AN INVESTIGATION OF THE CRITICAL SUCCESS FACTORS FOR ADOPTING AGILE PROJECT MANAGEMENT APPROACH IN IT FIRMS IN SRI LANKA

Thanthri Waththage Kanishka Karunasena

(138413K)

Dissertation submitted in partial fulfillment of the requirements for the Degree of Master of Science in Project Management

Department of Building Economics

University of Moratuwa

Sri Lanka

May 2017

DECLARATION OF THE CANDIDATE AND SUPERVISOR

"I declare that this is my own work and this dissertation does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text".

Also, I hereby grant to University of Moratuwa the non-exclusive right to reproduce and distribute my dissertation, in whole or in part in print, electronic or other medium. I retain the right to use this content in whole or part in future works (such as articles or books)".

Signature: Date:

The above candidate has carried out research for the Masters Dissertation under my supervision.

Name of the supervisor: Ch.Qs. Indunil Senevirathne

Signature of the supervisor: Date:

ACKNOWLEDGEMENT

First, I would like to acknowledge the opportunity provided by the University of Moratuwa for undertaking a master degree in project management. I am very grateful to my supervisor, Ch.QS Mr. Indunil Senevirathne who has provided me with immeasurable support and guidance throughout my candidature. This dissertation has benefited greatly from many stimulating discussions that we have had and his insightful comments on various drafts of the dissertation. I also would like to thank all the academic and non-academic staff who supported me in many different ways throughout my candidature at the University.

Secondly, I would like to thank all the respondents of the survey, my colleagues who helped me in numerous ways in getting a sufficient number of responses for the survey, and the industry experts who helped at various stages of this research.

Finally, I would like to thank my wife, Kushanthi Harasgama, for all the assistance and encouragement that she has given me, and my daughter, Tiranya and son, Geenuka for providing me with pleasurable distractions from writing this dissertation. I would also like to thank my parents for their support. This dissertation is dedicated to my father, T.W. Karunasena, and my mother, Chintha Kumari Wijerathne, to whom I am indebted forever for everything that I have achieved.

Abstract

Many Information Technology projects worldwide fail due to failures in project management. Most commonly used traditional project management approaches such as Project in Controlled Environment 2 and Project Management Body of Knowledge are widely criticised due to their limitations in accommodating changing business environments, frequently changing customer needs, unclear project objectives, poor communication among team members, and inappropriate project planning. As a result, many Information Technology (IT) project managers nowadays attempt to adopt agile project management practices in managing Information Technology projects.

Agile project management has proven to overcome many problems associated with traditional project management approaches. Ability to better cope with changes to the project environment, increased efficiency in project communication, not requiring development of detailed project plans upfront, and ability to handle project risks effectively, for example, are seen as the merits of agile project management. Increasing adoption of agile project management approach in IT field creates a need to identify the best practices that influence the successful adoption of agile project management in IT firms.

This research, therefore, aims to investigate the critical success factors for adopting agile project management practices in the IT firms in Sri Lanka. To fulfill the aim of the research several objectives of the research are formulated. They are to, examine the difference between the agile and traditional project management approaches, identify critical factors that affect the adoption of agile project management approach worldwide, develop a theoretical framework by hypothesizing the critical factors for adopting agile project management approach, and providing recommendations for IT organizations for successfully implementing agile project management practices.

To fulfil the research objectives, based on the comprehensive review of the literature a theoretical framework is hypothesised by identifying the critical factors discussed, and by using the theories on technology adoption. The hypothesised framework is tested using the Structural Equation Modeling techniques with the use of survey data collected in Sri Lanka. The research findings reveal that organizational and cultural factors, team readiness, management readiness, relative advantage of using agile, agile project management compatible existing practices in the organization, and observability of the results of agile are the most critical factors for adopting agile project management in Sri Lanka.

Keywords: Agile Project Management, Structured Project Management, IT Projects, Structural Equation Modelling

TABLE OF CONTENTS

Declaration of the Candidate and Supervisor	i
Acknowledgement	ii
Abstract	iii
Table of Content	iv
List of Figures	vii
List of Tables	viii
List of Abbreviations	ix
Chapter 1 – Introduction	1
1.1. Research background	1
1.2. Motivation for the research	4
1.3. Research questions, aim and objectives	5
1.4. Research approach	6
1.5. Limitations of the research	8
1.6. Structure of the dissertation	8
Chapter 2 – Literature Review	10
2.1. Introduction	10
2.2. An overview of the structured project management approach	11
2.3. Limitations of the structured approach	12
2.4. Agile project management and its merits	14
2.5. A summary of related research	17
2.5.1. Critical success factors for adopting agile approach	17
2.5.2. Post adoptive usage of agile methods	24
2.6. An overview of theories of technology adoption	27
2.6.1. The theory of technology-organization-environment	27
2.6.2. The theory of diffusion of innovation	29
2.7. Limitations of agile project management research	31
2.8. Summary	31
Chapter 3 – The Theoretical Framework	33
3.1. Introduction	33
3.2. The theoretical background of the framework	33
3.3. A new theoretical framework	36

