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MASSEY UNIVERSITY

Application of Theory of Constraints concepts and Lean tools as an innovative approach to the Timor-Leste public procurement process

A thesis presented in partial fulfillment of the requirements for the degree of:

Master of Logistics and Supply Chain Management

at Massey University, Manawatu

New Zealand

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2012

ABSTRACT

At a time when public resources are very limited and while demand for better services is continuously increasing, the public procurement function can have clear benefits from 'doing more with less'. This thesis has sought to explore the mechanisms and practices that inhibit the ability of the Timor-Leste procurement (TLS-P) services to make better use of available resources. It also sought to investigate the viability of usage of the Theory of Constraints concepts and Lean tools (TOC-L) towards ongoing improvement processes within such a system.

The Theory of Constraints (TOC) concepts and Lean tools have been developed and intensively used within profit organisations: especially in production and distribution systems, in addition to service industries, such as health care services. Although applications of the Theory of Constraints concepts and Lean have been successful within the service sector, the literature is predominantly reporting cases where the concepts were applied separately, rather than as an integrated concept and the researcher has not identified any literature that discusses the application of both concepts within a public procurement process.

This study demonstrates that TOC-L can provide TLS-P services with a systematic framework for identifying problems that limit their ability to maximise budget execution effectiveness. The TOC analysis shows several policies and practices exist within the TLS-P which, whilst seeming to be intuitively logical and efficient for each agency, actually tend to focus these agencies on sub-optimal local performance. This approach means that the system's agencies do not have a clear agreement to coordinate and synchronise their activities, measurements and schedules —and therefore, budget execution effectiveness suffers in this situation. The results of the analysis suggest that all agencies must realign their local performance focus to one of a system-wide performance, in order to achieve desired benefits.

In order to facilitate this realignment, the researcher proposes a modification of the drum-buffer-rope methods for goods and services into a hybrid model, which can work for the TLS-P dynamic environment. This 'Dynamic-DBR'

(DBR_D) model provides the system with the ability to adjust capacity resources to meet service levels and due dates. The aim of this DBR_D is to fill the gap in the literature of reported adaptations of drum-buffer-rope methods, in order to suit the synchronisation of scheduling within public procurement processes.

The study also develops recommendations for the improvement of this approach, which is intended to facilitate future research.

ACKNOWLEDGMENTS

The endeavour of completing this thesis has been a challenge and without the support and help of others it would never have eventuated. Therefore, I have had the pleasure and honour to be surrounded by brilliant people, who have supported me along the way to finalising this thesis, especially Mr. Alan Wright (1st supervisor) and Dr. Norman Marr (2nd supervisor), who have both provided a great impact on my work.

Mr. Wright taught me how to use the TOC and Lean for supply chain optimisation and for ongoing improvement of processes within production and distribution systems. He stimulated my thinking and interest on how both concepts could be applied to the public sector — and especially to improve the TLS-P process. His ability to provide scientific freedom and encouragement to find my own way, together with his offered guidance and feedback has added considerable value to the quality of this writing. Dr. Norman Marr deserves special recognition for his role in showing me how to use research methods in supply chain management, in addition to providing valuable feedback on both the structure and quality of the writing in this thesis and their valued contribution has raised the level of this thesis.

I also would like to express my gratitude to the National Procurement Commission (NPC) and the National Development Agency (ADN) of Timor-Leste. Special thanks must go to the heads of both agencies: H.E. Mr. Xanana Gusmao, the Prime Minister of Timor-Leste, Mr. Aniceto (NPC commissioner), Mr. Hermingardo (NPC Commissioner) and Mr. Samuel (Director of ADN), who have all provided me with valuable data during my fieldwork at their offices. I also would like to express my thanks to New Zealand Aid for funding this research and especially to the staff at the International Support Office, Massey University (ISO).

Finally, I thank my beloved wife Diva and my daughter Divania for being here in New Zealand to support and encourage me during this difficult and sometimes frustrating time.

