Using The Internal Rate Of Return Method To Consider The Potential Degree Offerings Of A Liberal Arts College

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ABSTRACT

This paper considered the case of a liberal arts institution of higher learning that is hoping to improve its market competitiveness through the addition of either a graduate certificate program in human resources or the addition of a full graduate degree in human resources. An examination of internal rate of return financial value capital budgeting calculations was the quantitative tool through which the two alternatives were examined, with respect to estimated student enrollment data, over a period of five years. The capital budgeting outcomes indicated that the full degree program is the preferred alternative. Therefore, it was recommended that the institution consider the implementation of the full degree program as a viable method of increasing its revenues and enhancing its competitiveness.

Keywords: IRR, internal rate of return, capital budgeting, degree program, enrollment, enrollment forecast

INTRODUCTION

This financial analysis considers the case of an extended campus of a four-year institution of higher education that is located in Memphis, Tennessee. The college degrees offered by this branch campus consist of undergraduate degrees within the disciplines of business, social services, and health administration. Additional degree offerings consist of both graduate and undergraduate degree programs. This institution does not possess doctoral programs. The offerings of graduate studies include the Master of Business Administration, Master of Arts in Teaching, and the Master of Education.

However, as a method of improving its market value, institutional competitiveness, and increasing its organizational revenues, the institution hopes to improve its degree offerings through the introduction of a graduate certificate program within human resources management or a complete graduate degree in human resources management. The Memphis competitive market consists of entities of commensurate demographics, size, faculty, and mission that offer competing undergraduate and graduate degree programs. These competing programs are similar or equivalent to the existing program offerings of the college, and vary with respect to content areas and degree emphasis. Therefore, the college is hoping to differentiate itself to embellish its market position, strategy, and competitiveness. The direct market competitors, of like size and demographics, also do not currently offer a certificate or a complete degree program with an emphasis or concentration in human resources. Hence, there exists an opportunity for this institution to secure a unique position, within a niche market, according to the scope of its competitive strategy.

Rendering a decision, regarding its program offerings, will influence the strategic courses of action considered by this institution. Both the introduction and pursuit of any additional academic degree programs require the analysis of institutional cash flows through time. Such an analysis may be accomplished through the financial techniques of capital budgeting. This paper quantitatively investigates estimated cash flows involving the potential internal rate of return values for the proposed academic offerings. Based on the outcomes of this analysis, both conclusions and recommendations concerning these programs are offered.

LITERATURE REVIEW

Investigating the literature associated with capital budgeting presents an array of discussions associated with economic and financial analysis, through the use of capital budgeting techniques, among a variety of applications. The writings of Connor (2006) indicate that such techniques "earn a return greater than the cost of the capital invested" and generate cash flows that compensate for financial outlays and charges of interest, and provide "a net income to the business at current values." This concept is confirmed by the discussions of Brigham and Ehrhardt (2005) with respect to strategic financial decisions and organizational competitiveness. Based on the writings of Hartman (2000), the use of capital budgeting, through the use of corporate financial analysis, may be considered from the perspectives of market-value added and economic-value added characteristics. Megginson and Smart (2006) indicate that strategic decisions, embellished through the use of capital budgeting techniques of financial analysis, contribute toward the overall competitive advantage of a firm. According to the writings of Lasher (2005), both the ranking and selection of candidate projects may be accomplished through the use of capital budgeting techniques.

Capital budgeting is a salient tool, through which functions of effective and efficient project management are facilitated, among a variety of disciplines and pursuits. Within the context of education, the writings of Oslington (2004) consider capital budgeting regarding "online learning." Wilbowo (2006) considers capital budgeting applications, concerning attributes of private "infrastructure projects," with respect to the potentials of public government services. With respect to "new plant" investment risk considerations, the writings of Leitch (2004) discuss various "success factors" that impact capital budgeting analysis. The feasibility of nuclear plant projects is discussed within the writings of Graber and Rothwell (2006).

