PUBLIC PROCUREMENT PROCEDURES AND PROJECT IMPLEMENTATION FOR THE DIGITAL AGE: A SRI LANKAN PERSPECTIVE

Poboda Kalharani Masakorala

(179122L)

Degree of Master of Business Administration in Information Technology

Department of Computer Science & Engineering

University of Moratuwa

Sri Lanka

August 2021

PUBLIC PROCUREMENT PROCEDURES AND PROJECT IMPLEMENTATION FOR THE DIGITAL AGE: A SRI LANKAN PERSPECTIVE

Poboda Kalharani Masakorala

(179122L)

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

Department of Computer Science & Engineering

University of Moratuwa

Sri Lanka

August 2021

Declaration

"I declare that this is my own work, and this thesis/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 at this moment grant to the University of Moratuwa the non-exclusive right to reproduce and distribute my thesis/dissertation, in whole or in part in print, electronic, or another medium. I retain the right to use this content in whole or part in future works (such as articles or books).

UOM Verified Signature	
	14.08.2021
P.K.Masakorala	Date

The above candidate has carried out research for the Master's thesis under my supervision.

Dr. C. R. De Silva

Date

Abstract

Procurement of information systems is a complex process as information systems include different systems ranging from off-the-shelf products to highly specialized systems for niche sectors. The inherent challenges of the procurement of information systems combined with the complex nature of public procurement make public procurement of information systems an area that should be further researched. This study is focused on identifying recommendations to overcome challenges faced in the public procurement of information systems. A literature survey was conducted to identify stakeholders' problems in the public procurement of information systems. The remainder of this research was done using the Modified Delphi method. The first round of Delphi was done using face-to-face interviews with a selected portion of an expert panel. Questions used in face-to-face interviews were formulated using the information gathered in the literature survey. Expert opinions on the solutions to the listed problems and problems they encountered in their careers were then formulated into a closeended questionnaire. It was distributed in the second Delphi round to the full panel of experts. The outcome of the second Delphi round is a set of recommendations that can be used to overcome challenges faced in the public procurement of information systems. The recommendations are categorized under the main categories tender specifications, bidevaluation criteria, government regulations, project management, collaboration among procurers and bidders, and competence of procurers. Further, the recommendations were ranked according to their level of importance. Furthermore, it was identified that there is no significant difference of opinion between the two stakeholder groups, procurers and bidders. The findings of this research can be adopted to improve the existing public procurement procedure and project implementation of information systems. There is a high efficacy to the generated recommendations as they were generated by the consensus of an expert panel of procurers and bidders.

Keywords: Public procurement, Information systems, Delphi method

Dedication

To

My Husband, Parents & Brothers

for their unwavering support

Acknowledgement

I express my sincere gratitude to everyone who helped me complete this study on "Public procurement procedures and project implementation for the digital age: a Sri Lankan perspective".

Firstly, my special gratitude to my supervisor Dr C. R. De Silva, for his constant guidance, encouragement and support until the end of my study.

Secondly, I express my gratitude towards lecturers at the University of Moratuwa for sharing their invaluable knowledge from the outset of the MBA program.

Finally, I would like to thank the panel of experts who participated in my survey, willingly allocating time from their work schedules to fulfil the research requirements.

Table of Contents

Declaration	1	1
Abstract		ii
Dedication .		iii
Acknowled	Igement	iv
List of Figu	ıres	vii
List of Tabl	les	viii
List of Abb	previations	x
List of App	pendices	xi
1.	Introduction	1
1.1.	Background	1
1.2.	Motivation	2
1.3.	Problem Statement	3
1.4.	Research Objectives	4
1.5.	Research Significance	4
1.6.	Research Outline	4
2.	Literature Review	5
2.1.	Factors/ Type affecting the research problem	5
2.1.1.	Failure of e-governance implementation	5
2.1.2	.Improvement of ICT infrastructure to avoid failure of e-governance imple	mentation 5
2.1.3.	Influence of public procurement on the improvement of ICT infrastru	ıcture 6
2.2.	Existing case studies/ related work	8
2.2.1	Bidding Documents – Tender Specifications	8
2.2.2	Bidding Documents – Bid Evaluation Criteria	10
2.2.3	Government Regulations	11
2.2.4	Collaboration among Procurers and Bidders	12
2.2.5	Project Management	13
2.2.6	Competence of Procurers	13
2.3	Evaluation of related works/ approaches	15
2.4	Testing and analysis approaches	22
2.4.1	Delphi method	22
2.4.2	Attitude scales	23
2.4.3	Expert panel	24
2.4.4	Consensus measurement	24
2.4.5	Importance Rank	25
2.4.6	Mann-Whitney U test	25
2.5	Limitations in existing work and new challenges	25
3.	Methodology	27
3.1.	Research Methodology	27
3.2	Conceptual Framework	29

