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THE MANAGERIAL IMPERATIVE OF EVALUATING NON-CAPITAL EXPENDITURES WITHIN A CAPITAL BUDGETING CONTEXT

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Abstract

It has long been an accepted precept that the purpose of management is the maximization of shareholder wealth. Few would dispute the notion that projects requiring long-term capital investments should be subjected to capital budgeting. Numerous authors have, however, questioned the appropriateness of subjecting non-capital expenditures, such as advertising, research or product development, to capital budgeting analysis. These studies have suggested that it is inappropriate to evaluate expenditures with uncertain outcomes, such as advertising, research and product development, with a technique as rigorous as net present value. The present study contends that it is not only appropriate to evaluate non-capital expenditures using capital budgeting techniques but it is essential for firm survival. Furthermore, despite difficulty in applying capital budgeting to advertising or R&D expenditures, no other analytical technique is superior to capital budgeting in determining the effect of expenditures on the financial performance of the firm.

INTRODUCTION

Owners are primarily interested in the wealth creation ability of an enterprise, and they typically evaluate their investments by the value of the investment's financial return. Owners tend to prefer that all long-term corporate decisions to be evaluated based on the investment's contribution to the maximization of shareholder wealth. Dean (1994) suggests that "the master goal of the modern corporation . . . should be to maximize the present worth at the corporation's cost of capital of the future stream of benefits to the stockholder. All other objectives ... should be either intermediate or subsidiary to this **overriding** corporate objective." (Emphasis added.)

Shareholder interest groups are becoming more vocal and are making more rigorous performance demands upon management. In an era of corporate takeovers, it is incumbent upon managers to place performance demands upon themselves in order to survive. Decisions include what new products are to be introduced as well as incremental decisions concerning what products and markets should be expanded or contracted. When faced with scores of competing projects that effect the value of the firm, managers need an objective technique to sort through the often impassioned arguments. The tool that best assesses a proposed corporate investment's effect on shareholder wealth is capital budgeting, and more specifically net present value (NPV) analysis (Brigham 1995).

One type of investment activity that appears to be evaluated, at least implicitly, in this manner is R&D expenditures, specifically new product development investments. Chauvin and Hirschey (1993) in an empirical analysis of 1988-1990 COMPUSTAT firms found that R&D expenditures (or product development expenditures) were a highly significant variable in a firm's market value. This suggests that expenditures on product development are perceived by shareholders to significantly increase the market value of the firm. In the past marketers have suggested utilizing capital budgeting in the assessments of marketing decisions, including: 1) advertising; 2) distribution; and 3) product strategy decisions (Kirplani and Shapiro 1973; White and Miles 1996). Devinney, Stewart, and Shocker (1985) even suggest that "one of the strengths of marketing is its readiness to borrow concepts and theories from other disciplines."

However, there is a stream of research that questions the validity of capital budgeting in business decision making. Gold (1976) is critical of capital budgeting because of the assumption that "it is possible to forecast the time

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patterns of investment and operating expenditures as well as of revenues and net incomes over the life of the project." Gold then describes past inaccuracies in forecasting streams of future revenues in capital budgeting. Hayes and Garvin (1982) also carefully describe the "shaky foundations of capital budgeting" and contend that by discounting future cash flows reduces the incentive to invest today by decreasing the present value of those cash flows. Haley and Goldberg (1995) contend that NPV is an inappropriate tool for evaluating new products because of faulty theoretical assumptions and improper estimation of key variables.

Ross (1995), in a critical assessment of NPV analysis, suggests that appropriate capital budgeting should include the implicit option value of a project. For example, a new product may be introduced this year, or its introduction may be delayed untilmarket conditions are more favorable. Projects resulting from new product development that currently have negative NPVs compete with themselves inter-temporally. Option value exists from the possibility that the costs of capital may decline enough to generate a positive NPV.

