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Capital mobility and the Investment Decision

Nathan Schmukler

Any investment decision aimed at earning profits necessarily carries the risk of loss. But the cost of possible failure can be minimized if the principle of capital mobility is followed: the use of equipment and assets which have alternative uses —

CAPITAL MOBILITY AND THE INVESTMENT DECISION

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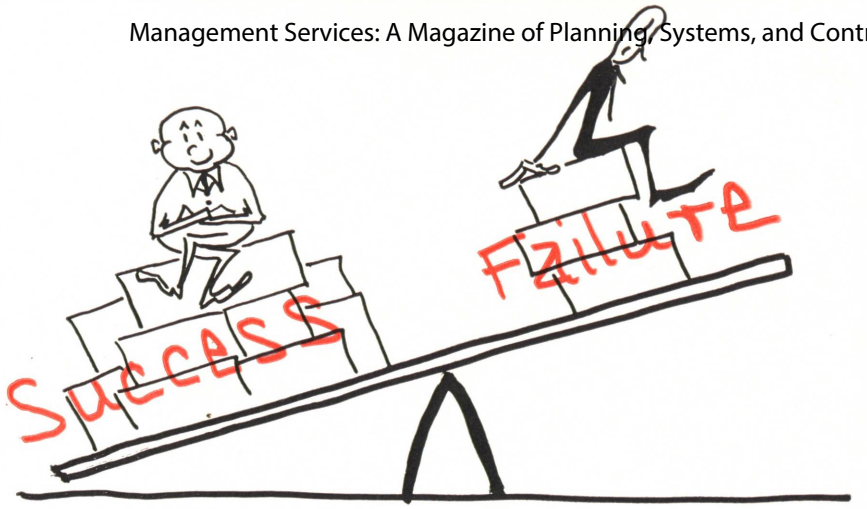
THE IMPORTANCE of the capital investment decision in business has been given increasing recognition in recent years. In few other areas can the right decision be so rewarding or the wrong decision so costly. Economic literature and business practice both reflect current efforts to improve and refine the decision making process associated with capital budgeting. Much of this effort has been focused upon the development of techniques for measuring the comparative profitability of alternative investments or the timing of capital replacements for minimum cost. As a result, significant advances have been made in these areas, particularly in the application of discounted cash flow analysis to the determination of profitability.

Many of these techniques, however, adopt profit maximization as virtually the sole criterion for the capital investment decision. Joel Dean's comment, "A business firm is an organization designed to make profits, and profits are the primary measure of its success,"[1] offers a valid guide for entrepreneurial decisions, but it should not be applied without qualification or reservation. Modern decision theory makes it evident that business actions are rarely simply and singly motivated but rather that they emerge from the complex interplay of many—often conflicting—goals.

An exclusive emphasis on profitability ignores the existence of other basic business aims. Among these, for example, are the survival of the organization and, related to survival, the preservation of its capital. In *Administrative Behavior*, Herbert Simon notes that "The

[1] Joel Dean, *Managerial Economics*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1951, p. 3.



The maximum long-run profitability of any enterprise is a net concept arising from the difference between the profits of successful decisions and the losses of unsuccessful ones.

values and objectives that guide individual decisions in organizations are largely the organizational objectives—the service and conservation goals of the organization itself."[2] The organization must incorporate in its decision making process values and procedures which minimize the dangers to its continued existence that are inherent in a free and rapidly changing market system.

Business decisions are thus subject to the opposing pressures of the unavoidable need to assume risk in order to make profit, and the menace of that risk to its survival. No safeguards and no system of decision making can assure total success.[3] Every investment decision is therefore taken not only with an awareness of the risk of failure for any individual project but also with the almost certain knowledge that some of the decisions will turn out wrong.

From this overall view the maximum long-run profitability of the enterprise is a net concept, arising from the difference between the profits of successful decisions and the losses of unsuccessful ones. A complete decisional system, directed toward maximizing long-run profits and promoting corporate survival and the preservation of capital, cannot be limited to an evaluation of comparative profitability on the assumption of success, either total success or success discounted for probability. It also must include measures to minimize the inevitable cost of failures.

