

**THE CRITICAL SUCCESS FACTORS TOWARDS
MIGRATION TO AGILE SOFTWARE DEVELOPMENT
PRACTICES IN THE IT INDUSTRY OF SRI LANKA**

**LIBRARY
UNIVERSITY OF MORATUWA, SRI LANKA
MORATUWA**

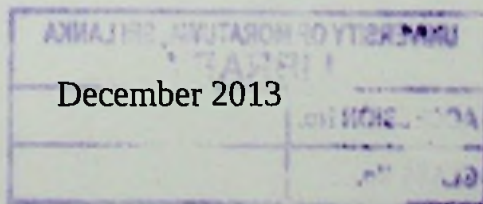
Uditha Jayawardhane

(129063J)

Thesis/Dissertation submitted in partial fulfillment of the requirements for the degree of
Master of Business Administration in Information Technology

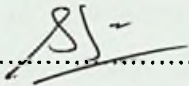
Department of Computer Science & Engineering

University of Moratuwa
Sri Lanka



DECLARATION

I hereby certify that this dissertation does not incorporate, without acknowledgement, any material previously submitted for a Degree or Diploma in any University and to the best of my knowledge and belief, it does not contain any material previously published or written by another person or myself except where due reference is made in the text. I also hereby give consent for my dissertation, if accepted, to be made available for photocopying and for interlibrary loans, and for the title and summary to be made available to outside organizations.

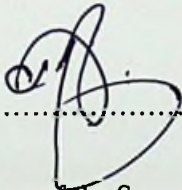


Signature of the candidate

03/26/2014

Date

To best of my knowledge the above particulars are correct.



Signature of the Supervisor

26/03/2014

Date



ABSTRACT

Traditional software development and management methodologies are not well suited for today because the improvements to the area of software development, emerging technologies, and ever changing business requirements.

The success factors affect in continuation of agile software development approaches may not be the same as that of migration. It may differ from country to country or may even for among different organizations depending on its inhabited culture.

In Sri Lanka, some IT organizations yet manage software development projects with traditional approaches like Waterfall method. Hopefully those organizations will adopt Agile software development practices in future.

This study consist of a pilot survey which interviews project managers from different IT organizations followed by a questionnaire prepared from the knowledge acquired by both the literature review and the pilot survey to software professionals. The data from the quantitative survey will then analyze with statistical methods to find out the critical success factors.

The critical success factors which are going to find in this research would help for the organizations migrating to Agile methodologies to apply the changes in efficient and effective manner.

Key words: Agile, Migration, Software development, Project Management

ACKNOWLEDGEMENTS

I would like to take this opportunity to express my utmost gratitude to all those who helped me in countless ways to make my research a success.

The guidance and unwavering support of my supervisor, Dr. Chandana Gamage, was a big contribution towards the advancement of the research work. Despite of his very busy and tight schedule, I was guided immensely throughout my research project.

I thank Mrs. Vishaka Nanayakkara and Mrs. Shiroshika Kulathilake for conducting the course which inhabited research skills and for providing advices by analyzing the project proposal and also other lecturers who commented and gave feedback during the progress review presentations. The diversified knowledge imparted to me with great skills and concern by all my lecturers helped me in successfully completing the research.

A special word of thanks goes out to ShipXpress, where I work at present for the support and flexibility given to me. My warm thanks go to all IT professionals who obliged to provide information and share their knowledge for the semi-structured interviews by taking the time off from their tight schedules and all others who participated in the electronic survey.

Finally, I thank my wife Asha, for taking all the responsibilities with the kids for me when I most needed and the help and support given throughout the MBA program and especially for the given love and care at all times. I gratefully remember the protection and love of my mother. Last but certainly not least, I thank Chandana Perera, Chamal, Omindu, Nishan, Anuradha, Iromie, Kenneth, Amitha and all my other friends, family and colleagues whom I do not have the capacity to individually name here.

