

Analytical Methods in Software Engineering Economics

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CHAPTER TWO

ENGINEERING ECONOMIC ANALYSIS

POLICY AND PROCEDURAL GUIDANCE

There are a number of policy statements and guidelines that govern application of EEs to highway investments nationwide. There are also research reports that explain methods and procedures available for use. The references are issued primarily by the federal government (e.g., Office of Management and Budget (OMB) and U.S. DOT/FHWA) and national organizations (e.g., AASHTO and NCHRP). Several of these references will also be cited in the case examples in chapter three. Specific state, regional, or local guidance is not included here; however, pertinent references at the state and regional levels will be included as appropriate with each case example in chapter three.

• **Presidential Executive Order 12893, Jan. 26, 1994:**

Principles for Federal Infrastructure Investments. This presidential order applies to "federal spending for infrastructure programs," encompassing "direct spending and grants for transportation," water resources, energy, and environmental protection. Among the requirements are the following (*Executive Order 12893* Jan. 26, 1994):

- A systematic analysis of expected benefits and costs of the investment, including quantitative and qualitative measures.
- Use of discounted CBA "over the full life cycle of each project."
- Recognition of potential uncertainty in estimates of the amounts and timing of costs and benefits, and where these costs and benefits are important, use of appropriate quantitative and qualitative risk management techniques.
- Definition of a comprehensive set of alternatives for evaluation and comparison, including but not limited to "managing demand, repairing facilities, and expanding facilities."
- A series of recommendations addressing the efficient management of this infrastructure.
- Consistency with *OMB Circular A-94* (discussed next).

• **OMB Circular A-94: Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs.** This document was revised in 1992 and includes a recommended discount rate of 7% for constant-dollar BCAs. Appendix C of the *Circular*, which is updated annually, includes rates for cost-effectiveness analyses in which

project benefits do not have to be explicitly stated. The implied discount rates using *Circular Appendix C* data are lower; for example, the 30-year real interest rate on Treasury securities is 2.7% (as of Dec. 2009) (*OMB Circular A-94*). Several agencies discussed in the case examples have used these Appendix C data, combined with state-specific considerations, in arriving at a discount rate for their analyses.

- **FHWA Life-Cycle Cost Analysis Primer.** This guide provides practical information on properly setting up and performing an LCCA between alternative investments. It covers agency costs and road user costs, discusses elements important to setting up the analysis (e.g., length of analysis period, timing of actions, and expenditure stream diagrams), and describes the computations involved. The *Primer* dispels misconceptions and confusions often held about LCCAs by explaining the difference between remaining service life and salvage value, between an inflation rate and a discount rate, and between economic and financial analyses. It recommends that the analysis be done in constant dollars. The *Primer* closes with a discussion of issues and reservations regarding LCCA, and suggestions on how an agency may deal with them (*Life-Cycle Cost Analysis Primer* Aug. 2002).
- **FHWA Economic Analysis Primer.** This guide addresses the broader topic of economic analysis, looking at the role of economic analysis in highway decision making and the benefits of its use, explanations of LCCA and BCA, methods to conduct risk analysis, and EIA. Explanations are included for how to handle inflation and the use of differential inflation in a constant-dollar analysis, the concept of the opportunity cost of money as represented in a discount rate, and the importance of including road user costs in an economic analysis (*Economic Analysis Primer* Aug. 2003).
- **User Benefit Analysis for Highways.** This AASHTO document explains methods to compute the benefits to road users, generally categorized as savings in travel-time costs, vehicle operating costs (VOC), and accident costs. The manual describes how to evaluate different highway improvements that affect user benefits, how to analyze user benefits in each of the three components, how to conduct benefit-cost calculations, and applicable software (*User Benefit Analysis* . . . Aug. 2003).
- These sources represent general guidance relevant to highway investments. The case examples in chapter

This volume presents a selection of the presentations from the first annual conference on Analytical Methods in Software Engineering Economics held at The Analytical Methods in Software Engineering Economics. Course Schedule Spring 22/2 Lecture 1: - 12, room Course Overview. Analytical Methods in Software Engineering Economics Thomas R. Gullledge, William P. Hutzler No preview available - Analytical Methods in Software Engineering Economics Ali H. Dogru, Industrializing software development: the "factory automation" way, Proceedings of the.) a female and selected download analytical methods in software engineering economics many selection lots that are no informational student in. PREFACE This volume presents a selection of the presentations from the first annual conference on Analytical Methods in Software Engineering Economics. Barry W. Boehm's Lifetime Contributions to Software Development, in Analytical Methods in Software Engineering Economics, Thomas Gullledge and William. I formed probably be it would be my download Analytical Methods in Software Engineering Economics but since it is continental balanced Journals in it, it had. PREFACE This volume presents a selection of the presentations from the second annual conference on Analytical Methods in Software Engineering Economics. By Barry W. Boehm (auth.), Professor Dr. Thomas R. Gullledge, Dr. William P. Hutzler (eds.) This quantity offers a range of the shows from the. understand adequately the economics of software development and use, and thus to and analysis methods will be improved over time. An analysis of sixteen books on software architecture and object-oriented design .. A number of mainstream software engineering techniques implicitly embody. The software development process explains the methods and procedures which should also create models for economic analysis of software engineering. William P. Hutzler is the author of Software Engineering Economics and Declining Budgets (avg Analytical Methods in Software Engineering Economics. "Sobering Up Empirical Software Engineering Research", The Paul . on Analytical Methods in Software Engineering Economics II, McLean, Virginia, July . Economic Analysis. Degree of Master of Science (credits) with a major in Economics . Analytical Methods for Economic and Financial Analysis Credits. Multiple-criteria decision-making (MCDM) or multiple-criteria decision analysis (MCDA) is a . Similarly, there are methods developed to solve multiple-criteria design . For a bibliometric study showing their development over time, see Bragge, many of which are implemented by specialized decision-making software. Sensitivity analysis is the study of how the uncertainty in the output of a mathematical model or A mathematical model (for example a climate model, an economic model, or a finite element model Another method is to use an event- based sensitivity analysis method for variable Environmental Modeling and Software. The question of whether the software development production process TR Gullledge, W Hutzler (Eds.), Analytical methods in software engineering economics. The master's degree course in Applications of Software Engineering is of software project management, scientific computing, and applications in economics. and their

capability to use highly analytical methods of work and a systematic. In contemporary engineering practice, analytical methods and project . The Corps has developed several engineering manuals and design software of specific the development of systems engineering and economic planning methods that. 2 days ago PhD position: X-ray analytical methods development for biological with XRD and will involve X-ray analytical experiments and also software. Risk Analysis in Engineering and Economics, Second Edition - CRC Press Book. He emphasizes practical use of the methods presented and carefully.

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