PURPOSE

The purpose of the present study is to suggest an alternative perspective to the Gold (1976), Garvin and Hayes (1982) and Haley and Goldberg (1995) stream of research on the interrelationship between capital budgeting and advertising, research or product development (or any non-capital expenditure) decision making. The goal is to suggest that correctly applied capital budgeting is not inconsistent with rational decision making in the area of non-capital expenditures but rather that it is the *only* analytical technique available to managers that will provide insight into product development decisions consistent with value maximization. This is accomplished in a two-step procedure. The initial step is to address the objections to capital budgeting. The second step is to demonstrate how net present value can be effectively applied to non-capital expenditure analysis.

OBJECTIONS TO NPV

Critics contend that capital budgeting is inappropriate for product development decisions for two reasons: 1) the underlying assumptions of capital budgeting; and 2) the practical issues that surround the implementation of capital budgeting. The assumptions are: (1) "reversibility without penalty;" (2) "equality of effect on future ability to invest;" and (3) objectivity of NPV assessment. The three issues include: (1) "issue of error bounds;" (2) issue of "risk vs. uncertainty;" and (3) the issue of "the stream of revenues." As one of the more recent articles criticizing the use of capital budgeting for non-capital expenditure business decision making, Haley and Goldberg (1995) reflect the synthesis of this stream of research. Therefore, responses to Haley and Goldberg (1995) are a rebuttal of this entire line of research. Table One provides a summary of Haley and Goldberg's (1995) assumptions, with alternative perspectives presented. Table Two provides a summary of Haley and Goldberg's (1995) issues, also with contrasting points of view offered.

Haley and Goldberg's (1995) objection to the application of capital budgeting to product development decisions appears to be based on an incomplete appreciation of both the utility and robustness of capital budgeting techniques and their inter-relationship with marketing decision making. Their claim that the unrealistic nature of assuming "reversibility without penalty" and "equality of effect on future ability to invest" negates the utility of capital budgeting when applied to R&D expenditures indicates only the most narrow application of capital budgeting. One of the basic requirements for capital budgeting is the estimation of cash flows. These cash flows are not limited to the specific project (or product) but include the effect that a project has on the cash flows of other projects (or existing products). Hence, the critical cash flows to estimate are the incremental cash flows to the firm. It is often the case that the project's cash flows are equivalent to the incremental cash flows of the firm. However, this is not always the case. It is quite easy to imagine that the introduction of a new product would have significant effects on the cash flows from the other products in the firm. For instance, General Motors must constantly evaluate how many of its own existing sales will be cannibalized with the introduction of a new model. If a new product is complimentary to an existing product, then the incremental cash flows should reflect the sales of the new item and the additional sales of the complementary item. In addition, there are often synergistic developments that result from new products.

New products also enhance value by providing additional managerial flexibility. Ross (1995) demonstrates how NPV analysis that is narrowly focused on the cash flows specific to the project underestimates the value of the project's total effect by ignoring the value of the options created by a new project. Increased opportunities, the result

of these options, always enhance value, and therefore contribute to a project's NPV. Thus, new products tend to expand available opportunities, creating options, and obviating any concern over reversibility and effect on investment.

Haley and Goldberg's (1995) contention that capital budgeting is hampered by the "issue of objectivity" hinges on the fact that cash flow estimates are just that - estimates. They believe that by presenting these estimates as "point estimates ... without any confidence interval or error bounds" deceptively implies more certainty about these estimates than reality suggests. They conclude that this uncertainty of future cash flows makes the estimates nearly useless as an aid to decision makers.