TABLE OF CONTENTS

DECLARATION.....	ii
ABSTRACT.....	iii
ACKNOWLEDGEMENTS.....	iv
LIST OF TABLES.....	vii
LIST OF FIGURES.....	ix
LIST OF ABBREVIATIONS.....	x
TERMS AND DEFINITIONS.....	xi
1 INTRODUCTION.....	1
1.1 Research Background.....	1
1.2 Motivation.....	1
1.3 Research Scope.....	1
1.4 Problem Statement.....	2
1.5 Research Objectives.....	2
1.6 Research Significance.....	3
1.7 Thesis Structure.....	3
2 LITERATURE REVIEW.....	5
2.1 Introduction.....	5
2.2. The Agile Practices.....	5
2.2.1 Introduction.....	5
2.2.2 Background and history of Agile.....	8
2.2.3 Agile methodologies.....	10
2.3 Process Evolution in Organizations.....	12
2.3.1 Introduction.....	12
2.3.2 Models for technology migrations.....	14
2.3.3 Factors affecting continuation and migration.....	18
2.3.4 Management challenges.....	22
2.4 Summary.....	25
3 RESEARCH METHODOLOGY.....	30
3.1 Introduction.....	30
3.2 Research Problem.....	30
3.3 Conceptual Framework (Research Design).....	30
3.4 Hypotheses.....	32
3.5 Questions for the Survey.....	36
3.6 Data Collection.....	39
3.6.1 Population, sample and sample selection.....	39
3.6.2 Process and methods of data collection.....	39
4 DATA ANALYSIS.....	41
4.1 Introduction.....	41
4.2 Reliability Analysis.....	41
4.2.1 Change management.....	41
4.2.2 Management competency.....	42
4.2.3 Organizational structure.....	42
4.2.4 Project planning & management.....	43
4.2.5 IT infrastructure.....	44

4.2.6 Success of Agile migration.....	44
4.3 Descriptive Analysis.....	44
4.3.1 Gender.....	45
4.3.2 Industry experience.....	46
4.3.3 Job role.....	46
4.3.4 Education level.....	47
4.3.5 Size of the organization.....	48
4.4 Inferential Analysis	49
4.4.1 Correlations.....	49
4.4.2 Hypothesis testing.....	54
4.4.2.1 Testing hypothesis 1.....	56
4.4.2.2 Testing hypothesis 2.....	57
4.4.2.3 Testing hypothesis 3.....	58
4.4.2.4 Testing hypothesis 4.....	59
4.4.2.5 Testing hypothesis 5.....	60
4.4.2.6 Testing hypothesis 6.....	61
4.4.2.7 Testing hypothesis 7.....	62
4.4.2.8 Testing hypothesis 8.....	63
4.4.2.9 Testing hypothesis 9.....	64
4.4.2.10 Testing hypothesis 10.....	65
4.4.2.11 Testing hypothesis 11.....	66
4.4.2.12 Testing hypothesis 12.....	67
4.4.2.13 Testing hypothesis 13.....	68
4.4.2.14 Testing hypothesis 14.....	69
4.4.2.15 Testing hypothesis 15.....	70
4.4.2.16 Testing hypothesis 16.....	71
4.4.2.17 Testing hypothesis 17.....	72
4.5 Summary of Hypothesis Test Results	73
5 RECOMMENDATIONS AND CONCLUSION.....	75
5.1 Introduction.....	75
5.2 Discussion.....	75
5.3 Recommendations.....	76
5.4 Research Limitations.....	76
5.5 Future work.....	78
5.6 Conclusion.....	78
REFERENCES.....	80
APPENDIX.....	86
Appendix A – Questionnaire	86
Appendix B – Semi-structured interview questions for top management.....	95

