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Research Papers

Study of CBA in software development with result to analysis in Waterfall Model with the participation of User

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Abstract

Many companies are dependent on historical data to build predictability models for cost/benefit justification of future projects. For small companies, which generally do nothave a process for collecting security data, the costs and the benefits of information security improvement projects have been very difficult to estimate and justify and also detailed attack data is not available to be used as references in cost estimations.

Due to these difficulties, many small companies choose to ignore entirely the security vulnerabilities in their systems, and many suffer the consequences of security breaches and significant financial loss. Small companies that do implement security improvement projects often have problems in understanding the cost structures of their improvement initiatives and how to translate risk exposures into costs that can be passed on to their customers.

To deal with the these problems, this report describes a framework for cost/benefit analysis aimed at providing acceptable estimations for small companies in their information security improvement projects. The framework classifies misuse cases into categories of threats for which nationally surveyed risks and financial data are publicly available. For each category of threats, costs, benefits, baseline risks, and residual risks are estimated. The framework then generates all permutations of possible solutions and analyzes the most optimal approach to maximize the value of security improvement projects.

Introduction:

Cost Benefit Analysis (CBA) is an economic evaluation technique that measures all the positive (beneficial) and negative (costly) consequences of an intervention or program in monetary terms. The valuation of all program outcomes in monetary units allows decision makers to directly compare the health outcomes of different types of health interventions. CBA can also be used to compare health-related interventions to those in other economic sectors.CBA enables policy makers to determine whether the value of its positive consequences exceeds the value of societal resources required to implement the program. This will help policy makers choose the program that provides the best return on investing societal resources.

The conceptual and theoretical framework of CBA is derived from welfare economics. Welfare economics is the study of changes in the well-being, or welfare, of individuals and society as decisions are made regarding the production, distribution, and consumption of goods and services. CBA incorporates theories that have been

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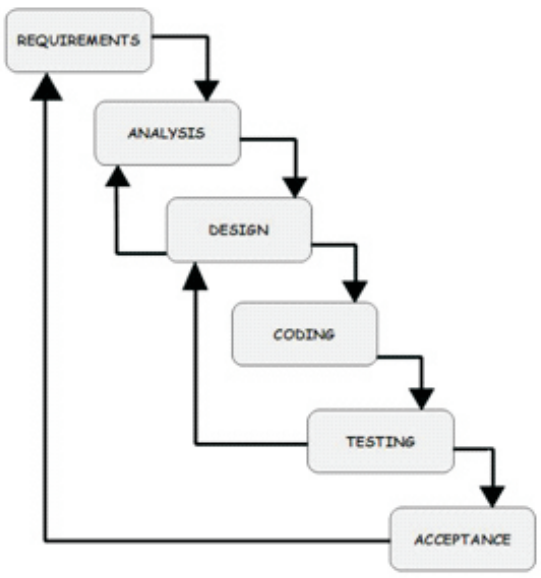
developed to address equity issues.

Significance of Waterfall Model:

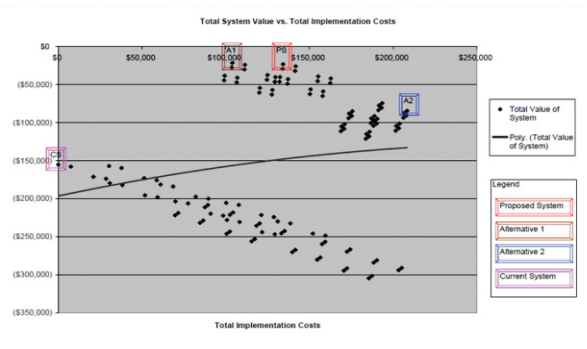
The waterfall model is a popular version of the systems development life cycle model for software engineering. Often considered the classic approach to the systems development life cycle, the waterfall model describes a development method that is linear and sequential. Waterfall development has distinct goals for each phase of development. Imagine a waterfall on the cliff of a steep mountain. Once the water has flowed over the edge of the cliff and has begun its journey down the side of the mountain, it cannot turn back. It is the same with waterfall development. Once a phase of development is completed, the development proceeds to the next phase and there is no turning back.



The advantage of waterfall development is that it allows for departmentalization and managerial control. A schedule can be set with deadlines for each stage of development and a product can proceed through the development process. Development moves from concept, through design, implementation, testing, installation, troubleshooting, and ends up at operation and maintenance. Each phase of development proceeds in strict order, without any overlapping or iterative steps. The disadvantage of waterfall development is that it does not allow for much reflection or revision. Once an application is in the testing stage, it is very difficult to go back and change something that was not well-thought out in the concept stage.

Total System Value versus Total Implementation Costs The Total System Value vs. Total Implementation Costs graph in Figure 2 shows us there are optimal and non-optimal solutions among the security solutions that the Company may choose to implement. The solutions with higher Total System Value are better solutions. The four colored boxes (solutions) are better solutions within their respective cost ranges because they have the highest Total System Value compared to other solutions on the same vertical lines in the graph. The pink solution represents the Total System Value of the current system.

It has zero total implementation costs. The Blue solution (Alternative 2) represents the total value of the system when every architectural and policy recommendation has been implemented. The brown solution (Alternative 1) and the red solution (Proposed System) have the highest Total System Value, meaning that by implementing either one the Company can obtain the best value for its system over the next three years of project lifetime. From a strictly financial perspective, solutions with higher Total System Value and lower Total Implementation Costs are preferred. Therefore, the graph suggests that Alternative 1 is a better solution than the Proposed System or Alternative 2. However, it is not immediately apparent from this view the extent to which Risk Exposures are reduced. We shall examine Risk Exposures in later sections. It is worth noting, however, that Alternative 1 is a subset of the Proposed System.



Total System Value vs. Total Implementation Costs

Conclusion:

The objective of the Cost/Benefit Analysis Framework is to provide a quantifiable financial analysis framework that small companies can apply to their projects. Within this scope, we show that unmitigated risks can be translated into costs, and we demonstrate the estimation methods for calculating costs of implementation for architectural and policy recommendations. The reductions in Risk Exposures in turn enable small

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companies to have less volatility in their Total System Value. The increase in predictability of results by implementing optimal solutions will enable small companies to profit more and to plan for future growth.

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