

1 Introduction

1.1 Background

Software industry is one of the rapidly growing industries in Sri Lanka. According to the Board of Investment (BOI) of Sri Lanka, presently there are about 175 software development companies that are operating in Sri Lanka. Nearly 7,000 employment opportunities have been created and this is still growing rapidly. The BOI of Sri Lanka believes that Information and Communication Technology (ICT) industry, which includes the software industry will create 25,000+ employment opportunities in 2012 and the targeted income would be 1Billion US dollars, which is around 15% of Sri Lanka's export income.

Although the software industry will be a potential revenue generator in Sri Lanka, the nature of uncertainty involved in it and the negative impact caused by uncertainty factors might change targeted revenue figures in future. These uncertainty factors on software projects and the impact caused by them on software project deliverables are collectively known as **risks** to software projects. This is a broad view and spans across multiple domains.

When considering a software development project, from the project management point of view, managing uncertain areas/items comes under risk management. Risk management is considered as a supporting function to project management.

Project risk management is the process of identifying, analyzing, and responding to risks throughout the life cycle of a project, in the interest of meeting project objectives. A frequently overlooked aspect of project management, risk management can often result in significant improvements in the ultimate success of projects. Effective risk management can have positive impact on selecting a project, determining the scope of projects, and developing realistic schedules and cost estimates. It helps project stakeholders including the client to understand the nature of the project, contributes team members in defining strengths and weaknesses, and helps to integrate other project management knowledge areas.

The software development process mainly takes care of the known aspects of software development. One can only precisely describe, schedule, assign and review known tasks to be done by following the process. Risk management takes care of the unknown aspects.

Risks are identified not for the sake of identification, but to anticipate and mitigate them if possible, or to respond to them when the mitigation strategies fall short. The key to managing a risk is not to wait until the risk becomes a problem or a failure, but to come up with actions and plans to avoid it. Managing risks early is nearly always less costly and painful than cleaning-up afterwards.

Thus it is important to identify key risks in the Sri Lankan context and the best possible methods to mitigate them.

1.2 Justification of the Research

Although researches and developments are carried out in the area of software project management, many software projects still fail to deliver systems on time, within budget, within project scope, and with acceptable quality. CHAOS study conducted in 1995 found that 31% of software projects are cancelled before they ever get completed. On the other hand, only about 16% of software projects get successfully completed on time and on budget (CHAOS, 1995).

Software industry has had just above 15 years of presence in Sri Lanka. During this period many software projects were completed and there will be many to come in the future too. Some had successfully been delivered and some had failed in the various time frames of the development life cycles. Reasons behind these successes and failures vary. Success stories definitely help us in the future. But the important factor is to understand what went wrong in failed projects, the causes for failures, probability of it to happen in the future and their impact. Sources of these causes are both internal to the project and external forces found in the environment. Risk is a common measure or the index that can be used to determine these internal and external causes. Risk can be a qualitative or quantitative indicator that can be derived with both probability of an event and the negative impact it can cause to the project.

The employees in the software industry, especially the software project managers, team leads and the technical leads are best aware of the probability of risks that can cause problems to a software project and the impact of each risk on the project success or failure. Although such knowledge and experiences gained and collected throughout the 15+ years are valuable to the future growth of the software industry in Sri Lanka, they still remain with individuals or companies. This is because there has been no way to share the experience. To our knowledge, there has been no research done on this aspect.

This research is aimed to mine and extract the risk management knowledge from the industry and make them available in useful form to help develop the software industry in Sri Lanka.

1.3 Research Aims and Objectives

This section describes the aims and objectives of the research. As described in the previous section, the intent would be to mine and extract unwritten knowledge on project risk management that resides among project managers, team leads and technical leads in Sri Lankan context and make them available for software industry in Sri Lanka.

The research is carried out in Sri Lankan context and its main objectives are as follows:

- Identify the key risks in software project management.

The findings can be used in software projects to prioritize key risk items and to enforce risk management function in software projects.

- Identify the most widely used risk identification methods in software projects.

1.4 Limitation and Scope of the Research

Risks associated with the software projects span into multiple areas both internal and external to projects. The factors or items that have direct relationship to projects are called internal. External factors/items span across multiple areas like countries, socio economic conditions, government policies, personal belief and so on.

Due to this wideness only a limited set of risk items were selected for this research. They are related to:

- Client or the end user
- Human resource that worked on the software development project
- Project requirements
- Project scope
- Project schedule/estimates
- Project quality management

This research is limited to the above listed areas. This selection is based on the discussions that researcher had with experts in project management and the findings of follow-up study to the 1995 CHAOS research, by the Unfinished Voyager Group (CHAOS, 1995).

Research scope is limited to the software projects and survey is carried out in large and medium-size software development companies operating within Sri Lanka.

Availability of contingency plans and their effectiveness might influence some of the measured impact values. It is assumed that there is no direct relationship between contingency plan and impact measures.

During the research, the researcher observed that most of the participants were reluctant to reveal the knowledge they have gained with their experience. This may be due to the non-disclosure agreements some of them have with their employers.