Capital mobility defined

It is in relation to this aspect of capital planning, the consequences and costs that would result from a change in a decision after it has been implemented, that the concept of capital mobility is significant.[4] Capital mobility is a measure of the recoverability of an investment other than by the service of the asset in the original use and environment for which the investment was initially made. The value basis for capital mobility depends upon the alternative use potential of the asset, by the original investor or by others. Assets may differ greatly in the degree to which they possess mobility. Some assets purchased for a particular capital project may have no value except for that project; other assets may retain their value in many other applications.

Take a company faced with the problem of moving a new product from the factory to a storage area. To accomplish this inventory movement, management is contemplating either the purchase of five fork lift trucks or the installation of a conveyor system utilizing a combination of gravity feed and electrical power and necessitating structural building modifications.

As another illustration, a company in an expansion program has a choice between two new product lines, each requiring additional investment. Product line A can be manufactured with the kind of equipment currently used for the company's major product lines. On the other hand, product line B requires highly specialized machinery for which no other company use exists.

As a last example, in furnishing new offices a company is considering either buying standard file cabinets or installing built-in units. In each of the situations described the alternative choices will involve the investment in assets substantially different in the degree of their mobility.

This quality of mobility is an important and favorable characteristic in capital investment, and it should be recognized in the capital budgeting process. Capital mobility does not affect the profitability of individual projects; it does affect the total profitability of the enterprise. Capital mobility does not eliminate, or even reduce, the risk of failure of an investment; it does reduce the cost of failure.

Capital mobility does not resolve the uncertainties of the future; it does, however, demonstrate most definitely an awareness of their presence and reality.

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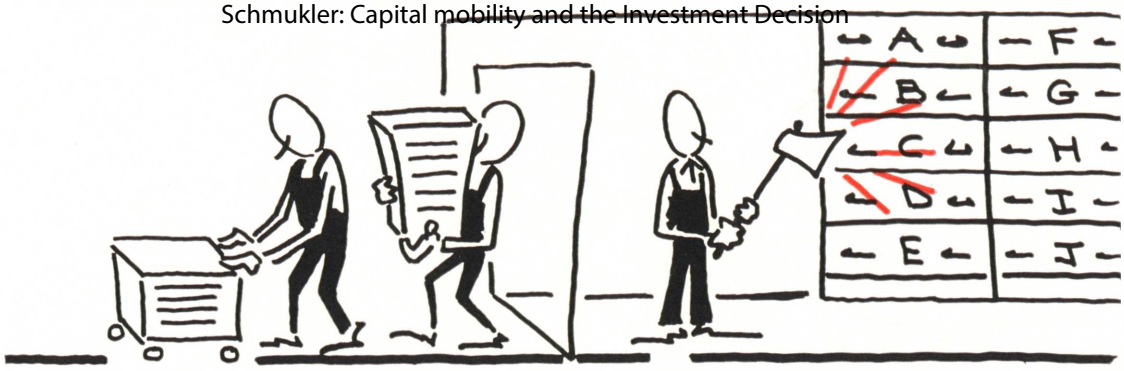
[2] Herbert A. Simon, *Administrative Behavior*, The Free Press, New York, 1965 (Free Press edition), p. 198.

[3] In reply to a question about mistakes in decision making, Alfred P. Sloan, former chairman of the board of General Motors, replied, "The executive who makes an average of 50-50 is doing pretty good." (*The New York Times*, January 17, 1964, as cited in *The Capital Budgeting Decision* by Harold Bierman, Jr., and Seymour Smidt, Macmillan Company, New York, 1966.)

[4] For an introduction to the economic concept of mobility, see Billy E. Goetz, *Management Planning and Control*, McGraw-Hill Book Company, Inc., New York, 1949, p. 44.



In furnishing new offices, a company is considering either buying standard file cabinets or built-in ones. The alternative choices will involve investment in assets substantially different in the degree of their mobility.

The introduction of capital mobility as a significant factor in the investment decision need not alter the method of profitability analysis employed in capital budgeting. The evaluation of mobility should supplement, not replace, the profitability analysis.

If the company relies upon the generally criticized but widely used payback method, then it is already implicitly stressing capital liquidity, and recognition of the additional factor of capital mobility is a natural and consistent step. For the company employing either unadjusted return on investment or some form of discounted cash flow analysis, both of them methods that emphasize profitability, it is particularly desirable to supplement any evaluation of comparative profitability with an analysis and evaluation of comparative mobility.