Within the mining industry, the use of capital budgeting analysis is also applicable. Nieto and Bascetin (2006) mathematical optimization, concerning the use of gradients, for improving project net present value outcomes. The benefit of such improvement results because project leadership improves its potential of rendering strategic decisions with respect to characteristics of project validity, ordering, selection, and implementation. The writings of Ricciardone and Chanda (2001), with respect to the cash flows of mining operations, also discuss the use of mathematical optimization.

Decisions regarding the potentials of realty investments also benefit from the use of capital budgeting analysis. The discussions of Witmer and Kelley (2005) consider capital budgeting analysis as a method of examining decisions between retaining property or the "immediate" sale of property. Given the illiquidity of real estate, the use of capital budgeting analysis provides a tool through which realty professionals and potential investors may consider strategic decisions among private, commercial, or governmental domains.

Capital budgeting analysis also impacts the medical and the pharmaceutical industries. Skrpnek and Sarnowski (2007) indicate that such analysis impacts "decision making prior to FDA approval" with respect to strategic decisions regarding experimental biotechnologies. Similar observations are discussed by Monnet (2005) in that capital budgeting analysis contributes toward the considerations of pharmaceutical projects involving new medicine development.

The domain of nursing education is also influenced and impacted through the use of capital budgeting. Harlow and Sportsman (2007) consider strategic capital budgeting decisions involving the acceptance and determination of patient simulators as nursing training devices. The costs and financial characteristics, considered between manual and simulated methods of instruction and training, are embellished through capital budgeting and sensitivity analysis (Harlow and Sportsman, 2007). Therefore, the use of capital budgeting contributes to the determination of training decisions among nursing education domains (Harlow and Sportsman, 2007).

This brief review of the literature demonstrates the significance and importance of capital budgeting, among a variety of domains, as a tool through which strategic decisions may be evaluated. Regardless of the domain or setting, capital budgeting provides the leaders and managers of projects with a quantitative method of analyzing the potential benefits of cash flows through time. Such a method of analysis may provide strengthened competitiveness and value for organizations. Based on the cumulative writings of this literature review, discussions

and arguments are given that demonstrate the saliency of capital budgeting as a valid method of financial analysis that embellishes the rendering of strategic decisions concerning either the acceptance or rejection of potential financial investments and endeavors. Based on the writings of Brigham and Ehrhardt (2005), the internal rate of return is a valid method of capital budgeting through which such strategic decisions may be contemplated. Therefore, the internal rate of return is the capital budgeting method selected to process and investigate the financial data of this paper.

PROBLEM STATEMENT AND INVESTIGATION QUERY

The Memphis extended location is evaluating the potential of increasing its competitiveness and revenues through the addition of either a graduate certificate or a full degree program within the discipline of human resources. Based on the estimated data sets for both of the proposed programs, the institution desires to determine which academic offering would provide an acceptable internal rate of return as a contributing factor to the decision of altering the array of offered graduate programs. Therefore, this paper attempts to investigate the following questions: 1) what are the possible internal rate of return values associated with the proposed programs and 2) which of the proposed programs is recommended for implementation based on the outcomes of the internal rate of return calculations?

METHODOLOGY

The methodology consisted of obtaining the anticipated financial data estimates from the Memphis extended site regarding the expected cash flows associated with the potential academic programs. After obtaining the data sets, the Brigham and Ehrhardt (2005) discussions concerning the concept of internal rate of return served as the quantitative method by which the data were processed. The software package used to process the data sets was Microsoft Excel. The ranking of the projects involved numerical ordering with respect to the internal rate of return outcomes. After the outcomes of the internal rate of return calculations, for both of the potential academic offerings were examined, the alternative demonstrating the highest internal rate of return outcome was recommended as a viable investment for consideration.