3.3.1. Agile readiness constructs 38
3.3.2. Diffusion of innovation attributes 41
3.4. A summary 47
Chapter 4 – The Research Methodology 48
4.1. Introduction 48
4.2. Selection of a suitable research methodology 49
4.3. Implementation of the quantitative research methodology 51
4.4. Summary 53
Chapter 5 - Analysis of Data 54
5.1. Introduction 54
5.2. Conducting the survey 54
5.3. Overview of the SEM 55
5.4. Preconditions for SEM 56
5.5. Analysis of demographic data 57
5.6. Reliability of the survey questionnaire 61
5.7. SEM analysis 63
5.7.1. Initial full measurement model 63
5.7.2. Model revision 65
5.7.3. Convergent validity of the factors 68
5.7.4. Defining the final measurement model 69
5.8. Summary 71
Chapter 6 – Discussion of Research Findings 72
6.1. Introduction 72
6.2. Testing hypothesis 72
6.3. Summary 77
Chapter 7 – Conclusion 78
7.1. Introduction 78
7.2. Revisiting research questions 79
7.2.1. Difference between agile and traditional approach 80
7.2.2. Critical factors 83
7.2.3. The revised framework 85
7.2.4. Recommendation 86
7.3. Future research 88

Reference List 89
Appendix I – Survey Questionnaire 96
Appendix II – K-S Test Results 104

LIST OF FIGURES

Figure 1.1. An overview of the research approach 07
Figure 2.1. An overview of Chow and Cao (2008) model 17
Figure 2.2. Jayawardena and Ekanayake's (2010) model 22
Figure 2.3. Senapathia and Srinivasan's (2012) framework 25
Figure 2.4. An overview of TOE theory 28
Figure 2.5. Attributes of diffusion of innovation 30
Figure 3.1. The theoretical background of the framework 34
Figure 3.2. Hypothesized theoretical framework 37
Figure 4.1. An overview of the quantitative research methodology 52
Figure 5.1. Gender Profile of the respondents 58
Figure 5.2. Age profile of the respondents 58
Figure 5.3. Industry profile of the respondents 59
Figure 5.4. Organizational profile of the respondents 59
Figure 5.5. Designations of the respondents 60
Figure 5.6. Educational profile of the respondents 60
Figure 5.7. Domain specific knowledge of respondents 61
Figure 5.8. Domain specific experience of respondents 61
Figure 5.9. Initial full measurement model 64
Figure 5.10. Initial one factor measurement model for OBSRVE 65
Figure 5.11. Estimated one factor measurement model for OBSRVE 66
Figure 5.12. Revised one factor measurement model for OBSRVE 66
Figure 5.13. Initial one factor measurement model for ORG_CUL 67
Figure 5.14. Revised one factor measurement model for ORG_CUL 67
Figure 5.15. Final measurement model 70
Figure 6.1. Structural model 73
Figure 7.1. A revised framework 85

LIST OF TABLES

Table 2.1. Critical factors agile project management approach 19
Table 2.2. Critical factors agile project management awareness 23
Table 2.3. Critical factors for post adoptive usage of agile methods 26
Table 3.1. Elements in the hypothesized theoretical framework 43
Table 5.1. Reliability of the survey questionnaire 62
Table 5.2. GOF statistics of initial and revised one factor models 68
Table 5.3. Convergent validity test results 69
Table 6.1. Significance of the structural paths 74
Table 6.2. Hypothesis test results 76
Table 7.1. Agile vs traditional project management 81

LIST OF ABBREVIATIONS

Abbreviation	Description
A_ADOPT	Adoption of Agile Project Management
AMOS	Analysis of Moment Structures
APM	Agile Project Management
AVE	Average variance extracted
COMPATI	Compatibility
COMPLE	Complexity
CHIN/DF	normed chi-square
CR	Critical Ratio
DOI	Diffusion of innovation theory (DOI)
ENV_RED	Environmental Readiness
GOF	Goodness of Fit
ICTs	Information and communications technologies
IT	Information Technology
K-S	Kolmogorov-Smirnov
MGT_RED	Management Readiness
ML	maximum likelihood
OBSERVE	Observability
ORG_CUL	Organizational Readiness
P-value	Probability value
PMBOK	Project Management Body of Knowledge
PMI	Project Management Institute
PRINCE2	Projects in Controlled Environment
PRO_RED	Process Readiness
REL_ADV	Relative Advantage
RMSEA	Root mean square error of approximation
SE	Standard Error
SFL	Standardized factor loading
SEM	Structural Equation Modelling
SPSS	Statistical Package for Social Sciences

TEM_RED	Team Readiness
TOE	technology-organization-environment theory
TOO_RED	Tools Readiness
UK	United Kingdom
US	United States
USA	United States of America
X2	Chi-square
X2/df	Normed chi-square