Capital liquidity

As used generally in accounting and finance, liquidity refers to the time period required in the normal course of operations to recover fully the original investment in an asset or to convert specialized capital back to cash or cash equivalents. In this sense, for example, an asset (such as inventory) with a turnover of 1.0 or higher is considered a liquid asset whereas an asset (such as equipment) with a turnover of 0.1 is considered a fixed or non-liquid asset.

According to this definition, the liquidity of capital affords no insight into the nature or degree of the mobility of capital. Assets with the same life expectancies will have identical factors measuring their liquidity, from a balance sheet point of view, even though they may differ greatly in the recoverability of the capital investment other than by means of the original service function, that is, in their capital mobility.

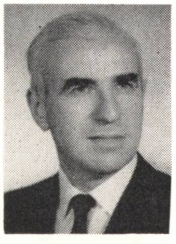
Liquidity and mobility

Asset liquidity may, however, be interpreted more broadly than in the usual accounting classification. Liquidity may be defined as the ability to convert to cash, at any point in the useful life of an asset, its unrecovered cost or remaining investment or as the ability to transfer the remaining service value, or a reasonable portion thereof, to cash or cash equivalents. In this sense only, liquidity is one of the determinants of mobility, and an asset possessing such liquidity may be said to have market mobility.

Like mobility in general, market mobility is a favorable asset quality. Market mobility refers to the convertibility of unrecovered service value to cash; use mobility refers to the convertibility of unrecovered service value to an alternative service value within the organization. In any given situation, market mobility may equal, exceed, or be lower than use mobility. Where an alternative use function is available internally, use mobility will often exceed market mobility because of marketing costs, transportation costs, time costs, and middleman profits.

It is important to distinguish clearly between the concept of capital mobility and that of salvage value. Salvage value measures that part of the original investment which it is estimated will be recovered, commonly by the market action of sale or trade-in, at the termination of the useful life of the asset in the function for which it was acquired. Mobility measures the alternative use value of the asset throughout its useful life. Salvage value is normally calculated upon the assumption that the project will be continued to fruition. Mobility invokes the calculation of alternative values if that assumption is not realized.

Salvage value affects, and is taken into account, in the forecasted profitability and yield of the proposed investment. Mobility does not affect the forecast of profitabil-



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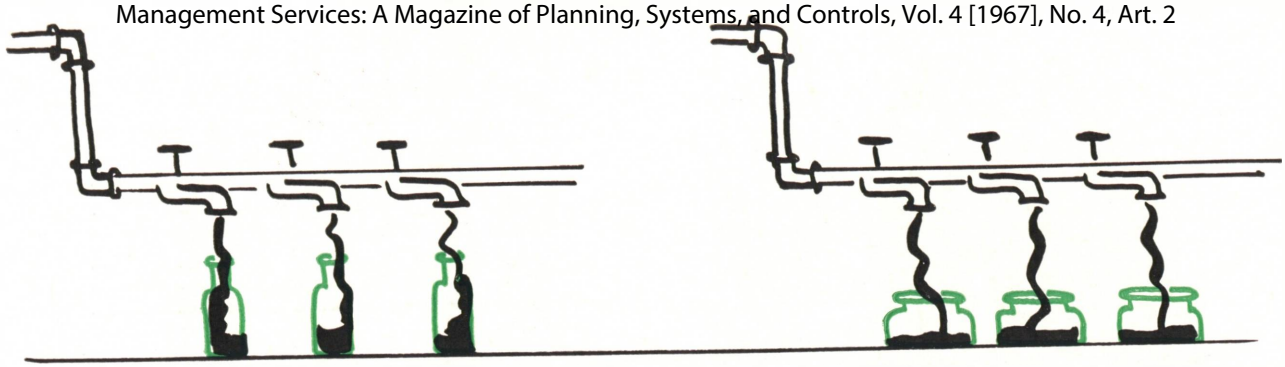


Equipment purchased to fill tubes of toothpaste but equally capable of filling jars of hair dressing would be an example of product mobility.

ity or yield. Salvage value normally influences the amount of annual depreciation charged to earnings and the book value of the asset. The measure of asset mobility usually has no effect upon the recorded depreciation of purchased equipment. In short, assets with identical cost, life expectancy, and estimated salvage value can differ greatly in their relative capital mobility.