SCOPE AND LIMITATIONS

The college is experiencing an initial, investigative phase of altering its graduate academic offerings. Therefore, the data sets used to generate the internal rate of return values consist of only estimated values that are subject to revision, and the resulting mathematical outcomes manifested within this paper may not be representative of later outcomes that may be generated through the use of revised data values or an increased period of time. The classifications and categories of data are also subject to revision because of the investigative aspect of altering the graduate program. Therefore, the outcomes determined within this paper may not be commensurate with those of any later analytical investigations that could include additional data categories, different variable values, and increased or decreased sets of variables.

Because the scope of this project is influenced by the status of the college as a non-profit entity, the for-profit entity objective of shareholder wealth maximization is not a primary concern of the college. Therefore, various aspects of the considerations of market-value added attributes that are normally associated with rendering decisions from the perspective of a for-profit environment are reduced. Instead, elements of economic value added (EVA) principles must be considered when considering project implementation. Although positive outcomes were manifested as a result of the internal rate of return analysis, the institution must also consider rendering a final decision that integrates such EVA concerns. Such an analysis is beyond the scope of this paper given the limitations expressed within the research investigation.

The mathematical tool through which the estimated data sets were processed consisted only of the internal rate of return method described by Brigham and Ehrhardt (2005). Therefore, a limitation of this investigation is manifested through the single method of analysis used to examine the potential of each of the proposed programs as an acceptable project. Hence, other methods of analysis, such as options analysis, cost-benefit analysis, net present value analysis, or payback period, may generate different considerations that may substantiate, corroborate, or refute the findings of this paper.

DISCUSSION

An initial set of estimated values were necessary for the computation of the internal rate of return values that were associated with the proposed programs. Examples of the initial investment data associated with the costs of offering the programs included such variables as marketing and advertising, leasing, insurance, legal fees and retainers, administration, adjunct and full-time faculty, recruiting, accreditation, facilities maintenance, classroom supplies, technology, and contingency funding. The estimated, initial costs associated with the year zero considerations were cumulatively $752,172.37 for the proposed graduate certificate and cumulatively $821,672.37 for the complete graduate degree program. During year zero of each proposed program, no student enrollments were estimated. Instead, the administrative and academic frameworks for program implementation were scheduled within the project period, and were manifested through the cumulative costs of the initial investments during year zero.

The estimated variables associated with the proposed graduate certificate consisted of base tuition, annual tuition increase percentage, annual student enrollment increase percentage rate, attrition rate percentage, and an estimated rate for internal rate of return calculations during years one through five. The proposed graduate certificate was estimated to contain 18 semester hours with a cost of $550.00 per semester hour. Therefore, the estimated base tuition rate for the certificate was $9,900.00. The estimated annual tuition increase percentage was thee percent; the estimated annual student enrollment increase percentage was 15.00%, the estimated rate of student attrition was 50.00%, and the estimated cost of capital rate for internal rate of return calculations was 11.00%. These estimated values were provided by the institution.

With respect to the proposed graduate certificate, a total of 60 students were estimated for enrollment during the first year because of existing partnerships with local corporations. Student enrollments for the remaining period, during years one through five, were calculated with respect to the expected growth rate of the program per year. The attrition values were calculated through multiplying the projected quantity of students by the appropriate attrition rate. The annual enrollment value was determined by subtracting the calculated attrition value from the projected quantity of students enrolled during each year. Tuition cash flows were calculated by multiplying the appropriate annual enrollment values by the appropriate tuition cost of the academic program for each annual period. These estimated values were provided by the institution. The following table presents the estimated data values that were derived from these values and methods. The rounding of values was not used within the mathematical calculations per the direction of the institution.

