reject decisions on individual projects. It must tie into the firm's long-range planning process- the process that chooses the direction of the firm's business and sets out plan for financing, production, marketing, research and so on. It must also tie into a procedure for measurement of performance.

2. Capital budgeting – the investment process with a number of distinct stages

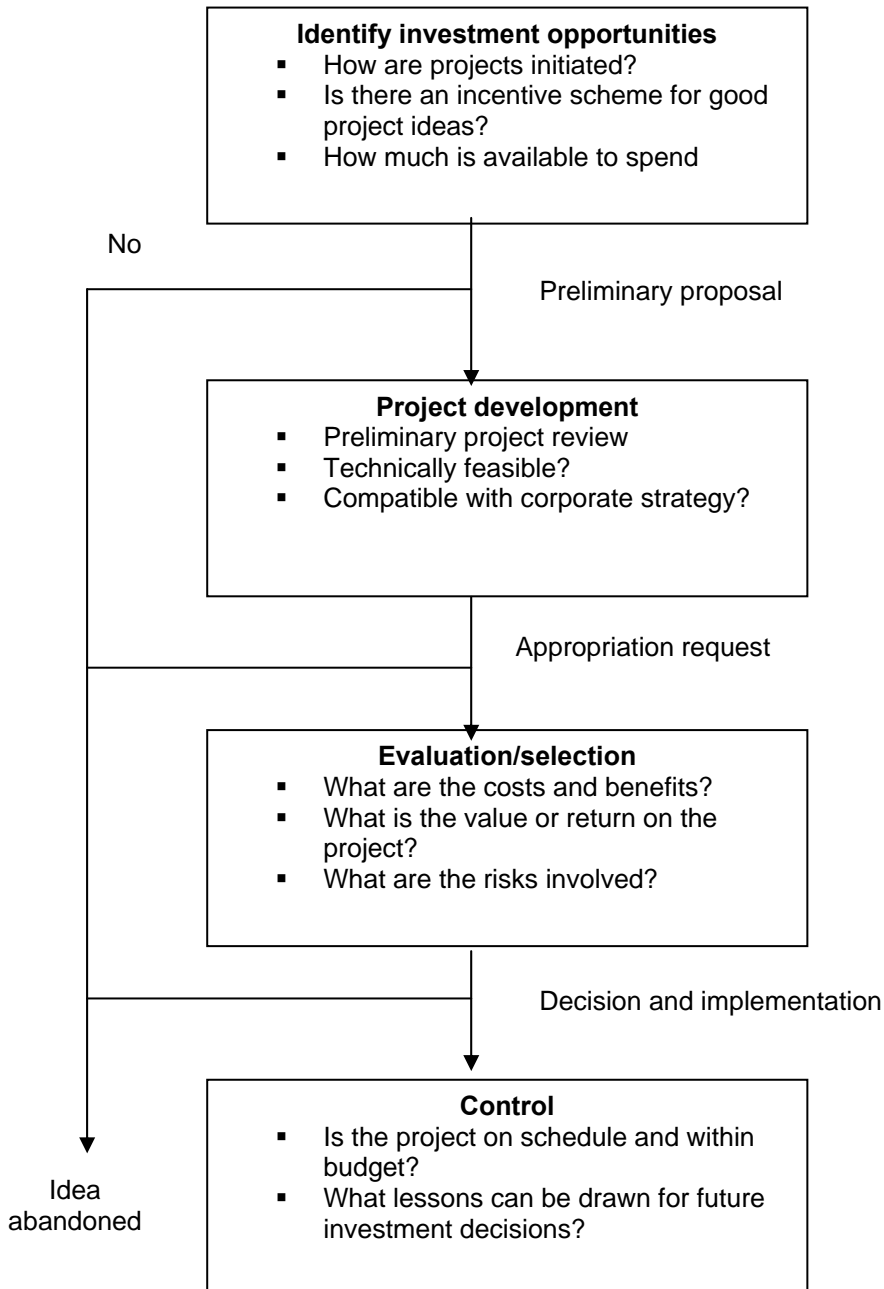
One way of viewing *capital budgeting* is to see it as a process with a number of distinct stages. According to this view, decision-making is an incremental activity, involving many people throughout the organization hierarchy, over an extended period of time. While senior management may retain final approval, actual decisions are effectively taken much earlier at a lower level, by a process that is still not entirely clear. We tend to regard investment decision-making as a rational process of resource allocation, although, in reality, decision making may be somewhat less ordered and rational than supposed.