Advantages of capital mobility

Capital mobility has the primary advantage, as discussed, of furthering the basic business aims of maximizing overall net earnings and conserving corporate capital. There are other advantages to the mobility of capital that justify its consideration as a factor in the investment decision:

- Capital mobility promotes ease of financing. As a general rule, assets that are highly mobile can be financed more readily and at lower cost than those that are not so mobile. Where leasing arrangements are advantageous, mobile assets can also be leased more easily.
- Capital mobility promotes change and innovation. When assets are purchased with alternative use possibilities evaluated in the decision, there is less pressure to persist in an original course of action. Both the psychological and financial costs of changing direction seem less onerous if the alternatives were already contemplated in the original decision.
- Capital mobility also will encourage innovation in those instances where company management is reluctant to accept the adverse effect upon reported earnings of a loss upon abandonment or sale. The existence of alternative use value may avoid the need for either action.
- Capital mobility, on the other hand, reduces the pressure to make hasty—and possibly premature—replacement decisions. Alternative use value will often decline less sharply from year to year than market or salvage value. The cost of a year's delay, as measured by the decline in alternative use value, will therefore not be as high.
- Capital mobility can offer the advantage of retaining and recovering not only the capital directly invested in the equipment but also the capital invested in skill, manpower training, experience, and organizational structure, which would be lost upon the sale or other disposition of an asset.
- Mobility can be advantageous to the extent that alternative use value may benefit from an increase in value as a result of inflation. This increase may partly or fully offset any unanticipated decreases in utility because of reduced asset efficiency or technological change. While it is true that value may decrease as a result of deflation, the historical record of price level changes suggests that the net benefit is likely to be on the upward side.
- Finally, company emphasis on the mobility of capital can influence not only the selection of a project among alternatives but also the nature of the alternatives submitted for consideration. Awareness that capital mobility will be a factor in selection gives project originators an incentive to conceive and plan projects in a way that increases asset mobility with little or no sacrifice in the profitability or other virtues of the project.

Types of capital mobility

The quality of capital mobility has its origin in the alternative use potential of the asset. This in turn is determined by the physical characteristics of the asset; the environment and physical manner in which it is employed; the technology of the industry; the nature, size, and diversity of the company; and relevant market conditions. The following classification of capital mobility suggests the source of mobility:

Functional mobility—The mobility of an asset may be based on its capability of serving a function other than the one originally planned. For example, vats used in a processing operation may serve instead as storage units.

Product mobility—This describes the service of an asset in its original function but applied to a product different from the product for which the asset was initially acquired. Equipment purchased to fill tubes of toothpaste, but capable of filling jars of hair dressing also, would be an example.

Place or plant mobility—Equipment may have a service value in a plant, warehouse, or office other than its original location. This type of mobility is particularly common in larger companies with multi-plant operations. An essential requisite for, and a common impediment to, the successful application of place mobility in large organizations is the information system within the company. The system should create an awareness of the equipment needs and resources of all segments of the business.

Capacity or efficiency mobility—Equipment no longer capable of attaining the standards of output and performance required in its primary and original use can often be employed under less exacting conditions. Commonly known as "downgrading" of machinery, this practice is a common source of capital mobility and also a means of prolonging asset life.[5]

Time mobility — Time mobility arises from the probability that an asset will acquire a use value if retained for the future, even if there is no present use application. Stand-by equipment is an example of time mobility. Time mobility is, of course, not cost-free, and its value must be discounted for time, storage, and other costs. Capital mobility is present only if there is a net value for future use. Time mobility is a most uncertain and elusive form of capital mobility, and management must guard against conjuring an imaginary time mobility to avoid acknowledging losses.

Determinants of capital mobility

Mobility is not an absolute quality that assets either possess or totally lack. Mobility is, rather, a relative concept, and assets may claim mobility to a greater or lesser degree. The following factors are material in determining the mobility level of assets:

1. The number of alternative mobilities attributable to the asset: For example, an asset possessing functional, product, and place mobility would generally be more mobile than one having only product mobility.

2. Any cost necessarily incurred in shifting an asset from its primary to a secondary use must be considered in determining the mobility of equipment. This includes dismantling and disassembly costs, moving costs, adaptation expenses, and re-installation costs. For some assets, such as desks, this cost may be minor. For other equipment, such as large, heavy presses, substantial cost may have to be incurred. These costs must be estimated and subtracted from alternative use value. High costs associated with achieving a secondary use of assets reduce capital mobility.