Table 1 - Proposed Graduate Certificate Values

Period	Students	Attrition	Annual Enrollment	Cash Flows
0	N/A	N/A	N/A	($752,172.37)
1	60.00	30.00	30.00	$297,000.00
2	69.00	34.50	34.50	$341,550.00
3	79.35	39.68	39.68	$392,782.50
4	91.25	45.63	45.63	$451,699.88
5	104.94	52.47	53.47	$519,454.86

The estimated variables associated with the proposed graduate degree consisted of base tuition, annual tuition increase percentage, annual student enrollment increase percentage rate, attrition rate percentage, and an estimated cost of capital rate for internal rate of return calculations during years one through five. The proposed graduate degree program was estimated to contain 39 semester hours with a cost of $550.00 per semester hour. Therefore, the estimated base tuition rate for the certificate was $21,450.00. The estimated annual tuition increase percentage was thee percent; the estimated annual student enrollment increase percentage was 15.00%, the estimated rate of student attrition was 55.00%, and the estimated cost of capital rate for internal rate of return calculations was 11.00%. A total of 35 students were estimated for enrollment during the first year. The following table presents the projected data values that were derived from these estimates. These estimates were provided by the institution.

With respect to the proposed graduate degree program, a total of 35 students were estimated for enrollment during the first year. Student enrollments for the remaining period, during years one through five, were calculated with respect to the expected growth rate of the program per year. The attrition values were calculated through multiplying the projected quantity of students by the appropriate attrition rate. The annual enrollment value was determined by subtracting the calculated attrition value from the projected quantity of students enrolled during each year. Tuition cash flows were calculated by multiplying the appropriate annual enrollment values by the appropriate tuition cost of the academic program for each annual period. The following table presents the estimated data values that were derived from these values and methods. The rounding of values was not used within the mathematical calculations per the direction of the institution.

Table 2 - Proposed Degree Program Values

Period	Students	Attrition	Annual Enrollment	Cash Flows
0	N/A	N/A	N/A	($821,672.37)
1	35.00	19.25	15.75	$337,837.50
2	40.25	22.14	18.11	$388,513.13
3	46.29	25.46	20.83	$446,790.09
4	53.23	29.28	23.95	$513,808.61
5	61.22	33.67	27.55	$590,879.90

The internal rate of return values were calculated, for both the proposed graduate certificate and the full graduate program, using the methods and tools discussed within the Brigham and Ehrhardt (2005) textbook. The MicroSoft Excel spreadsheet package was the software medium through which the determinations of internal rates of return were calculated. The calculated net internal rate of return of the proposed graduate certificate was 39.04 percent. The calculated net present worth value of the full degree program was 41.58 percent. Both outcomes surpassed the required cost of capital estimate of 11 percent.

Based on these final outcomes of the internal rate of return calculations, the preferred alternative was the proposed full degree program because it manifested the highest internal rate of return value. The preference of the project, demonstrating the highest internal rate of return value, conforms to the decision models presented by Brigham and Ehrhardt (2005), Blank and Tarquin (2005), Megginson and Smart (2006), and Lasher (2005).

IMPLICATIONS

During the last five years, the college has witnessed decreased enrollments within both its graduate and undergraduate programs because of new market entrants within its academic market. Thompson and Strickland (2003) indicate that the strategy pursued by an organization contributes to its long-term competitiveness and longevity, and that strategy may include aspects of product and service differentiation.   The implications of potentially adding either a graduate certificate or a full graduate program within the academic offerings of the college are strategic because they affect differentiating the long-term functioning, operations, cash flows, and competitiveness of the institution from the perspectives of products and services.

Such competitors offer both undergraduate and graduate programs that rival the existing academic programs of the college. Therefore, the addition of the proposed graduate certificate or the full graduate program, with a concentration in human resources, will allow the college to pursue a competitive strategy based on the differentiation of its academic offerings because none of the existing competitors offer such an academic concentration. This observation conforms to the basic characteristics of business policy and strategy as discussed by Thompson and Strickland (2003).

The outcomes of the internal rate of return calculations indicate that the full graduate program in human resources is the preferred undertaking for the college. The addition of such a program is a decision that should not be rendered lightly because of its strategic characteristics and potential consequences. Investing financial resources will require a significant commitment from the institution and its stakeholders because the Memphis campus is a small subset of the overall college, and funding for the Memphis campus is derived primarily from student tuition

revenues. Therefore, the campus must wisely allocate funding for projects that will contribute toward the fulfillment of its mission while concurrently satisfying its needs for enhanced revenues and strengthened market competitiveness.