LIST OF TABLES

Table 2-1: Summary overview of the various approaches: applicability at different enterprise scales and intensity of focus.....	13
Table 2-2: Chronological evolution of software process models.....	14
Table 2-3: Guidelines for selecting tools/techniques for business process re-engineering	17
Table 2-4: Software product success factors according to software practitioners	19
Table 2-5: Methodology comparison.....	26
Table 2-6: Factors affecting agile migration and continuation.....	26
Table 3-1: Questions for the Survey.....	36
Table 3-2: Questions for measuring migration success.....	39
Table 4-1: Reliability statistics of Change Management.....	41
Table 4-2: Reliability statistics of Management Competency.....	42
Table 4-3: Reliability statistics of Organizational Structure.....	42
Table 4-4: Reliability statistics of different question combinations.....	43
Table 4-5: Reliability statistics of Project Planning & Management.....	43
Table 4-6: Reliability statistics of IT Infrastructure.....	44
Table 4-7: Reliability statistics of Success of Agile Migration.....	44
Table 4-8: Correlations among Change Management related factors.....	50
Table 4-9: Correlations among Management Competency related factors.....	51
Table 4-10: Correlations among Organizational Structure related factors.....	52
Table 4-11: Correlations among Project Planning & Management related factors.....	53
Table 4-12: Correlations among IT Infrastructure related factors.....	54
Table 4-13: Model Summary.....	54
Table 4-14: Software Project Success – Analysis of Variance.....	55
Table 4-15: Correlations results of Revising Reward & Motivation Systems.....	57
Table 4-16: Correlations results of Effective Communication.....	58
Table 4-17: Correlations results of Empowerment.....	59
Table 4-18: Correlations results of Human Involvement.....	60
Table 4-19: Correlations results of Training and education.....	61
Table 4-20: Correlations results of Creating an effective culture.....	62
Table 4-21: Correlations results of Committed and strong leadership.....	63
Table 4-22: Correlations results of Championship & sponsorship.....	64
Table 4-23: Correlations results of Management of risk.....	65
Table 4-24: Correlations results of Adequate job integration approach.....	66

Table 4-25: Correlations results of Appropriate job definitions & allocation of responsibilities.....	67
Table 4-26: Correlations results of Nature of organization.....	68
Table 4-27: Correlations results of Team environment.....	69
Table 4-28: Correlations results of Effective planning & use of management techniques	70
Table 4-29: Correlations results of Effective process redesign.....	71
Table 4-30: Correlations results of Adequate IT investment & sourcing.....	72
Table 4-31: Correlations results of Effective use of software tools.....	73
Table 4-32: Summary of hypothesis test results.....	73
Table 5-1: Demographic statistics related to over representation.....	77

LIST OF FIGURES

Figure 2-1: Agile Software Development Methodology.....	6
Figure 2-2: The four views of the agile methods.....	7
Figure 2-3: An initial representation of the three-dimensional effect on process modeling evolution.....	14
Figure 2-4: Overview of Instructional Technology Diffusion Theories showing diffusion goal and philosophical view.....	15
Figure 2-5: ROI Metrics.....	18
Figure 2-6: Factors affecting software development team performance.....	21
Figure 2-7: Success attributes.....	23
Figure 3-1: Conceptual Framework.....	31
Figure 4-1: Frequency analysis for Gender.....	45
Figure 4-2: Frequency analysis for Experience.....	46
Figure 4-3: Frequency analysis for Job Designation.....	47
Figure 4-4: Frequency analysis for Education Qualification.....	48
Figure 4-5: Frequency analysis for Number of Employees.....	49

LIST OF ABBREVIATIONS

Abbreviation	Description
ASD	- Agile Software Development
AUP	- Agile Unified Process
BPO	- Business Process Outsourcing
BPR	- Business Process Re-engineering
DSDM	- Dynamic Systems Development Method
FDD	- Feature-Driven Development
HR	- Human Resource
IS	- Information System
IT	- Information Technology
ITES	- IT enabled Services
RUP	- Rational Unified Process
RAD	- Rapid Application Development
SDLC	- Software Development Life Cycle
SLASSCOM	Sri Lanka Association for Software and Service Companies
XP	- Extreme Programming

TERMS AND DEFINITIONS

Term	Definition
Migration	The transition from one process or methodology being practiced to another process or methodology is considered as “migration” in this study. That is, bringing a new way of doing something in to action effectively. Therefore, the migration only covers the initial stage or the first phase which related to the acquisition of a new process during an adoption.
Adoption	The choice to acquiring and using a new process or methodology is considered as “adoption” in this study. It means, the adoption covers not only the acquisition but also its continuous integration to keep it going forward.