Analytical Methods in Software Engineering Economics

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- **The Need to Consider Consequences.** The consequences of highway decisions—costs as well as project impacts, results, or outcomes—have become more familiar to the highway community with the growing importance of performance management and accountability reporting. The consequences of a decision necessarily follow the decision—therefore, EEA necessarily involves projections or forecasts of the future. Although estimates of the future always involve risk or uncertainty, the need to forecast is inherent in many engineering calculations (e.g., pavement design, road capacity design, intersection capacity design, safety projections, and infrastructure deterioration modeling) and tools are available to help with decision making in this context. Later sections of this chapter will deal with risk analysis and identifiable issues in forecasting; several case studies in chapter three illustrate techniques to deal with risk and uncertainty. (Both costs and benefits are treated as consequences, because in many transportation analyses benefits are construed as reductions in costs or costs avoided. Similarly, "negative benefits" or disbenefits affect the analysis in a manner similar to costs.)
- **The Need for a Viewpoint—Consequences to Whom?** In private-sector analyses, the appropriate viewpoint is often that of business owners seeking profit. Public-sector analyses are more complicated—rarely is the intended benefit limited solely to the government agency. (The ability of an agency to perform within its budget is a separate matter—one of many reasons for distinguishing between financial and economic analyses in chapter one.) With respect to transportation, the viewpoint is generally that of the public at large. However, it will be clear in subsequent sections that even this broad perspective is not always sufficient—the "public" comprises stakeholders and constituents who themselves reflect different viewpoints. Certain chapter three case studies illustrate particular aspects; for example, the federal versus the regional perspective in the Critical Facilities case example, maritime versus regional highway conveyance of freight in the same example, and different values of time associated with different road users in the Accelerated Project Delivery case example.
- **The Desirability of Commensurable Measures.** Economic costs and benefits that are all monetized can be compared in a straightforward manner—the challenge is to estimate these as accurately as possible, or at least to be aware of simplifying assumptions. The value of commensurable measures is illustrated in almost all cases in chapter three, but particularly in the Economics-based Tradeoffs example. For some consequences, however, the use of noncommensurable measures is unavoidable (see also the next item).
- **Comparisons of alternatives might consider nonmonetized as well as monetized consequences.** That important consequences of investment decisions may not be able to be monetized or even quantified is recognized in federal policy. Provisions of Executive Order 12893 acknowledge that nonmonetized (or nonmarket) and qualitative benefits may need to be included in an analysis (*Executive Order 12893* . . . Jan. 26, 1994). All of the case studies in chapter three address cost as a monetized consequence. Although most of them also include monetized benefits, some use other approaches. For example, the Bridge Programming and Permitting case applies a utility function to characterize the health of bridge assets as a measure of benefit; the Safety Programming case shows instances where the frequency of fatal and serious-injury accidents is used as a surrogate for the monetized economic cost of these collisions.
- **Only differences in consequences matter when comparing alternatives.** This principle has several implications:
  - Only the future matters; past investments or "sunk costs" are no longer relevant in decisions on future investments.
  - In situations where discounted benefits streams among all investment options are close in value to one another, a BCA may reduce to a simpler, discounted cost-minimization problem. This situation may occur when policy or practice results in essentially the same performance trend among all candidate investments (a situation that may arise, for example, in pavement preservation).
  - An accurate tally of differences in consequences among candidate investments requires the actual costs (or benefits) associated with each option. Average costs (which often result from simplifying assumptions in management systems) or allocated costs (as computed by cost accounting systems) may lead to incorrect economic conclusions.
- **Separable decisions could be made separately whenever practicable.** Within the highway transportation field this principle often applies to how project alternatives are defined. A proposed project may combine several types of highway improvements that otherwise could be performed separately; for example, renewed pavement surface condition, new safety hardware, mobility enhancements, and improved drainage features. It is preferable to evaluate each project component incrementally and retain only those that pass economic muster ("each tub on its own bottom"), rather than analyzing the entire project in a single step. An economic result for the project as a whole might mask the weak economic performance of one or more components that would not be viable on their own.
- **Criteria for decision making are needed.** Criteria help structure a decision to meet stated policy goals and targets, and to guide a decision maker in dealing with multiple goals and objectives reflecting competing and sometimes contradictory interests. The primary criterion of an economic analysis would relate to making the best use of limited resources. Other criteria can

Analytical Methods in Software Engineering Economics Thomas R. Gulledge, 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 Gulledge 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. Gulledge, 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.