If successful, the desired differentiation strategy, coupled with the recommended full degree program per the outcome of the internal rate of return calculations, presents the opportunity for the campus to provide a greater array of academic pursuits for its served market. Further, if the proposed full degree program is pursued, then the campus has an opportunity to become a competitive market leader within a niche market that serves the training and academic needs of corporations, government entities, and individuals from the perspective of human resources management. Additionally, if the proposed full degree program is pursued, then the campus is presented with an opportunity to potentially satisfy its financial objective of increased revenues during the projected five-year period.

If unsuccessful, the desired differentiation strategy, coupled with the recommended full degree program per the outcome of the internal rate of return calculations, may contribute toward a further decline of the campus. Also, given the financial aspects of personnel, physical infrastructure, technological, accreditation, marketing, recruiting, and other related expenses that would be associated with altering the graduate regimen and program offerings, the campus could manifest financial jeopardy that could contribute to a worst-case condition of closure for the extended center should the differentiation strategy fail to be successful.

CONCLUSIONS AND RECOMMENDATIONS

The college must consider expanding its potential academic offerings that provide strategic benefits for the organization. The addition of either the proposed graduate certificate or the full degree program is hoped to strengthen the strategic competitiveness of the college and improve its revenues, and is hoped to provide the potential of serving a larger share of the Memphis competitive market. Further, the addition of either program is hoped to provide an additional attribute through which the college may provide educational services for both local and regional corporations, government entities, and individuals that have a need for enhanced human resources training and personnel credentials. As a result, the college may strategically increase its visibility and improve its market reputation within its competitive market through such relationships. Further, such programs offerings present the potential of providing a greater range of academic resources within its community.

Both outcomes of the internal rate of return calculations demonstrated positive outcomes. Therefore, both alternatives qualify as acceptable undertakings. However, the institution is currently restricted by a mutually exclusive condition in that only one of the alternatives may be pursued given its current financial and physical resources. The calculated internal rate of return value of the proposed graduate certificate was 39.40 percent. The calculated internal rate of return value of the full degree program was 41.58 percent. Both outcomes surpassed the required cost of capital estimate of 11 percent.

According to Brigham and Ehrhardt (2005), the alternative representing the highest internal rate of return outcome is the preferred choice between the two alternatives. Therefore, based on the internal rate of return outcome values, the preferred alternative was the proposed full degree program because it manifested the highest internal rate of return value. Hence, it is recommended that the institution consider the full degree program as a viable project to strategically enhance its academic offerings, contribute to the improvement of organizational value, and strengthen its market competitiveness.

An additional recommendation regarding the rendering of a decision between the two potential graduate programs concerns the scope and limitations of this paper. The scope and limitations of this study were confined to the used of initial, estimated data sets that are subject to revision through time over five years. As a result, the data variables and quantity of variables and variable values may change with time during the exploratory phases of this investigation. Therefore, it is recommended that this investigation be repeated using updated data values during future phases of exploration and analysis. Such data may contribute toward an improved strategic outlook given the current economic factors impacting the enrollment of the institution.

Another aspect of the scope and limitations of this study involve the solitary method of quantitative analysis used within this paper. The internal rate of return method of capital budgeting analysis, described by Brigham and Ehrhardt (2005), was the mathematical tool through which the estimated data sets were processed. Therefore, a limitation of the analytical method implemented within this paper was the single method of analysis used to investigate the potential of each of the proposed programs as an acceptable project. Additionally, it is recommended that other methods of analysis, such as risk analysis, options analysis, net present value analysis, cost-benefit analysis, or payback period, be used as additional investigations for either substantiating or refuting the findings of this examination, and as additional tools through which a decision outcome may be facilitated and strengthened.

AUTHOR INFORMATION

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NOTES