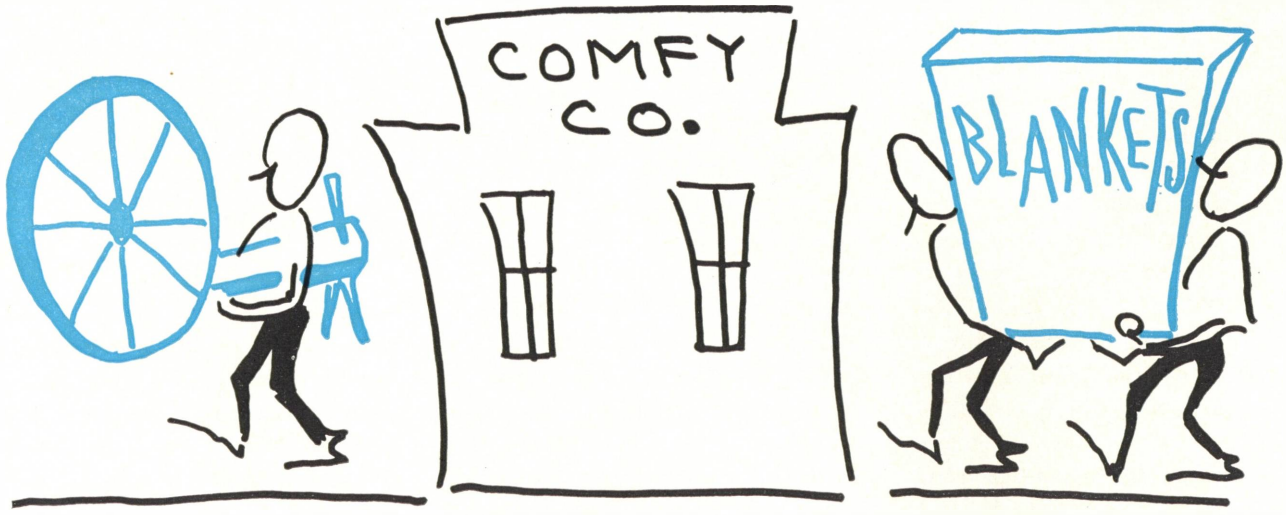
3. The relationship of value in alternative use to value in original use: The closer the value of the asset in alternative use is to its value in original use the greater the mobility of the asset.

4. The specialization of the equipment and the extent to which it is physically or functionally associated with other equipment: Normally, generalized and independent assets tend to have the greatest mobility.

5. The physical mobility of the asset: It is evident that the ability to move an asset physically generally increases capital mobility. Capital mobility is, however, not wholly dependent upon physical mobility. A recent *Wall Street Journal* article reports, "A Spring Mills blanket and bedspread manufacturing plant . . . is being converted to a warehouse because it is 'less economical' to operate than newer plants."[6] This is an instance of physical immobility accompanied by functional mobility.

[5] George Terborgh, *Business Investment Policy*, Machinery and Allied Products Institute and Council for Technological Advancement, Washington, D.C., 1958, p. 70.

[6] *The Wall Street Journal*, March 2, 1967, p. 18.



A blanket and bedspread manufacturing plant was converted to a warehouse because it was "less economical" to operate than newer plants. This is an example of physical immobility accompanied by functional mobility.

6. The amount of equipment already on hand, serving, or capable of serving the alternative function: The concept of alternative use potential for proposed equipment acquisitions cannot be applied indefinitely or without taking available alternatives into account. The law of diminishing returns operates here, and the greater the number of alternatives already available to service a function the less each additional alternative is worth and the lower the degree of capital mobility.

7. The certainty of being able to employ the asset in its potential alternative function: Where an alternative use is positive and definite, the degree of asset mobility is higher than where the alternative use is uncertain, conditional, or contingent. An alternative use associated with a staple line of merchandise imparts greater mobility than one dependent upon a fashion-based product.

Comparative capital mobility

Under the usual restraint of limited financial resources, the capital budgeting decision typically calls for the selection of projects among alternatives competing for available funds. This selection process is facilitated by a comparative evaluation—and ranking—of the factors that are important in the decision, such as urgency, profitability, risk, and capital mobility. To compare capital mobilities the company can prepare a simple classification separating proposed projects into three categories, high mobility, average mobility, and low mobility. Depending on the general nature of the assets, this rough classification would be adequate for many situations. The need to fit projects into one of the categories at least would serve to incorporate the mobility factor into the decisional process.

