

APPLICABILITY OF EARN VALUE MANAGEMENT IN SRI LANKAN CONSTRUCTION PROJECTS

W. M. Tharanga Nimashanie

(10/8360)



University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
www.lib.mrt.ac.lk

Degree of Master of Business Administration in Project Management

Department of Civil Engineering

University of Moratuwa
Sri Lanka

February 2012

APPLICABILITY OF EARN VALUE MANAGEMENT IN SRI LANKAN CONSTRUCTION PROJECTS

Weerasinghe Mohottige Tharanga Nimashanie

(10/8360)



University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
www.lib.mrt.ac.lk

Dissertation submitted in partial fulfilment of the requirement for the degree of Master of Business Administration in Project Management.

Department of Civil Engineering

University of Moratuwa
Sri Lanka

February 2012

DECLARATION

I hereby declare that the research dissertation entitled “Applicability of Earn Value Management in Sri Lankan Construction Projects” submitted by me in partial fulfilment of the requirements for MBA is my own work. Further, it has not previously formed on the basis of any other academic qualification at any institution.


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:

W.M.T Nimashanie

10/8360

Date:

 University of Moratuwa, Sri Lanka.
The above candidate has carried out this research for the Master of Business Administration in Project Management under my supervision.

Signature of the supervisor:

Prof. A. A. D. A. J. Perera

Department of Civil Engineering

University of Moratuwa

Date

Abstract

Earn Value Management is a globally accepted and well established integrated planning and control methodology that combines the measurement of cost, schedule and technical performance. It enables early detection of performance issues and allows corrective actions to be implemented in a timely manner.

The objective of this study is to establish the possibility of introducing Earn Value Management as an ICTAD Condition of Contract for Major Contracts for the performance reporting and evaluation.

In literature review derived the several important benefits of the EVM as an effective performance measuring technique, the problems in implementing and commonly used practice standards in the globe. The construction industry was an early private industry adopter of EVM. EVM is commonly used in United States of America, United Kingdom, Australia and other European and Asian countries to evaluate construction projects. EVM is a flexible and universally applicable project management technique. However, in Sri Lankan construction industry there is a need of a globally established performance monitoring technique for the development of the industry and better performance. Under these circumstances, it is important to find out the feasibility of introducing EVM as an ICTAD condition for the construction industry.

The effectiveness of the ICTAD document to the industry is high. The level of acceptance is significant; the responses show that 64% of respondents accept the Time Schedule as an effective tool and 37.3% submit it on-time for all projects to fulfil the ICTAD requirement. However, Sri Lankan construction industry doesn't have a proper understanding and knowledge about the use of Time Schedule and its limitations. The lack of knowledge about the technique hinders the getting appropriate use of the technique. However, respondents believe effective performance measuring technique should not have these limitations.

The result of this study confirms the possibility of introducing the EVM in Sri Lankan construction industry for performance reporting and evaluation. Further, results highlight that the importance and necessity of Earn Value Management to enhance the efficiency and effectiveness of Sri Lankan construction industry. The majority of respondents believe the most important aspect of the EVM is, it helps projects to be completed within time and cost constraints compared to other benefits. The survey results illustrate that more than 80% of respondents believe Sri Lankan construction industry need EVM concept for effective and accurate performance management. The cost performance management is the primary concern of the Industry. The Industry's perception on the possibility of EVM implementation is satisfactory.

ACKNOWLEDGMENT

This dissertation is an outcome of a constant effort of a research for nearly six months. During this period I was fortunate to receive assistance, guidance, ideas and encouragement from many who helped me to make this academic venture a success.

First and foremost, I would like to express my appreciation and sincere gratitude to my supervisor Prof. Asoka Perera, Senior Lecturer of Department of Civil Engineering, University of Moratuwa for the encouragement, guidance and support throughout the research with great enthusiasm.

My deepest gratitude goes to Dr. Rangika Halwatura and Dr. Lesley Ekenayake of Department of Civil Engineering, University of Moratuwa for providing me valuable guidance during the period of the research.

I would like to thank the staff of the Civil Engineering Department and the library staff of the University of Moratuwa for their excellent support extended to me.



I wish to convey my highest appreciation and gratitude towards the organizations and professionals who contributed to the survey by sacrificing their precious time and energy. I place my grateful gratitude for all my MBA batchmates, friends and many other who whole heartedly supported in my research works.

I further extend my gratefulness to the staff of Regional Support Centre (W-S), National Water Supply and Drainage Board, my employers during the research for providing me the support to carry out the research.

Last, but definitely not least, My heartfelt gratitude go out to my husband, my parents and parents-in law for their endless patience, support and encouragement given throughout the years for the completion of the MBA and the research.

