

Chapter 2: Research Objectives

Most software projects encounter unexpected problems along the way. Key variables such as cost, resources and final project duration and others are subjected to much uncertainty or risk. In the course of software development we analyze many situations and make decisions which involve great risks that may eventually lead to project failure, non-completion, increased cost or other serious consequences. Enormous benefits can therefore be realized, if proper risk analysis has been carried out and effective risk management methods utilized at the very onset of the project development.

For many years, project managers have relied heavily on software development teams for the successes of software projects. Estimations of project costs, schedule, size and others have been carried out by these groups of people. This has always been a subjective and intuitive process influenced by factors such as personality, opinions, experience and eagerness and pressures to win over contracts. Quotations offered are usually biased towards shorter time schedules and lower overall cost, which in effect, have most of the time been, grossly underestimated. Many projects face problems of late completion/delivery and unexpectedly high cost, which occasionally amounted to several times the original estimates. Completed software products are unreliable and often exhibit poor performance characteristics. Some projects have faulted and have even failed to be completed. The situation is further aggravated by the nature that software products are intangible. They can neither be seen nor touched. Software project managers are unable to gauge progress of their projects as well as their counterparts in the civil or mechanical engineering fields do.

This research work attempts to address the above issues. Its objectives are:

- ♦ to conduct a comprehensive study and to acquire a thorough understanding of what risk management involves, in the context of software development process;
- ♦ to investigate the existing software risk management techniques;
- ♦ to evaluate and compare currently available computer supported risk management tools;
- ♦ to come up with an idea/concept to manage software risk;
- ♦ to apply such a concept to build a software tool that is able to support risk management;
- ♦ to evaluate the usefulness and practicality of the tool developed.

In addition, this research intends to produce and introduce a risk management tool that will be useful, reliable, easily understandable and friendly. Intuitively, it is also the objective of this project, that through this research, a better understanding and familiarization of software development is acquired, together with the added opportunity to practice the concept of risk management, which is fast becoming one of the important components of software engineering practice.

I have used combinations of methodologies for the research. There are:

♦ ***Library and resource center search.***

The work commences with the detailed finding of all relevant books, magazines, publications, articles and other relevant reading materials. The purpose of this search is to have a clear understanding of what software risk management is and to investigate the existing software risk management techniques. It is then followed by

a thorough study of existing software life-cycle process models to identify weaknesses of each of these models. Various problems encountered by software development organizations are identified and the root causes that led to the problems are also analyzed. Effects or consequences that these problems have created on past software projects are analyzed. This is carried out by studying numerous published disastrous projects.

♦ ***Internet search.***

The Internet search is to supplement the library and resource center search. Latest information on risk management and other useful articles are extracted from several Internet locations. Relevant demonstration software and limited-period trial software copies have also been downloaded for evaluations.

♦ ***Survey on evaluation-software-packages from software companies.***

The work continues with the investigations of various evaluation software packages. These evaluation software packages are obtained from commercial software developers through e-mail requests. Techniques, approaches and designs of these software packages have been studied. Comparisons are also made to identify their strengths and weaknesses.

♦ ***Informal interview with friends who work as IT executives, database administrators and other computer-related personnel.***

The objective of this search is to get more opinions and a broader perspective on the subject. Applications of software risk management in software development organizations have been investigated. Techniques that they have employed, effectiveness and problems that they have faced are analyzed. Reasons for not employing risk management have also been studied.

♦ ***Discussions with project supervisor and coursemates.***

The purpose is to gather ideas, opinions and suggestions from this group to further enhance my knowledge in software risk management.

Various collected materials and inputs are then combined to obtain an overall picture and clearer perspective on the subject. An idea of managing software risk statistically based on the context of organization is then planned. Analysis is conducted to investigate into the functional and non-functional requirements of the tool, which is to be developed. Various statistics and software engineering books have been referred to. Other software packages have also been studied to acquire ideas on interface designs. Detailed design of the tool is then carried out. It is finally followed by the choice of programming language, hardware and software to be used. More details of the tool development process are further discussed in Chapter 4.