3.3	Data Collection Methods	30
3.3.1	Primary Data	30
3.3.2	Secondary Data	31
3.4	Sampling Design	31
3.4.1	Target Population	31
3.4.2	Sampling Size	32
3.5	Research Instruments	33
3.5.1	Distribution Methods	33
3.5.2	Pre survey/ Delphi Round 01	33
3.5.3	Questionnaire Design/ Delphi Round 2	34
3.6	Summary	35
4.	Data Analysis	36
4.1.	Data collection of first Delphi round	36
4.2.	Presentation of qualitative analysis	37
4.3.	Data collection of second Delphi round	48
4.4.	Descriptive analysis	49
4.4.1.	Age	49
4.4.2.	Gender	50
4.4.3.	Occupation	51
4.4.4.	Years of experience in public procurement	52
4.4.5.	Number of projects	53
4.5.Statis	tical analysis to clarify expertise of 0-5 years of experience/ projects group	54
4.6.	Statistical analysis of Delphi round 2	60
4.6.1.	Consensus Measurement	61
4.6.2.	Importance ranking	102
4.6.3.	Inter-group comparison.	105
4.7.	Summary	119
5.	Conclusion	120
5.1.	Summary	120
5.2.	Recommendations	128
5.3.	Research Limitations	129
5.4.	Future research directions	130
References.		131
Appendix A	A – Pre-survey questionnaire	135
Appendix E	S – Invitation letter to participate in Delphi survey	138
Appendix C	. – Delphi questionnaire	140

List of Figures

Figure 2.1: Aspects of public procurement of information systems	8
Figure 3.1: Research methodology	28
Figure 4.1: Age groups of Delphi panellists	49
Figure 4.2: Gender of Delphi panellists	50
Figure 4.3: Occupation of Delphi panellists	51
Figure 4.4: Years of experience in public procurement	52
Figure 4.5: Number of projects handled by Delphi panellists	
Figure 4.6: Number of projects vs years of experience	54
Figure 4.7: Responses for recommendation 01	61
Figure 4.8: Responses for recommendation 2	62
Figure 4.9: Responses for recommendation 3	
Figure 4.10: Responses for recommendation 4	
Figure 4.11: Responses for recommendation 5	65
Figure 4.12: Responses for recommendation 6	
Figure 4.13: Responses for recommendation 07	67
Figure 4.14: Responses for recommendation 08	68
Figure 4.15: Responses for recommendation 09	69
Figure 4.16: Responses for recommendation 10	
Figure 4.17: Responses for recommendation 11	71
Figure 4.18: Responses for recommendation 12	72
Figure 4.19: Responses for recommendation 13	
Figure 4.20: Responses for recommendation 14	
Figure 4.21: Responses for recommendation 15	
Figure 4.22: Responses for recommendation 16	
Figure 4.23: Responses for recommendation 17	
Figure 4.24: Responses for recommendation 18	78
Figure 4.25: Responses for recommendation 19	79
Figure 4.26: Responses for recommendation 20	80
Figure 4.27: Responses for recommendation 21	81
Figure 4.28: Responses for recommendation 22	82
Figure 4.29: Responses for recommendation 23	83
Figure 4.30: Responses for recommendation 24	84
Figure 4.31: Responses for recommendation 25	
Figure 4.32: Responses for recommendation 26	86
Figure 4.33: Responses for recommendation 27	87
Figure 4.34: Responses for recommendation 28	88
Figure 4.35: Responses for recommendation 29	89
Figure 4.36: Responses for recommendation 30	90
Figure 4.37: Responses for recommendation 31	91
Figure 4.38: Responses for recommendation 32	92
Figure 4.39: Responses for recommendation 33	93
Figure 4.40: Responses for recommendation 34	94
Figure 4.41: Responses for recommendation 35	95
Figure 4.43: Responses for recommendation 36	96
Figure 4.44: Responses for recommendation 37	
Figure 4.45: Mann-Whitney U test outcome for recommendation 2	113
Figure 4.46: Mann-Whitney U test outcome for recommendation 1	115