TABLE OF CONTENTS

	Page
DECLARATION	II
ABSTRACT	III
ACKNOWLEDGMENT	IV
TABLE OF CONTENT	V-VI
LIST OF FIGURES	VII
LIST OF TABLES	VIII
LIST OF ABBREVIATIONS	IX-X
LIST OF APPENDICES	XI
1 INTRODUCTION	1-4
1.1 Background	1
1.2 Problem Statement	1-2
1.3 Scope and Objectives	2
1.4 Methodology	2-3
1.5 Major Findings	3-4
1.6 Arrangement of the Report	4
2 LITERATURE REVIEW	5-23
2.1 History of Earn Value Method	5-6
2.2 Earn Value Method	6-10
2.3 Earn Value Method as a performance measure	10-12
2.4 Problems in Implementing EVM	12-14
2.5 Limitations of Earn Value Analysis	14
2.6 Influence of Characteristics of Construction Projects on EVM	14-17
2.7 Standard Practices of Earn Value Management and Comparison of Different Standards	17-20
2.8 Existing Provisions in ICTAD Guidelines for Performance Measurement	21-22
2.9 Summary	22-23
3 RESEARCH METHODOLOGY	24-30
3.1 Literature Review	24

3.2	Questionnaire Survey	24
3.3	Framework of Study	24-26
3.4	Sample Selection and Sample Size	27
3.5	Method of Data Collection and Analysis	27
3.6	Operationalization of Variables	28-29
3.7	Limitations to the study	30
3.8	Summary	30
4.	ANALYSIS AND DISCUSSION OF RESULTS	31-61
4.1	Introduction	31
4.2	Reliability of Data	31-33
4.3	Understanding the effectiveness of current ICTAD condition on performance measuring (Time Schedule) to the industry.	33-37
4.4	Investigation of Industry's perspective on existing practice (Time Schedule)	37-43
4.5	Understanding how well Time Schedule is established within the industry as an ICTAD Condition	43-46
4.6	Industry's awareness on Earn Value Method	46-48
4.7	The necessity of EVM to Sri Lankan construction industry	48-55
4.8	Understanding the possibility of implementing EVM	55-61
5	CONCLUSION AND RECOMMENDATION	62-64
5.1	Conclusion	62-63
5.2	Recommendation	64
5.3	Further Research	64
6	REFERANCES	65-66
APPENDICES		
	Annex 1 – Questionnaire for the research	66-73

LIST OF FIGURES

	Page
Figure 1: Basics of Earn Value Management	7
Figure 2: Transforming data into EVM parameters	9
Figure 3: EVM and Project Management	10
Figure 4: Composition of Respondents of the study	31
Figure 5: Reason for usage of Time Schedule	34
Figure 6: Frequency of on-time submission of Time Schedule	34
Figure 7: Reason for not submitting Time Schedule on time	35
Figure 8: Reason for update of original Time Schedule	36
Figure 9: Frequency of review the Time Schedule	36
Figure 10: Frequency of usage of ICTAD document	43
Figure 11: Frequency of usage of Time Schedule	44
Figure 12: Human Resources use to develop the Time Schedule	46
Figure 13: Software use to develop the Time Schedule	46
Figure 14: Industry's awareness on EVM and related concepts	48
Figure 15: Box Plot for Need of EVM	55
Figure 16: Best path to introduce a new practice to Sri Lankan construction industry	56
Figure 17: Time requirement to change to a new practice in performance measuring	56

LIST OF TABLES

	Page
Table 1: Comparison of EVM Standards	18-20
Table 2: Operationalization of variables	28-29
Table 3: Data Validation for Question no. 4 and Question no. 12 c.	32
Table 4: Data Validation for Question no. 12 f and Question no. 14.	33
Table 5: Questions to investigate the industry's awareness on limitations of the existing practice (Time Schedule)	37-39
Table 6: Descriptive statics to investigate the industry's awareness on limitations of the existing practice (Time Schedule)	39
Table 7: Questions to investigate the industry's perspective on importance of limitations of the Time Schedule	41-42
Table 8: Descriptive statics to investigate the industry's perspective on importance of limitations of the existing practice (Time Schedule)	42
Table 9: Questions to investigate the importance of usage of the Time Schedule	44-45
Table 10: Descriptive statics to investigate the importance of usage of Time Schedule	45
Table 11: Frequency table for the questions testing the Industry's awareness on EVM	47
Table 12: Questions to investigate the necessity of EVM to Sri Lankan construction industry	49-53
Table 13: Frequency table for the questions testing the necessity of EVM to the Sri Lankan construction industry	53-54
Table 14: Descriptive statics to investigate the necessity of EVM to Sri Lankan construction industry	54
Table 15: Questions to investigate the possibility of introducing EVM as ICTAD condition	57-58
Table 16: Descriptive statics to investigate the possibility of introducing EVM as an ICTAD condition	59
Table 17: Frequency table for the questions testing the necessity of EVM to the Sri Lankan construction industry	59

LIST OF ABBREVIATIONS

Abbreviation	Description
AC	Actual Cost
ANSI	American National Standards Institute
AS	Australian Standard
BAC	Budget Cost at Completion
CPI	Cost performance Index
C/SCSC	Cost/Schedule Cost Systems Criteria
CV	Cost Variance
ECC	Estimated Cost to Completion
ETC	Estimate to Complete
EV	Earned Value
EVA	Earn Value Analysis
EVM	Earn Value Management
EVPM	Earn Value Project Management
FCC	Forecast of Project Completion Cost
ICTAD	Institute for Construction Training and Development
MS	Micro Soft
NASA	National Aeronautics and Space Administration
PC	Percentage Completed
PERT	Program Evaluation and Review Technique
PMBOK	Project Management Body of Knowledge
PMI	Project Management Institute
PV	Planned Value
SBD	Standard Bidding Document
SOW	Statements of Work
SPI	Schedule Performance Index
SV	Schedule Variance

UK
US
USA
WBS

United Kingdom
United States
United States of America
Work Breakdown Structure



University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
www.lib.mrt.ac.lk

LIST OF APPENDICES

Appendix	Description	Page
Appendix 1	Questionnaire for the research	65-72



University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
www.lib.mrt.ac.lk