Generally, within a capital budgeting context, various authors have attempted to describe this like a four-stage process:

- identification of investment opportunities;
- development of an initial idea into a firm proposal;
- selection of projects;
- control of projects, including post audits.

All these can be illustrated in figure 1:

Figure 1 - The capital investment decision



Stage one: identification

Economic theory views investment as the interaction of the supply of capital and the flow of investment opportunities.

It would be quite wrong, however, to assume that there is a continuous flow of investment ideas. Possibly the most important role which top management

can play in the capital investment process is to cultivate a corporate culture which encourages managers to search for, identify and sponsor investment ideas. Questions to be asked at the identification stage include:

1. How are projects proposals initiated?
2. At what level are projects typically generated?
3. Is there a formal process for submitting ideas?
4. Is there an incentive scheme for identifying good project ideas?

Generating investment ideas involve considerable effort, time and personal risk on the part of the promoter. Any manager who has experienced the hurt and frustrations of having an investment proposal dismissed or an accepted proposal fail is likely to develop an inbuilt resistance to creating further proposals unless the organization culture and rewards are conducive to such activity. There is some evidence that firms employing long-term incentive plans encourage the initiation and implementation of capital investment projects.

For the identification phase of non-routine, strategic capital budgeting decisions to be productive, managers need to conduct environmental scanning, gathering information which is largely externally oriented, much of which is non-financial and ex ante. We should not expect the formal information system within most organizations to be particularly helpful in identifying non-routine investment ideas. Informal channels of communication are frequently more important in identifying investment ideas.

Stage two: Project development

The second stage in the capital investment decision-making process is the screening of all investment ideas and development of those showing sufficient promise. This is sometimes termed *the preliminary project review*.

It is neither feasible nor desirable to conduct a full-scale evaluation of each investment idea. The screening process is an important means of filtering out projects not thought worthy of further investigation. Idea may not fit with strategic thinking, or fall outside business units designated for growth or maintenance.

The investment process usually forms part of a wider strategic process. Capital projects are not normally viewed in isolation, but within the context of the business, its goals and strategic direction. Screening proposals therefore address such questions as:

1. Is the proposal compatible with corporate strategy?
2. Is the idea technically feasible?
3. Do we have access to the required resources (for example, finance, technology, skills, and so on)?
4. Does the project need further development?

Another element of the development phase involves defining projects, the detailed specification of the proposal, together with its technical and economic characteristics. Projects must be created. So, capital projects do not begin life in a filing cabinet awaiting only the tedious collection of the information necessary for their evaluation. They must be created. The choice of the form of a project occurs at the screening and definition stages where information is limited, search required and analysis sequential.

The very act of gathering information necessitates communicating with other managers and seeking support for the project. Commitments are made and alliances formed early on in the process, usually well before any financial analysis has been conducted. In order to collect information, it is necessary to communicate with people, to make certain decisions, and often to give tacit promises. In this process commitments are accumulated until a situation is

created which leads inevitably to investment.

The amount of information gathered is largely determined by the data perceived as necessary to gain a favorable decision, and the extent to which the promoter will be held responsible for later performance related to the data.

Stage three: evaluation/selection

The selection phase involves evaluation of the project and the decision outcome (for example, accept, reject, request further information). Project evaluation, in turn, involves the assembly of information (usually in terms of cash flows) and the application of specified investment criteria. Each firm must decide whether to apply rigorous, sophisticated evaluation models or simpler models which are easier to grasp yet capture many of the important elements in the decision.

