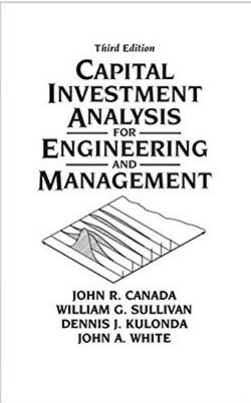

Capital Investment Analysis for Engineering and Management (3rd Edition)

By John R. Canada, William G. Sullivan, Dennis J. Kulonda, John A. White

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This guide enables engineers and engineering managers to communicate effectively with financial professionals, while offering a balanced presentation of the basics of engineering economic analysis. Focuses on real management situations. Provides accounting/cost accounting fundamentals to measure results. Introduces the concept of “options analysis” applied to capital investment decisions. Aids in conducting economic analyses with liberal use of spreadsheets. Introduces tax considerations and their consequences. For those interested in learning more about capital investment decision methodologies, particularly engineers and engineering managers.

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Editorial Review

From the Back Cover

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This book is intended primarily for graduate or advanced undergraduate study for students in engineering and business disciplines emphasizing capital investment decision methodologies. The scope and coverage of the book also make it suitable as a text and a reference in industry.

This book is an evolution of *Intermediate Economic Analysis for Management and Engineering* by John R. Canada, published by Prentice-Hall in 1971. That was revised with the capable coauthorship of John A. White and renamed *Capital Investment Decision Analysis for Management and Engineering*, published in 1980. The Second Edition, slightly renamed and published in 1996, incorporated the primary creative coauthorship talents of William G. Sullivan. This Third Edition benefits from the active coauthorship of all three of the preceding authors and is considerably enhanced by the addition of Dennis J. Kulonda, who provided accounting, finance, and managerial perspectives to broaden the usefulness of the book, particularly in the Engineering Management field. It continues as a text and reference that is more concise and yet more advanced than traditional applied works and is highly lucid—incorporating abundant example problems and solutions.

Part One places capital investment decisions within a systems analysis framework. Chapters 1-3 provide fundamental concepts and techniques important in accounting, cost measurement, and estimating. Extensive supplemental glossaries are provided in an Instructor's Manual.

Part Two begins with a rather succinct summary of basic time value-based evaluation techniques in Chapters 4-6. Chapter 7 covers currently important depreciation methodologies and federal income tax law provisions, with numerous examples of ways to make after-tax comparisons of alternatives. Chapter 8 shows how to consider inflation explicitly, if needed, and Chapter 9 addresses replacement analyses in moderate depth. Chapter 10 is all-new material on new product and expansion analyses. Chapter 11 summarizes capital budgeting management perspectives and includes appendices on adjusted present worth or value and bundled financing.

Part Three remains a solid treatment of formal approaches to evaluation of risk and uncertainty in capital investment analyses. Its Chapters 12-16 contain minimal modifications to such topics as risk, sensitivity, and decision tree analysis.

Part Four includes new material and specialized topics. Chapter 17 on real options analysis is based on an

outstanding *Harvard Business Review* article by Timothy A. Luehrman. Chapter 18 contains considerably enhanced materials on activity-based costing and management. Finally, Chapter 19 provides a good overview of multiattribute decision techniques, with heavy emphasis on use of the analytic hierarchy process.

For Parts One and Two, no specialized mathematics are required; while, for much of Part Three, it is assumed that the student understands the basic analysis procedures of Part Two and has a fair knowledge of elementary probability and statistics. Some probability concepts are explained in the text, but those who need further background will find that the first half of most probability and statistics texts will provide adequate reference material. Complete understanding of the application of some specialized quantitative techniques to capital investment analyses involving probabilities will be facilitated by prior exposure to the theory underlining those techniques.

For a course in economic evaluation of alternative projects at the advanced undergraduate or initial graduate level, Parts One and Two can-be used for a broad overview as well as principles/techniques orientation and review purposes. Parts Three and Four provide the primary material not normally included in a first course. Throughout, ample student problem exercises are included, and even more comprehensive problems and cases are suggested in the Instructors Manual. Since the chapters in Parts Three and Four and largely independent of one another, one can include or delete chapters according to the needs of individual courses/interests.

The book is updated to reflect the increasing usefulness of Excel spreadsheets in lieu of tabled factors for computationally intricate decision problems. However, coverage of traditional interest factors and tables is retained, as it remains a desirable way to articulate concepts and enable quick feedback on the understanding of material.

Assumptions and Perspectives

We have made numerous assumptions throughout this book and have strived to notate them clearly, particularly if they differ from authoritative standards. By assumptions, we mean "educated guesses" and "plausible simplifications" to facilitate analyses—such as estimates of future cash inflows and outflows, interest rates, inflation rates, income tax regulations, and other matters affected by the future circumstances regarding the economy and the organization.

A key assumption in this book is that the viewpoint taken in an economy study is that of profit-seeking owners (i.e., shareholders) of an organization. For public organizations or regulated firms, the viewpoint typically is that of management endeavoring to maximize benefits or minimize costs. Consequently, we assume that managers who act on economic analysis results are rational persons making decisions objectively to take advantage of feasible investment opportunities available to them.

Another important assumption in much of this book is that most capital investment decisions are made independently of financing decisions. In this regard, we usually assume that engineers and others propose projects to be funded by a firm's overall pool of capital, and decisions regarding which projects to accept are separate from decisions concerning the sourcing of capital to fund these projects. This important assumption is often referred to as the "separation principle." We depart from this assumption briefly in Section 7.6 regarding "After-Tax Analyses that Include Specific Funding Arrangements," and in the Appendices to Chapter 11.

Finally, we assume through most of the book that engineering projects are irreversible and are to be undertaken in the near-term future if the return is acceptable. In reality, another possibly more useful

comparison of alternatives would consider investing capital in a feasible project today or waiting one or more years to make the investment decision. The flexibility of deferring a project may add value to a prospective investment opportunity. Accordingly, Chapter 16, "Decision Tree Analysis," and Chapter 17, "Capital Investment Decisions as Real Options," include methods for qualifying the possible value of project postponement. Additionally, in Chapter 9 we recognize that equipment replacement decisions usually involve the option of waiting to invest at a more opportune time.

Numerical Precision

Most, but not all, of the numerical examples and problem exercises have been solved using computer-generated interest factors—sometimes contained within Excel-type programs and sometimes within handheld financial calculators. The interest factors tabulated in Appendices A and B are rounded to four decimal places and their use does not generally result in the precision of computer-generated answers. Either approach is quite close enough for usual economic analysis purposes. Indeed, given the inherent inaccuracy of many estimates in practice, it is common to round off answers to what are thought meaningful—such as to the nearest dollar or thousand dollars or, say, three significant digits. This edition contains tabled factors for some 15 different interest rates. Of course, factors for any other rates can be calculated using formulas in Table 4-1 or 4-3.

Users Review

From reader reviews:

Robert Warden:

The reason why? Because this Capital Investment Analysis for Engineering and Management (3rd Edition) is an unordinary book that the inside of the book waiting for you to snap this but latter it will distress you with the secret this inside. Reading this book close to it was fantastic author who have write the book in such awesome way makes the content on the inside easier to understand, entertaining approach but still convey the meaning fully. So , it is good for you because of not hesitating having this ever again or you going to regret it. This phenomenal book will give you a lot of advantages than the other book include such as help improving your skill and your critical thinking method. So , still want to hesitate having that book? If I had been you I will go to the book store hurriedly.

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Mark Garcia:

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