

## Utilizing Software to Improve Cost-Estimation

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### Problem Definition

There are countless numbers of projects in numerous industries that have run over budget. It is not uncommon to hear of examples of final costs being double the initial estimates. From small single-product projects to large state highway construction projects, it seems that cost overruns are the norm. There must be something that can be done by company executives in order to sharpen the estimations projected for projects.

#### Symptoms that require attention

Results of one study (Pfleeger, 1998) revealed that thirty-five percent of managers surveyed indicated that their current cost estimates were “moderately unsatisfactory” or “very unsatisfactory.” On a five-point Likert scale, that means that only sixty-five percent indicated that their cost estimates were “very satisfactory,” “moderately satisfactory,” or “satisfactory.” One reason given by the study for cost overruns was that some tasks are overlooked. Another reason cited for cost overruns was the lack of sufficient estimating guidelines. A third reason for cost overruns was insufficient analysis when developing a cost estimate.

#### Underlying fundamental issue and problem statement

*What must company leaders do to increase the accuracy of cost-estimation?*

#### Justification for Problem Definition

It would seem that the ability to estimate costs for projects would improve over time. Unfortunately, that has not been the case. Despite the experience of those in charge of forecasting costs, many factors are not considered or are deemed unimportant during the analysis

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<sup>1</sup> This case analysis was organized from the scenario depicted on page 101 (“Sidebar 3.3: Causes of Inaccurate Estimates”) of the textbook, Software Engineering, Theory and Practice by Shari Lawrence Pfleeger.

phase. Also, the estimation team may have difficulties considering a large number of variables. A simplified approach based on experience may not be effective. Also, changes in personnel may affect the ability of the company to show accurate cost estimates. Companies need a sound system with which to base accurate forecast modeling.

### Alternate Courses of Action

#### Alternative 1

Maintain the status quo by doing nothing new.

#### Alternative 2

Hire more effective management

#### Alternative 3

Utilize software that accurately models the project

### Evaluation of Alternatives

#### Alternative 1 (Maintain the status quo).

Advantage(s). Doing nothing is always an option. Managers can always think that there have been enough tried-and-true measures taken thus far to get them to the state they are currently in. It is easy to remain the same, and some employees are resistant to change.

Disadvantage(s). Doing nothing will not solve the problem of facing inaccurate cost estimates. If management decides to maintain the status quo for any number of actions or decisions, they are essentially stating that they can accept the current state of affairs, which may be described in terms of mediocrity. By changing policy, it communicates that what has worked in the past was insufficient, and that communication can be a reflection of the abilities (or inabilities) of current management.

#### Alternative 2 (Hire more effective management)

Advantage(s). In some cases, managers may have reached their current positions by having a combination of qualities that include amiability and longevity on the job. Being on the job for a long time does not mean that a worker knows all that is necessary to effectively manage. Perhaps a better manager could see things more completely and could provide a broader perspective from which to anticipate and incorporate more cost-related issues.

Disadvantage(s). Hiring a new manager, or new management team may only be a part of the solution. Amicability is a good quality, but when hiring or promoting someone to management status, should not be chosen by qualities less important than sound management skills.

### Alternative 3 (Utilize software that accurately models the project)

Advantage(s). With all of the advancements in software technology, there must be a way to utilize current (or create new) software that can effectively model a project for more accurate cost estimations. Software can make calculations that consider a multitude of variables.

Disadvantage(s). Software is only as good as the programmer who designs it or the system analyst who recommends improvements for it. Some companies may not be able to afford to have proprietary software developed, and the smallest companies may not be able to afford to have a computer specialist on the payroll.

### Review, Conclusions, Recommendations

Since maintaining the status quo will not solve the problem of improving cost estimates, it is an impractical solution alternative. Things should be left the same only if the company cannot afford to implement ideas deemed necessary to improve.

Hiring a new manager or management team may help clarify the tasks associated with improving cost estimates, but there is no guarantee of that likelihood. Also, a new manager may

be good at cost estimating, but may be disagreeable to work with, thereby affecting employee morale. An effective manager must be well rounded with both people-related skills and technical ability.

Since executives want to do something to improve the forecasting of costs for projects, and since it is assumed that they hire the best possible managers that they can get, they should look at incorporating the use of software to help solve the underlying fundamental issue. The more variables that a software program can consider and analyze, the more effective will be its algorithmic approach. Consider what investors in the securities markets currently have available. Software exists for securities investors that allow them not only to include company-specific and industry-specific variables, but also historical and current economic variables (e.g., employment rate, Consumer Price Index, inflation rate, interest rates). Using the software, an investor could then input as many variables as are deemed necessary in order to determine the desirability of an investment in a particular stock or security. It would be up to the investor to determine how best to evaluate the data resulting from the model.

#### Follow-up and Evaluation

Any company that decides to utilize new or existing software to help with cost-estimation practices should consider an evaluation plan with two parts. The first part should be a regular monitoring of the system to ensure accurate and acceptable functionality. The second part of the plan would require mandatory continuing education for managers to keep current with trends and improvements in forecasting models.

Executives or owners of companies should want to realize two objectives as a result of what they chose as the alternative solution to the underlying fundamental issue: (a) successful cost-estimation modeling ability through use of the software, and (b) improved training of

managers. The first objective will follow from the careful implementation of a software program that they deem acceptable. If designed with adherence to the recognized software development lifecycle, all relevant factors should be recognized, studied, and considered.

The second objective of company executives can be accomplished by requiring training of managers so that managers can learn from the errors and successes of others who have been involved in cost-estimating in their own or even unrelated industries. Attending lectures or workshops, or reading reports of effective forecasting, may benefit them in providing new insights and broadened perspectives.

There are always unexpected costs that are difficult to anticipate. For instance, lumber costs for construction projects can rise due to droughts, fires, worker strikes, and rising costs of fuel to transport the lumber. A home building company that has a two-year plan to develop a residential neighborhood in phases should not only provide for, but should *expect* contingencies such as the rising cost of lumber and other materials. There have been several building companies in Austin that have gone out of business because of improper planning. Their narrow profit margin was erased with the unexpected rising cost of materials.

There are some costs that will be impossible to predict. For instance, as interest rates rise, fewer homebuyers can qualify for home ownership. A building company may not be able to predict how rates will affect their operations until rates have actually risen. While their cost estimating may have been accurate, their forecasting of net sales will have been affected with rising interest rates. However, effective management coupled with sound cost-estimating software will allow companies the best chance possible to keep costs very close to original estimates. When cost estimates are very close to accurate, then clients, customers, and employees

will benefit from the results of accuracy. Also, the company will be represented as being more professional, which will enhance its future business prospects.