A simple quantification of the classification method can be introduced by setting a mobility scale with ranking, for example, from 1 to 10. To ensure some uniformity in ranking, a model mobility scale can be prepared showing typical company assets with their scale rankings. Specialized molds or dies, for example, might be given a ranking of 10 whereas a generalized machine tool would have a ranking of 1 or 2.

In place of this class and category approach, the ranking of projects may be based upon a mobility factor computed by the following formula:

The alternative use value divided by the original investment equals the mobility factor. The mobility factor will vary directly with the mobility of the capital investment. This simple formula is based upon values prevailing at the inception of the proposed project. Its validity for measuring comparative mobility rests upon the assumption that either the original relationships will persist for the life of the project or any changes will be equal or equivalent for all of the alternatives. Under these conditions, the original mobility factor will fairly compare the projects.

Often, however, the relationship between alternative use value and original investment prevailing at inception will not remain constant but will change and will change unequally for alternative investments. An example is illustrated in the exhibit on page 19. Project A requires the construction or purchase of a large glass-coated tank that could be used alternatively and effectively for a year or two in a research program but thereafter could serve no other company purpose. Project B, on the other hand, requires an all-metal tank, initially not as effective in the research program but serviceable for a long time in plant operations. Assuming zero salvage value in both cases, the comparison between Project A and B is shown in the exhibit.

The shaded areas ABCD and A′B′C′D′ represent the difference between unamortized cost and alternative use value over the life of the investment. All else being equal, capital mobility is at a maximum when this area is at a minimum. However, ranking by minimum areas, whether determined by inspection or computation, has certain weaknesses. If the relationships are nonlinear, the comparisons and computations may be difficult. Furthermore, the comparison of absolute magnitudes of area difference is not meaningful unless the alternative investments are approximately equal in size.

An easier and better method of deriving a measure of comparative mobility that spans the life of the project comes from the following modification of the previously described mobility factor:

The sum of the alternative use values at the end of each period divided by the sum of the book values at the end of each period equals the mobility factor. At times it would also be appropriate to include in the numerator the original cost of the assets and in the denominator the alternative use value at inception. In both forms the higher the mobility factor the greater is the mobility of the capital investment over its life.

Unequal risk

Capital projects often differ substantially in their probability of success. To the extent that the likelihood of success affects the expected profitability of the alternative investments, the calculation of relative profitability can be modified by the application of appropriate factors for risk and uncertainty. The probability of success also affects the relative mobility

. . . is higher than where the alternative use is uncertain, conditional, or contingent.

value of the project, however. Alternative use is a potential that becomes an actual value only upon the re-allocation of assets from their original function. Thus, the more doubtful the success of the proposed project the more likely is alternative use value to be realized. Conversely, for a project assured of success or consummation, alternative use values are less relevant.

Consequently, where the comparison of mobility is between projects of unequal risk, the computation of the mobility factor should take this into account, and the formula should be further modified as follows:

