

# **An Empirical Study of Software Development**

## **Failures in Sri Lanka**

By

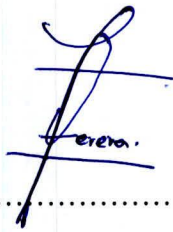
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**(GS/MC/2361/2004)**

**Thesis submitted to the University of Sri Jayewardenepura for  
the award of the Degree of Master of Science in Management  
on 31<sup>st</sup> December 2007.**

## Declaration Statement

The work described in this thesis was carried out by me under the supervision of Dr. Sampath Amaratunge (Dean, Faculty of Management Studies and Commerce, University of Sri Jayewardenepura), and a report on this has not been submitted in whole or in part to any university or any other institution for another Degree/Diploma.

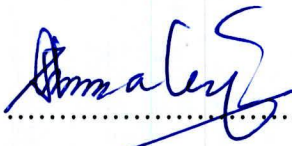
A handwritten signature in blue ink, appearing to read 'Perera', is written over a horizontal dotted line. The signature is stylized with a large loop at the top and a horizontal stroke across the middle.

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## Supervisors' Declaration Statement

I certify that the statement made by the candidate is true and that this thesis has been accepted for submission to the University.



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## Abbreviations and Nominal Definitions

| <b>Abbreviation/ Concept</b>                          | <b>Definition</b>  |
|---|--|
| ACM   | Association For Computer Machinery   |
| BOI   | Board Of Investment  |
| Bypassing Lifecycle Stages                            | Software development life cycle is a set of steps which should be followed when developing software. This factor deals with software developers not following these steps properly and by- passing some steps. |
| Causes  | Phenomena which directly causes the factors of software development failures to originate in software development projects.  |
| Change Management (Customer Side)                     | The lack of change management practices in the customer organization.  |
| Changing User Requirements                            | The tendency of the customer to changes requirements during the development process.   |
| Communication between Members of the Development Team | Communication mechanism that exists inside the software development team to communicate with each other concerning work related matters  |

|   |   |
|---|---|
| Communication between the Development Team And Users    | Communication between the members of the software development team and the customer of the software (organization the software is developed for)                |
| Corporate Politics with Negative Effects on the Project | This factor deals with internal corporate politics in the software development organization which might affect the success of the software development process. |
| Customer  | Organization the software is built for.   |
| <i>et al</i>  | And Others  |
| High Employee Turnover                                  | This factor deals with the high employee turnover of the software development team.   |
| IEEE  | Institute of Electrical and Electronics Engineers   |
| Inadequate Testing                                      | Software testing is the main factor which checks if the software is working properly. This explains that the testing is lacking.                                |
| Insufficient Budgets                                    | A specific budget will be allocated to every software development project and this deals with the insufficiency of the budget allocated.                        |

|   |  |
|---|--|
| Incorrect or Conflicting<br>User Requirements | This factor deals with the development team getting incorrect or conflicting requirements for the software by the customer.  |
| Insufficient Research                         | When using new technologies the developers have to do a lot of research and understand the proper implications of these technologies. This deals with the lack of sufficient research.   |
| IT  | Information technology   |
| Lack of Commitment of<br>Team Members         | This factor deals with the lack of commitment for the successful completion of the software product among the members of the software development team.  |
| Lack of Industry /<br>Domain Knowledge        | Software developer is expected to have a good knowledge about the industry to which the software is being developed for. This explains lack of knowledge of the software developer regarding the industry in which the software belongs too. |
| Lack of Proper<br>Documentation               | Lack of documents related to the software under development. The documents will include software requirement specifications, sign off documents etc.   |

|                                    |  |
|------------------------------------|--|
| Lack of Proper Quality Standards   | Software as a product should have quality standards and this factor deals with the lack of quality standards maintained when developing the software.  |
| Lack of Skilled Staff              | There are certain skills required when developing software and this specifies that these skills are lacking in the software development team.  |
| Lack of Top Management Commitment  | Lack of top management commitment in the customer organization.  |
| Lack of Training of Staff          | Lack of training given to the members of the software development team on technologies.  |
| Lack of User Participation         | When developing software the participation of the people who are going to use the software in the customer organization is essential. This factor deals with the lack of participation of the customer organization users. |
| Misunderstanding User Requirements | This specifies that the needed requirements of the intended software to be developed are misunderstood. This will lead to a software product which is does not support the customer's business requirement.                |

|                                    |  |
|------------------------------------|--|
| Misunderstanding User Requirements | This specifies that the needed requirements of the intended software to be developed are misunderstood. This will lead to a software product which does not support the customer's business requirement. |
| Poor Management Skills             | Management skills of the people who lead the software development team.  |
| Poorly Defined Project Scopes      | Any software development project should have a clearly specified scope in which the software should be developed in. This factor deals with the lack of a proper scope of the software.                  |
| Resources Shifted from the Project | This factor deals instances where resources in a software development project (software developers or any other resources attached to the particular project) get shifted to other projects.             |
| Requirements                       | Expected functionality of a software product.  |
| R&D                                | Research and development   |
| SEA                                | Software exporters association   |
| SLASI                              | Sri Lanka Association for the Software Industry  |



|                                       |  |
|---------------------------------------|--|
| Software Development Failures         | Software projects in Sri Lankan software development companies which either exceeds its, cost, time or does not conform to its required functionality.                   |
| Undefined Project Success Criteria    | There should be documented criteria to measure the success of the software development activity. This factor deals with the lack of a properly defined success criteria. |
| Unstable Organizational Environment   | This factor deals with the stability in the software development company.  |
| US                                    | United States  |
| Use of Incorrect Modelling Techniques | Software development team not using proper software modelling to model the software.   |
| Use of Wrong Technologies             | This explains that the technologies used in the development of the software product are not in line with the needed appropriate technology.                              |
| User                                  | People who ultimately use the software product in their day to day activities (employee's in the customer organization)  |

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### **ABSTRACT**

Software development projects are considered as a unique entity in terms of project management due to the inherent attributes it encapsulates making them distinct and susceptible to failure. Therefore the importance of software project risk management is emphasized where the identification of the factors, which affect software development projects to fail, being the main component. This survey based study focuses on identifying the factors that affect software development failures and the causes of these factors in Sri Lankan software development companies. Twenty-seven factors affecting software development failures were identified using a stringent scientific methodology and were tested to ascertain their validity, importance and the causes in terms of the Sri Lankan context using an interview based questionnaire. Twenty-five software development companies, which belong to the software exporters association, were selected for data collection and the gathered data were analyzed to ascertain the significance to the defined objectives using statistical tools. Misunderstanding of user requirements, poor project management skills of managers and the lack of communication between the members of the software development team were identified as the top three factors affecting software development failures in Sri Lanka while the lack of proper communication between the development team and the customer, poor project management knowledge of managers, and lack of proper planning were identified as the main phenomena which cause these factors to originate in software development projects in Sri Lanka.