TABLE ONE
Haley and Goldberg's Assumptions Pertaining to the Utilization of the Financial Paradigm in Product R&D

ASSUMPTION	HALEY AND GOLDBERG'S (1995) POSITION	AN ALTERNATIVE PERSPECTIVE
"REVERSIBILITY WITHOUT PENALTY" & "EQUALITY OF EFFECT ON FUTURE ABILITY TO INVEST"	Requires that costs of capital and future investments remain static or go lower over ... time	Capital budgeting examines all incremental cash flows and new ventures create more flexibility, which adds value
OBJECTIVITY OF NPV ASSESSMENTS	NPV's use of point estimates without confidence intervals vitiates the results	NPV can adjust for the confidence interval around the point estimates by adjusting the discount rate, through the use of certainty equivalents or sensitivity analysis

TABLE TWO
Haley And Goldberg's Issues Pertaining to the Utilization of the Financial Paradigm in Product R&D

ISSUE	HALEY AND GOLDBERG'S (1995) POSITION	AN ALTERNATIVE PERSPECTIVE
ERROR BOUNDS	Error bounds invalidates the use of point estimates	Error bounds are reflected in the risk adjustment of discount rates
RISK VS. UNCERTAINTY	"Risk can be measured and dealt with ... Uncertainty cannot."	Issue is the variability in the cash flows. Variability is handled with risk adjustment of discount rates with certainty equivalents.
REVENUE STREAMS	More innovative projects generate revenue streams over a longer period than less innovative projects	Revenue estimation must include all incremental revenues, including spin-offs, tie-ins and synergistic developments

Haley and Goldberg (1995) are assuming that no techniques have been developed to mediate the forecasting problems of point estimates described by Gold (1976). However, this conclusion is outdated. Basic textbooks in financial management, as early as Levy and Sarnat (1986), describe many techniques designed to make the capital budgeting framework more robust in the face of uncertain cash flows. Risk is often defined as variability in cash flows. Therefore, the uncertainty in a project's cash flows should be reflected by the risk premium component of the discount rate. Alternatively, the certainty equivalents method may be used to evaluate estimates of uncertain future cash flows. (A discussion of certainty equivalents may be found in any number of finance texts. For instance, see Brigham and Gapenski, 1997, or Megginson, 1996, or Brealey and Myers, 1991.) The object in certainty equivalents is to determine a risk-free cash flow that you deem equivalent to the uncertain, risky cash flows. These risk-free cash flows are then discounted by the risk-free rate. Finally, sensitivity analysis (or scenario analysis) also allows the decision maker to evaluate the efficacy of an investment decision with uncertain cash flows. With sensitivity analysis, the project is evaluated under numerous cash flow estimates to determine which scenarios enhance the value of the firm,

The three implementation issues surrounding capital budgeting that concerned Haley and Goldberg (1995) and other researchers, specifically the issue of error bounds, risk versus uncertainty, and the stream of revenues, also result when capital budgeting is viewed from too narrow a perspective. The issue of error bounds assumes that the projected cash flows are used with no regard to the probability distributions surrounding those cash flows. No application of capital budgeting suggests that the analyst divorce the cash flow projection from the variability associated with that cash flow. Rather, the degree of variability is used to adjust the discount rate upwards or to adjust the certainty equivalents downward.

The second issue Haley and Goldberg (1995) take with applying capital budgeting to non-capital investments , such as product development, deals with the difference between risk and uncertainty. It is a distinction that is not typically made in the finance literature. Applying Haley and Goldberg's definition, risk is the variability in cash flows for a project if it is successful while uncertainty arises from the probability that the project may not be successful. Both risk and uncertainty, as used by Haley and Goldberg, effect the variability of the expected cash flows. International operations have an additional source of cash flow variability from exchange rate fluctuations. To distinguish between the source of the variability does not change the variability itself. Making such a distinction is similar to spending a great deal of effort decomposing the interest rate on your bonds into the risk-free rate and the risk premium. If your cost of debt is 10%, it matters very little if the risk-free rate is 7% and your risk premium is 3% or if your risk premium is 6% and the T-bill rate is 4%. Your cost is 10% in either case. It is because of the irrelevance of the source that risk and uncertainty are often used interchangeably in finance.