List of Tables

Table 2.1: Evaluation of related works/ approaches	15
Table 3.1: Questionnaire mapping table	34
Table 4.1: Participant profiles	36
Table 4.2: Presentation of qualitative analysis	38
Table 4.3: Age groups of Delphi panellists	50
Table 4.4: Gender of Delphi panellists	50
Table 4 5: Occupation of Delphi panellists	
Table 4.6: Years of experience in public procurement	52
Table 4.7: Number of projects handled by Delphi panellists	53
Table 4.8: Hypothesis test summary of Mann-Whitney U test	55
Table 4.9: Frequency response for recommendation 01	61
Table 4.10: Frequency response for recommendation 02	62
Table 4.11: Frequency response for recommendation 03	63
Table 4.12: Frequency response for recommendation 04	64
Table 4.13: Frequency response for recommendation 05	
Table 4.14: Frequency response for recommendation 06	66
Table 4.15: Frequency response for recommendation 07	67
Table 4.16: Frequency response for recommendation 08	68
Table 4.17: Frequency response for recommendation 09	69
Table 4.18: Frequency response for recommendation 10	
Table 4.19: Frequency response for recommendation 11	71
Table 4.20: Frequency response for recommendation 12	72
Table 4.21: Frequency response for recommendation 13	
Table 4.22: Frequency response for recommendation 14	74
Table 4.23: Frequency response for recommendation 15	75
Table 4.24: Frequency response for recommendation 16	76
Table 4.25: Frequency response for recommendation 17	77
Table 4.26: Frequency response for recommendation 18	
Table 4.27: Frequency response for recommendation 19	
Table 4.28: Frequency response for recommendation 20	
Table 4.29: Frequency response for recommendation 21	
Table 4.30: Frequency response for recommendation 22	
Table 4.31: Frequency response for recommendation 23	83
Table 4.32: Frequency response for recommendation 24	
Table 4.33: Frequency response for recommendation 25	
Table 4.34: Frequency response for recommendation 26	
Table 4.35: Frequency response for recommendation 27	
Table 4.36: Frequency response for recommendation 28	
Table 4.37: Frequency response for recommendation 29	
Table 4.38: Frequency response for recommendation 30	
Table 4.40: Frequency response for recommendation 32	
Table 4.41: Frequency response for recommendation 33	
Table 4.42: Frequency response for recommendation 34	
Table 4.43: Frequency response for recommendation 35	
Table 4.44: Frequency response for recommendation 36	
Table 4.45: Frequency response for recommendation 37	
Table 4.46: Summary of percentage agreement	98

Table 4.47: Importance rank of recommendations according to the mean	_ 103
Table 4.48: Inter-group comparison under General category	106
Table 4.49: Inter-group comparison under Tender specifications category	108
Table 4.51: Inter-group comparison under Government regulations category	_ 112
Table 4.52: Inter-group comparison under Collaboration among procurers and bidders category _	_ 114
Table 4.53: Inter-group comparison under Project management category	_ 116
Table 4.54: Inter-group comparison under Competence of procurers category	_ 118
Table 5.1: Summary of recommendations obtained from the Delphi survey	121
Table 5.2: List of recommendations	129

List of Abbreviations

CIO Chief Information Officer

EMAT Economically Most Advantageous Tender

ERP Enterprise Resource Planning

ICT Information & Communication Technology

IT Information Technology

IS Information Systems

List of Appendices

Appendix A – Pre-survey questionnaire	135
$Appendix \ B-In vitation \ letter \ to \ participate \ in \ Delphi \ survey$	138
Appendix C – Delphi questionnaire	140