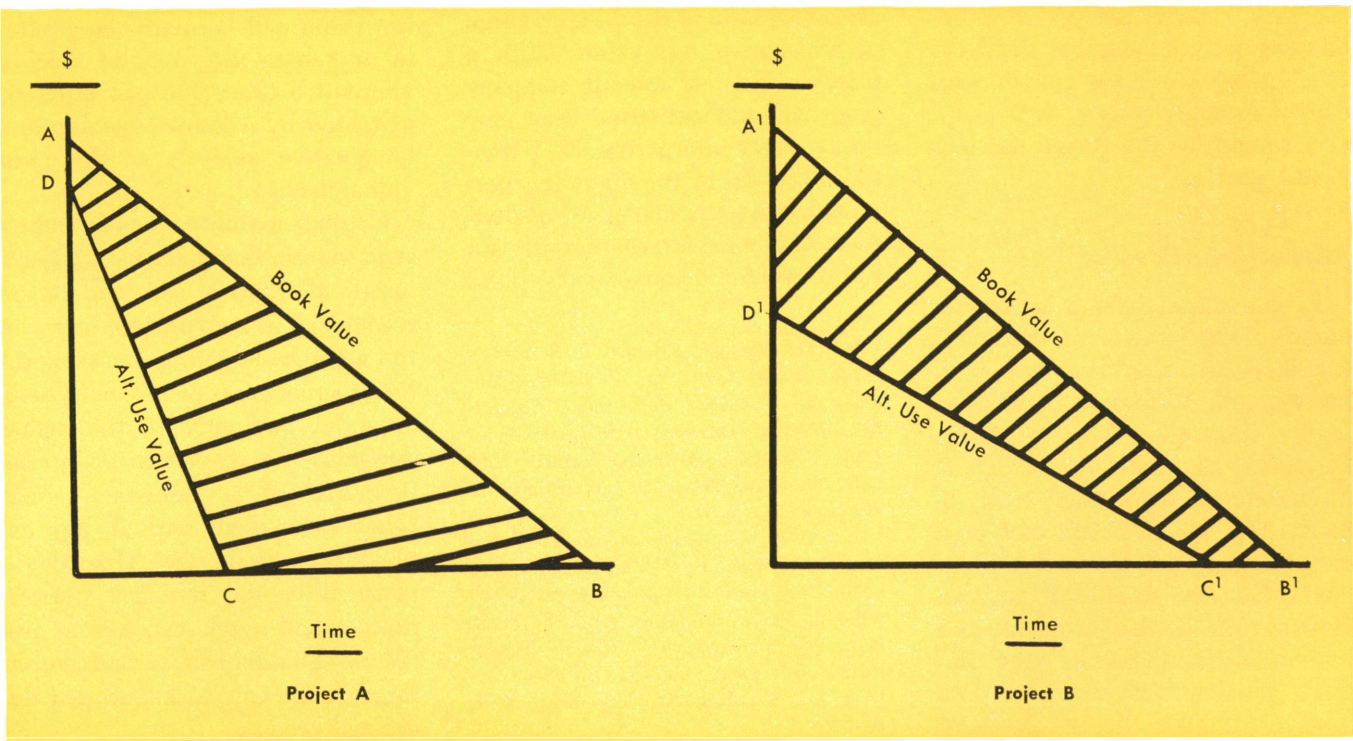
The product of the sum of the alternative use values at the end of each period and the probability of success of the proposed primary investment divided by the sum of the book values at the end of each period equals the mobility factor. As in the previous form, the mobility factor would reflect the relative mobility of capital over the life of the project, but now adjusted for relative risk.

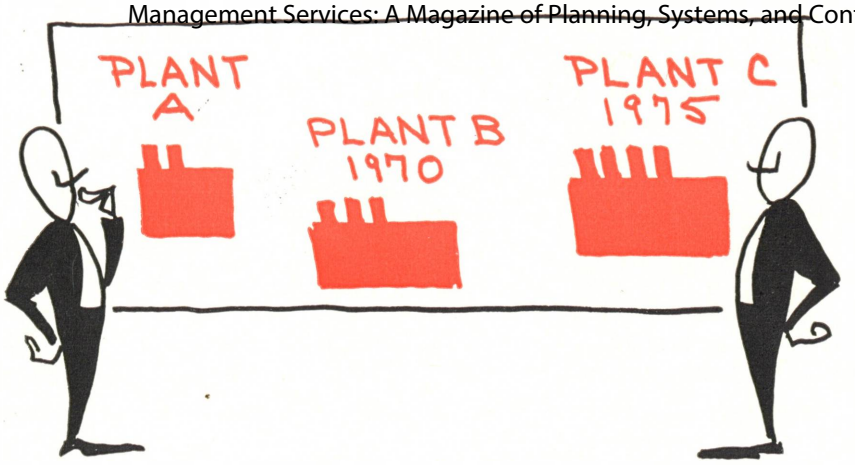
So far in this article the relative capital mobility has been computed by using book value or unamortized cost as the basis for comparison with alternative use value. This approach has certain advantages. Regardless of the crudeness or complexity of the capital budgeting process, the estimated annual depreciation and corresponding declining book value are data that usually are readily available. The determination of comparative mobility on the basis of book value is therefore convenient, and it is satisfactory in many cases.