Table of Contents

CHAPTER 1 – INTRODUCTION	1
1.1. Introduction.....	1
1.2. Background of the Case Study.....	1
1.3. Research Objective	2
1.4. Scope and Limitation of Research.....	3
1.5. Significance of the Research.....	3
1.6. Theoretical Framework.....	3
1.7. Thesis Outline	4
CHAPTER 2: LITERATURE REVIEW.....	7
2.1. Introduction.....	7
2.1.1. Public Procurement.....	7
2.2. Timor-Leste Procurement Process.....	8
2.3. Application of TOC and Lean in the Public Sector.....	13
2.4. Theory of Constraints (TOC)	13
2.4.1. TOC Five Steps (TOC-FS).....	14
2.4.2. TOC Thinking Process (TOC-TP)	18
2.4.3. TOC Drum-Buffer-Rope (TOC-DBR)	29
2.4.4. TOC Performance Measurement.....	36
2.5. Lean Tools.....	37
2.5.1. The Five-S (Sort, Straighten, Shine, Standardize, Sustain)	38
2.5.2. Value Stream Map (VSM)	39
2.5.3. Just in Time: Pull Production	42
2.5.4. Continuous Flow Processing	44
2.5.5. Prevention of Quality Defects and Equipment Breakdown.....	45
2.5.6. Continuous Improvement.....	45
2.5.7. Worker Involvement (Team Work)	45
2.5.8. Standardised Work	46
2.6. Compatibility between Lean and TOC-DBR Approach.....	46
2.6.1. Step One: Identify the Constraints	48
2.6.2. Step Two: Exploit the Constraints	48
2.6.3. Step Three: Sub-ordinate Everything Else to the Above Decision	49
2.6.4. Step Four: Elevating the Constraints	51
2.6.5. Step Five: If the constraint has been broken - repeat Step One, but do not allow inertia to become a systems constraint	52
2.7. Potential Contradictions between Lean and TOC-DBR.....	52
2.8. Conclusion.....	54
CHAPTER 3: RESEARCH METHODOLOGY AND DESIGN	57
3.1. Introduction.....	57
3.2. Qualitative versus Quantitative Research.....	57
3.2.1. Develop an initial understanding of an issue or problem.....	57

3.2.2. Understand the process and dynamic nature of reality	58
3.2.4. Improve findings from quantitative study.....	58
3.2.5. Flexible procedures for subject selection	59
3.3. Research Methods and Design	61
3.2.1. Type of data collection	61
3.4. Data Collection Process	66
3.4.1. Staff opinion survey of UDEs	66
3.5. Data Analysis Process.....	67
CHAPTER 4: ANALYSIS AND DISCUSSION	68
4.1. Introduction.....	68
4.2. The TLS-P Process	69
4.2.1. Agencies Involved.....	69
4.2.2. Current State of Value Stream Map (CS-VSM).....	73
4.2.3. The Procurement Cycles	74
4.2.4. Planning and Budget Stage	75
4.2.5. Specification Requirements and Commitment to Funding	77
4.2.6. Tendering and Contract Establishment.....	78
4.2.7. Contract Management, Completion and Hand-over.....	82
4.2.8. Problem Identification	84
4.2.9. Conclusion	93
4.3. Applying TOC–TP	94
4.3.1. Current Reality Tree: What to change?.....	94
4.3.2 Conclusion	112
4.4. TOC-L: Towards a TLS-P System Improvement Process	113
4.4.1. Introduction	113
4.4.2. TLS-P system improvement.....	114
4.4.3. Future Reality Tree: What to change to?	117
4.4.4. Solution for TLS-P System improvement	144
4.4.5. Prerequisite Tree (PRT).....	151
4.4.6. Application of TOC-L for TLS-P system improvement	154
4.4.7. Conclusion.....	161
CHAPTER 5 - CONCLUSION AND RECOMMENDATION FOR FURTHER RESEARCH.....	163
5.1. Conclusion.....	163
5.1.1 Research Question One: “How does the system work?”	163
5.1.2. Research Question Two: “What are the constraints in the system that limit the throughput value and why?”.....	165
5.1.3. Research Question Three: “How can the system be improved?”	165
5.1.4. Research Question Four: “Can TOC-L help towards system improvement?”	167
5.2. Limitations and Recommendations for Future Research.....	168

LIST OF FIGURES

Figure 2.1 Cycle of procurement	9
Figure 2.2 A Systems as a 'Chain' Concept	14
Figure 2.3 Relationship between TP tools	19
Figure 2.4 Example of CRT	20
Figure 2.5 Evaporating Cloud (EC)	21
Figure 2.6 The relationship between CRT and EC	23
Figure 2.7 Future Reality Tree	24
Figure 2.8 The FRT injection from EC and CRT	25
Figure 2.9 Example of PRT	26
Figure 2.10 Transitions from FRT to PRT	27
Figure 2.11 Simple Illustration of PRT	28
Figure 2.12 The four element of TT	28
Figure 2.13 Transformations from PRT to TT	29
Figure 2.14 Drum-buffer-rope	30
Figure 2.15 DBR for Services	33
Figure 2.16. Buffer Sizing	34
Figure 2.17 The TOC measurement for not-for-profit organization	36
Figure 2.18 Example of current value stream map	40
Figure 2.19 Example of Future state value stream map.....	41
Figure 2.20 A simple kanban systems	42
Figure 2.21 using lean alongside with TOC-DBR	47
Figure 2.22 Cost saving result from TOC-Lean-Six Sigma (TLS) trial	54
Figure 4.1 TLS-P cycle and agency involve	74
Figure 4.2 Stage one and two of the procurement cycle	76
Figure 4.3 Stage three and four of the procurement cycle	78
Figure 4.4 Stage five and six of the procurement cycle	81
Figure 4.5 Stage seven and eight of the procurement cycle	83
Figure 4.6 Filing systems of ADN and NPC	92
Figure 4.7 TLS-P CRT Part One	98
Figure 4.8 TLS-P CRT Part Two	100
Figure 4.9 TLSP- CRT Part Three	102
Figure 4.10 TLS-P CRT Part Four	104