The capital budgeting literature identified a lot of methods for capital investment evaluation, in accordance with we study investment decision in certainly, riskily or uncertainly environment. So, in certain environment we have financial appraisal techniques. Here we can distinguish between 'naive' or simple (without discounting) and 'sophisticated' or complex methods (with discounting) of investment analysis. *Simple method include: the cost criteria, the accounting rate of return and payback period. Complex method include: net present value; derived criteria from net present value (profitability index, discounted payback period and net present value for projects with different lives) and internal rate of return.*

Modern finance theory prescribes selection rule consistent with the assumed goal of the firm of wealth maximization. One such selection rule concerns net present value (NPV). Given certainty and perfect capital markets, the wealth of the firm's shareholders is

maximized when projects with after-tax positive net present values are selected. Long-term investment decisions give rise to changes in corporate cash flows in different future periods. It is necessary to incorporate into the decision analysis a means of taking account of the differences in timing between cash flows, and the NPV approach achieves this by discounting all cash flows at a rate commensurate with the time-value of money reflecting the opportunity cost of funds. A related selection rule employs the internal rate of return (IRR) approach. Projects should be accepted where the IRR -that rate of return which equates the initial cash outlay with future cash flows- exceeds the cost of capital.

Here we have two questions: "Which capital budgeting methods should companies be using?" and equally important question "Which methods are companies using?" Table 1 helps answer these questions.

Table.1-Percentage of CFOs who always or almost always use a given technique

Methods	% Always or almost always
Internal rate of return	75,6
Net present value	74,9
Payback period	56,7
Discounted payback	29,5
Accounting rate of return	30,3
Profitability index	11,9

Source: Figure 2 from John R. Graham and Campbell R. Harvey, "The theory and practice of corporate finance: evidence from the field", *Journal of Financial Economics* 60 (2001). Based on a survey of 392 CFOs.

As can be seen from the table, approximately three-quarters companies use the IRR and NPV methods. This is not surprising, given the theoretical advantages of these approaches. Over half of these companies use the payback method, a rather surprising result given the conceptual problems with this

approach. And while discounted payback represents a theoretical improvement over regular payback, the usage here is far less. Perhaps companies are attracted to the user-friendly nature of payback.

The obvious conclusion to be drawn is that managers prefer to employ a combination of appraisal methods, sophisticated and naïve.

One might expect the capital budgeting methods of large firms to be more sophisticated than the methods of small firms. After all, large firms have the financial resources to hire more sophisticated employees. Table 2 provides some support for this idea.

Table.2 - Frequency of use of various capital budgeting methods

Methods	Large firms	Small firms
Internal rate of return	3.41	2.87
Net present value	3.42	2.83
Payback period	2.25	2.72
Discounted payback	1.55	1.58
Accounting rate of return	1.25	1.41
Profitability index	0.75	0.78

Source: Table 2 from John R. Graham and Campbell R. Harvey.

Here firms indicate frequency of use of the various capital budgeting methods on a scale of 0 (never) to 4 (always). Numbers in table are average across respondents. Both the IRR and NPV methods are used more frequently, and payback less frequently, in large firms than in small firms. Conversely, large and small firms employ the last three approaches about equally.

An assessment of the risks involved in making investment decisions is a crucial element of the evaluation process. The most popular approach involves testing the *sensitivity* of critical investment inputs and underlying economic assumptions. Other approaches are: *break-point analysis*; *decision trees and computer simulation*.

Once we recognize that decision outcomes cannot be forecast with accuracy (that is, we introduce the reality of uncertainty), the cost of capital, representing the opportunity cost of funds, is no longer constant. Firms should accept projects where the expected net present value is positive when discounted at the appropriate risk-adjusted opportunity cost of funds for the projects, risk being viewed in terms of how the project's expected return covaries with the stock market's expected return.