The final objection Haley and Goldberg (1995) have to the application of capital budgeting in product development decisions deals with the estimation of the stream of revenue. Capital budgeting theory mandates that all incremental cash flows should be included. This includes the cash flows from the project as well as cash flows that result from ancillary products. This explains the existence and constant creation of numerous movies targeted to children and Saturday morning cartoons. Ticket sales or advertising revenues may not cover the production costs. However, the revenues generated by "tie-ins" from the attendant sale of action figures and licensing of the main characters for children's clothing and Halloween costumes more than compensate for the initial shortfall in revenues.

One of the suggestions of Haley and Goldberg (1995) is to "compare the financial projections of product research projects with the actual results ... to determine biases." However, an essential step in capital budgeting is the post project audit in which estimated cash flows are compared with actual cash flows (Brigham, 1995). The purpose of the audit is to determine if any systematic bias exists in revenue estimation exist.

There are numerous examples of companies that incorrectly calculated the non-direct cash flows from a projector utilized an inappropriate discount rate. In hindsight, it is easy to be critical of opportunities missed because of erroneous estimates. Haley and Goldberg (1995) remind the reader that RCA sold the technology for the Betamax to Sony, and suggest that the sale was a mistake. However, at the time, there were numerous competing videocassette technologies and numerous competing uses for RCA's capital. Had RCA maintained this technology, they would have ultimately been the loser, as Sony was, when the market opted for the VHS format. Given the uncertainties that characterized the market and the competing investment opportunities available to RCA at that time, it is clear that RCA did make the value maximizing decision based on projected cash flows and the risk-adjusted discount rate.

CONCLUSION

Capital budgeting has enjoyed a rich tradition as a management decision tool by corporations and academics alike (Kirplani and Shapiro 1973; Klammer 1973; Gitman and Forrester 1977; Schall, Sundem, and Geijsbeek 1978; Aggarwal 1980; Kim and Farragher 1981; Jones 1986; Cook and Rizzuto 1989). While its applications are most readily associated with fixed asset investments, it is appropriate for any expenditure where there is a timing differential between the cash outflows and the cash inflows. A recent study by White and Miles (1996) suggests that capital budgeting should be applied to advertising expenditures. Research and product development exhibit many similarities with the advertising analysis. Expenses are readily know but the level and timing of resultant cash inflows are uncertain. Whatever the cause of the uncertainty, be it product acceptance or competitor's response, the risk can and should be incorporated into capital budgeting technique.

Apparent mistakes in the application of capital budgeting to product development, such as the sale by RCA of the technology Sony used to make the successful Trinitron television, may result from different perceptions on risk and/or differing required rates of return. A plausible explanation of the transaction above is that Sony faced a lower cost of capital because of its position in the kiritsu, allowing Sony and other dominant Japanese corporations access to "captive" bankers, resulting in a subsidized cost of capital. Remember, if the buyer and the seller share identical expectations and motivations, no transactions will occur. It is only when perceptions and/or motivations differ that the transaction occurs and both parties depart satisfied.

Managers need to be aware of the very powerful analytical tool that they have in capital budgeting. Haley and Goldberg's (1995) claim that "marketing and R&D managers also may be getting penalized for poor results when the fault lies within the financial techniques used in project evaluation and selection" suggests that NPV analysis should be avoided. However, like any tool, NPV analysis will suggest sub-optimal decisions when the assumptions on risk, the cost of capital, the option value of the project, and the timing and magnitude of the cash flows are not estimated correctly. The fact that a tool is misused does not imply that the tool should be discarded. Such is the case of capital budgeting in the evaluation of new products. Proper capital budgeting requires a thorough estimation of all of the incremental cash flows, as well as the appropriate risk adjusted discount rate. Erroneous decisions from the incorrect application of capital budgeting does not imply an inappropriate analytical tool. The fault is not in the technique but in the application. Thus, the solution is not to replace the technique but to improve the application.

In the final analysis, it is the manager's responsibility to make the difficult decisions as to which projects should be continued and which terminated. They should incorporate of all available information to make the decision. They should be aware, however, that in publicly traded corporations, they will be evaluated by the decision's contribution to stockholder wealth.

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