Figure 4.11 TLS-P CRT Part Five	106
Figure 4.12 TLS-P CRT Part Six	108
Figure 4.13 TLS-P CRT Part Seven	110
Figure 4.14 TLS-P EC systems dilemma	111
Figure 4.15 EC – a with assumptions	115
Figure 4.16a EC with list of possible injection	116
Figure 4.16b EC – with best injection	117
Figure 4.17 TLS-P FRT Part One – Injection to the Core Problems	120
Figure 4.18 TLS-P FRT Part Two	122
Figure 4.19 TLS-P FRT Part Three	124
Figure 4.20 TLS-P FRT Part Four	126
Figure 4.21 TLS-P FRT Part Five	128
Figure 4.22 TLS-P FRT Part Six	130
Figure 4.23 TLS-P FRT – Part seven	132
Figure 4.24 TLS-P FRT Part Eight	134
Figure 4.25 TLS-P FRT Part Nine	136
Figure 4.26 TLS-P FRT Part Ten	138
Figure 4.27 TLS-P FRT Part Eleven	140
Figure 4.28 TLS-P FRT Part Twelve	142
Figure 4.29 DBR _D for TLS-P systems	150
Figure 4.30 Hypothetic Gantt chart scheduling at NPC based on table 4.4	157

LIST OF TABLES

Table 4.1 example of project to be tendered and a typical time frame	79
Table 4.2 List Identifying Problems (UDEs)	93
Table 4.3 List Identifying Undesirable Effects	95
Table 4.4 Injections for TLS-P system improvement	144

LIST OF ABBREVIATIONS

ADN	Agencia Decevolvimento Nacional (National Development Agency)
BoQ	Bill of Quantity
C/O	Change Over
CAFI	Conselho Administrasaun das Fundus da Infratructure (Council of Administration for Infrastructure Funds)
CCR	Capacity Constraint Resources
CM	Capacity Management
CNE	Commisariado Nasional das Elecoens (National Election Commission)
CoM	Council of Ministry
CPV	Cashier Payment Voucher
CRD	Conflict Resolution Diagram
EC	Evaporating Cloud
CRT	Current Reality Tree
CS-VSM	Current State Value Stream Map
DBR	Drum-Buffer-Rope
DBR _s	Drum-Buffer-Rope for services
DEs	Desirable Effects
EC	Evaporating Cloud
FCFS	First Come First Serve
FRT	Future Reality Tree
FS-VSM	Future State Value Stream Map
GoTL	Government of Timor-Leste
I _a	Active Inventory
IO	Intermediate Objective
I _p	Passive Inventory
L/T	Lead Time
LMs	Line Ministries
MDGs Suco	Millennium Development Goals Sucos
MoF	Ministry of Finance
MPS	Major Project Secretariat
NPC	National Procurement Commission
NVA	Non-Value Added
OE	Operation Expenses
P/T	Processing Time
PDD	Pakote Desenvolvimento Decentralizado (Decentralization Development Package)
PO	Purchase Order
PPP	Public-Private-Partnership
PR	Purchase Requisition
PRT	Prerequisite Tree
SBD	Standard Bidding Document

SLA _Q	Service Level Agreements quality
SLAs	Service Level Agreements
SLA _T	Service Level Agreements cycle time
SLA _U	Service Level Agreements utilization
SPP	Strategic Procurement Plan
STA	Secretariado Técnico do Aprovisionamento (Procurement Technical Secretariat)
T	Throughput
TLS-P	Timor-Leste Procurement
TLS-P EC	Timor-Leste-Procurement Evaporating Cloud
TLS-P CRT	Timor-Leste-Procurement Current Reality Tree
TLS-P FRT	Timor-Leste-Procurement Future Reality Tree
TLS-P PRT	Timor-Leste-Procurement Prerequisite Tree
TOC	Theory of Constraints
TOC-FS	Theory of Constraints – Five Steps Focus
TOC-L	Theory of Constraints and Lean
TOC-TP	Theory of Constraints – Thinking Process
TP	Thinking Process
TSDP	Timor-Leste Strategic Development Plan
TT	Transition Tree
UDEs	Undesirable Effects
VSM	Value Stream Map
WIP	Work-In-Progress