Managers, however, frequently operate in a somewhat different environment. Most large capital investment projects may be defined as ill-structured problems, calling for decision processes that have not been previously encountered in quite the same form and for which no explicit set of ordered responses exist. Novelty, complexity, ambiguity and irreversibility are the hallmarks of many capital investment projects. While financial theory fulfils an important role in saying how capital investment decisions should be made under specified conditions and given a wealth-maximizing goal, it gives the mistaken impression that sound capital budgeting is all about selecting the right technique and criteria. Increasingly it has become apparent that the emphasis on formal investment appraisal techniques rather than on the whole process is misplaced.

Following evaluation, larger projects may require consideration at a number of levels in the organization hierarchy until finally approved or rejected. The decision outcome is rarely based wholly on the computed signal derived from financial analysis. Considerable judgment is applied in assessing the reliability of data underlying the appraisal, fit with corporate strategy, and track record of the project sponsor. The selection phase is essentially a political process. Projects put forward at lower levels in the organization need the 'impetus' of

sponsorship by a higher level manager with a good track record to secure a rapid and safe passage to final approval level. In many organizations relatively few projects are rejected at the final approval stage since to do so would indicate a lack of confidence in the decision-making judgment of those involved at earlier stages.

Stage four: control

The capital budgeting literature frequently assumes that control occurs after the selection phase. In fact, for most projects, relatively little real project control is possible then, the process being more that of monitoring implementation and performance through post-audit and other procedures. These 'controls' do, however, provide useful feedback on how well the capital budgeting process is operating, for example, the realism of assumptions.

The capital budgeting control process may be divided into pre-decision and post-decision controls.

Pre-decision controls are mechanisms designed to influence managerial behavior. Examples of such controls include the selection and training of subordinates to possess goals and risk attitudes consistent with senior management (selection controls), setting authorization levels and procedures to be followed (intervention controls) and influencing the proposals submitted by setting goals, hurdle rates, cash limits and identifying strategic areas for growth (influencing controls).

Post-decision controls are introduced to help managers implement the project on schedule and to achieve the planned levels of performance.

Also termed post-completion audit, project post-audit reviews the financial impact of a capital expenditure decision on one or more occasions during its life and/or at the end of its life. The main thrust of post-audit is a comparison of a project's actual cash flows with the estimates which were used in its original

appraisal. In addition, the "fit" between a proposal and the strategy which it was adopted in order to support may be assessed.

Post-auditing capital investment decisions offers a number of advantages:

1. knowledge that a proposal will be post-audited, if implemented, may result in *more rigorous estimation* of related costs and benefits at the appraisal stage;

2. post-audit during a project's life *may reveal problems* which can be corrected, or may indicate problems of such magnitude that project abandonment is required;

3. the post-audit process could *suggest hitherto unforeseen opportunities* for worthwhile capital investments or strategic improvement;

4. post-audit results may be incorporated in *evaluations of managerial performance*.

Also, post-auditing capital investment decisions offers a number of problems. Arguably the major danger inherent in post-audit arises from overemphasizing its financial control aspect:

1. that is, the comparison of estimated and actual costs/benefits, which might *inhibit managers*. Such inhibition could be reflected in a managerial risk aversion which reinforces pressures towards short-term approaches;

2. Post-audit can also be a *costly, time-consuming exercise*, and, given the strategic implications of the audit's subject-matter, we may be committing scarce resources to little or no good effect unless the post-audit can adequately reflect these.

3. once a capital investment project is under way, its ramifications might be so wide that *it is virtually impossible to identify related costs and benefits* (let alone quantify them).

4. post-audit must recognize the possibility of a lengthy *time lapse*

between project inception and proper appreciation of its consequences.

3. Conclusion

In **conclusion**, we can say that capital budgeting is a complex decision process what involves the outlay of current funds in anticipation of future cash flow benefits.

So, capital budgeting is the process of evaluating the cash flows from investment opportunities and deciding which ones should be accepted or rejected by the firm.

The capital budgeting process requires four distinct stages.

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