

1.011 Project Evaluation

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Assignment 6 Project Effectiveness

Objective: develop a spreadsheet that you can use to illustrate the costs and benefits, rate of return, cost effectiveness and other financial aspects of the major alternatives for the case you are studying for your term project. The spreadsheet should be useful in comparing the performance of different approaches to solving a problem or in conducting sensitivity analysis for a particular option. The structure could be based upon what you have already developed for earlier assignments, or you could do something quite different.

- a. **Performance measures (20%):** identify the most important performance measures that you believe should be used to evaluate the major alternatives for your project (which you identified in P.S. 5). Include the NPV of the project for the owner and at least one non-monetary factor, such as “reductions in highway fatalities” or “reduced emissions”.
- b. **Performance model (40%):** develop a spreadsheet that can be used to estimate these performance measures for each of the major alternatives. The spreadsheet can be a modified version of what you have developed for prior assignments, or it can be entirely new. The spreadsheet should include several elements related to both costs and benefits (e.g. major cost drivers, unit costs, parameters related to demand, time for construction, parameters related to capacity or performance capabilities, etc.)
- c. **Performance assessment (20%):** create a matrix showing the expected performance for each of the major alternatives. Compare and contrast the performance for the various options. For non-monetary measures, discuss the cost-effectiveness of the various approaches.
- d. **Sensitivity analysis (20%):** One of the alternatives will in fact be the project that was actually built. Show how different assumptions concerning costs or revenues or other aspects of performance would affect the performance measures for this project. Which factors appear to be most critical to the success of the project?

NOTE: Everyone should develop their own spreadsheet, as this is not a group assignment. However, you are encouraged to discuss the assignment within your group so that you can each address a different set of issues. Members of a group may each consider different aspects of performance, they may look at similar projects, or they may consider the effectiveness of different types of alternatives. If you have any questions about the assignment or how to divide the workload, please contact the TA or the instructor.

Thoughts on Spreadsheet Design

1. Title: have a title for the spreadsheet and for each exhibit
2. Appearance: set up the spreadsheet so that you can print exhibits for your term project
3. Control panel: have a section where it is easy to enter key variables and see key results
4. Tables: a table that shows results for various sets of inputs can be very useful to have
5. Level of detail: you do not have to be any more detailed than “Skyscraper”; if you do not have the data that you would like, then you should estimate what seem to be reasonable numbers for costs and benefits (be sure to explain which numbers are estimates and why you believe these estimates are reasonable; if you have good numbers, be sure to show the source) - this assignment is concerned with your ability to design a spreadsheet and you will be able to get better inputs as you progress with your term projects
6. Graphs: it is often helpful to create one or more graphs to display cost, benefits, comparisons of options, or sensitivity analysis
7. Interpretation of Results: it may be useful to introduce cost effectiveness measures for some projects (e.g. \$/resident, or \$/transit trip, or some other measure that puts the numbers into context)
8. Color, borders, etc: this can make your results sparkle - but don’t spend a lot of time on this and don’t let the style overwhelm the substance
9. Text: remember, you can write descriptive paragraphs in the spreadsheet
10. Detailed calculations vs. results: you may want to move the details to a part of the spreadsheet that you don’t have to print or view; make some portions of your work accessible in tables and charts that are easily viewed and printed.
11. Level of precision: remember that your analysis involves many different estimates, some of which are bound to be rather imprecise. When you show results, be sure not to use too many significant figures. Spreadsheets allow you to specify the number of decimal places, and they also allow you to round off the numbers that are displayed. You can also show results in, say, \$ million or even \$ billion and thereby avoiding having to show too many significant digits.

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