Instead of using book value, however, it is possible to use unrecovered cost as the basis for computing comparative mobility. This approach would be particularly appropriate, for example, if different depreciation methods, such as straight-line and accelerated, are adopted for the alternative projects or if there is a substantial difference between payback periods and asset lives. Unrecovered cost would be determined in the usual manner by subtracting from the original investment the annual net inflow comprising either net revenue or net cost savings of the project. Unrecovered cost would then be substituted for book value in the calculation of the mobility factor. For companies using payback in the capital budgeting decision and for companies using discounted cash flow techniques, unrecovered cost at the end of each period will normally be either already calculated or easy to compute.

Whether book value or unrecovered cost is employed, it is important to keep a number of points in mind. First, some standard of reference is necessary in the evaluation of comparative mobility. Absolute comparisons will not assist the investment decision. The fact that the alternative use value of the equipment in one project is $50,000 and in another is $100,000 is not meaningful for a decision until we relate these figures to some asset cost basis.

Second, we are engaged in measuring relative mobility and not individual project profitability. The





Since alternative use is a future value, management's plans and vision of the company's future are directly relevant to determination of this value.

mobility concept represents primarily a defensive corporate posture, an awareness of alternative possible solutions for potential problems—one factor among many to be considered in the final investment decision. Absolute precision in the standard of reference adopted is not vital as long as it provides a general basis for comparison.

Third, it may seem that unamortized cost and unrecovered cost are values looking backward and that their use may create the appearance of sunk cost reasoning. But recall that cost is being used as a basis for determining the relative mobility of assets not yet acquired, of costs not yet incurred. Thus, the time perspective associated with capital mobility points, as it properly should, to the future and not to the past.

Alternative use value

In the measurement of capital mobility the process of determining alternative use value may often be difficult, uncertain, and even highly subjective. This is almost inevitable any time a cost that is essentially an opportunity cost, in contrast to an historical cost or a cost based on market value, is injected into the decisional process. However, as in other economic and accounting applications, the absence of completely objective data need not inhibit the development of techniques for decision making as long as reasonable estimates can be made.[7]

The initial burden of preparing and justifying the estimates of alternative use value should rest with those who submit the proposal.[8] They should be familiar with the physical and technological characteristics of the proposed investment and alert to possible alternative company use of the equipment. Their estimates should include adequate supporting data and be subject to the same critical review as other forecasts in the proposal.

Higher-level management can also contribute to the determination of alternative use value. With a broader view of overall company programs and activities, they may be aware of alternative use potential unknown to the operating personnel at a particular plant or division. And since alternative use is a future value, management's plans [illegible] where the company is headed are directly relevant to determining this value.

The capital budgeting record itself can provide a source of alternative use data. A review of approved projects may indicate that the successful completion of some projects in process may encourage complementary investments. Marginal, deferred, and even rejected capital spending proposals may contain clues to alternative use. Through these channels and others it should normally be feasible to ascertain the existence and establish the value of alternative asset use.

Grouped assets

If a proposed capital project involves expenditures for an aggregate of separate, distinct assets, all to be committed to the project, alternative use value may be determined in two ways. If the assets in combination have an alternative use for the company, alternative use value can be computed for the group as a whole based upon aggregate value. Where no such alternative use exists for the aggregate, the analyst should explore possible alternative uses of the individual assets and take the sum as the alternative use value of the entire project. Although alternative use value will normally be greater in aggregate use, a good deal of alternative use value can often be extracted by a knowledgeable and imaginative analysis of the individual assets.

Capital mobility, which represents the service potential of assets in an alternative use, should be recognized as a significant factor in the capital budgeting decision. Although this concept has long been accepted implicitly in the actual decisions of management and in the literature of investment, it has rarely been dealt with in any explicit or formal way. The advantages of capital mobility warrant explicit and overt recognition, and their evaluation should be incorporated in the capital investment decisional process.

[7] See, for example, Edward L. Summers, "Opportunity Costs for Planning, Control, and Financial Reporting," *Budgeting,* January/February, 1967, p. 6; or John J. Scanlon, "Thinking Ahead," *Harvard Business Review,* January/February, 1967, p. 5.

[8] In a survey Donald F. Istvan concluded that "it is usual to find minor proposals originating from the operating personnel, whereas major proposals generally come from top management." (*Capital-Expenditure Decisions,* Indiana Business Report No. 33, Indiana University, 1961, p. 10.)