An Investigation of the Public Value of e-Government in Sri Lanka

A thesis submitted in fulfilment of the requirements for the degree of

Doctor of Philosophy

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Declaration

I, Kanishka Karunasena, hereby declare that,

a. I am the sole author of this thesis, except where due acknowledgement has been made,

b. the work has not been submitted previously, in whole or in part, to qualify for any other academic award, and

c. the content of this thesis is the result of work which has been carried out since the official commencement date of the approved research program.

Kanishka Karunasena

01 March 2012
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# Table of Content

Declaration ................................................................................................................... i  
Acknowledgement ........................................................................................................ ii  
List of Publications ...................................................................................................... vii  
List of Abbreviations .................................................................................................. ix  
List of Tables ............................................................................................................... xii  
List of Figures ............................................................................................................. xiii  
Abstract ....................................................................................................................... xvi  

Chapter 1: Introduction ................................................................................................. 1  
1.1 Research Background ............................................................................................ 1  
1.2 Motivation of the Research ................................................................................... 5  
1.3 Research Aims and Research Questions ............................................................... 7  
1.4 Research Methodology .......................................................................................... 8  
1.5 Structure of the Thesis ........................................................................................... 9  

Chapter 2: The Literature Review .................................................................................. 13  
2.1 Introduction ............................................................................................................ 13  
2.2 An Overview of e-Government ............................................................................. 15  
2.3 Developments of e-Government in Sri Lanka ..................................................... 26  
2.4 Evaluating the Performance of e-Government .................................................... 34  
2.5 Evaluating the Public Value of e-Government ..................................................... 50  
2.6 Conclusion ............................................................................................................ 65  

Chapter 3: The Theoretical Framework ......................................................................... 67  
3.1 Introduction ............................................................................................................ 67  
3.2 The Theoretical Background ................................................................................ 68  
3.3 A Theoretical Framework ...................................................................................... 72  
3.4 Conclusion ............................................................................................................ 83
Chapter 4: Research Methodology ................................................................. 84
  4.1 Introduction.............................................................................................. 84
  4.2 Approaches to Research ......................................................................... 86
  4.3 A Convergent Parallel Mixed-methods Methodology.............................. 91
  4.4 The Research Methodology Implementation......................................... 95
     4.4.1 The Implementation of the Quantitative Strand .............................. 97
     4.4.2 The Implementation of the Qualitative Strand ......................... 105
  4.5 Research Validity.................................................................................... 108
  4.6 Conclusion.............................................................................................. 110

Chapter 5: Analysis of Quantitative Data ...................................................... 111
  5.1 Introduction.............................................................................................. 111
  5.2 An Overview of the Data Analysis Techniques ..................................... 112
  5.3 Preparing the Data for the SEM Analysis.............................................. 121
     5.3.1 Dealing with Missing Data.............................................................. 121
     5.3.2 Dealing with Outliers, Skews and Kurtosis.................................. 122
     5.3.3 Normality Test............................................................................... 124
     5.3.4 Remedies for Non-normality.......................................................... 125
     5.3.5 Reliability of the Questionnaire..................................................... 125
  5.4 An Overview of the Survey Data........................................................... 126
  5.5 The SEM Analysis.................................................................................. 130
     5.5.1 The Full Measurement Model......................................................... 130
     5.5.2 Modifications of the Full Measurement Model........................... 135
     5.5.3 Analysis of One-factor Congeneric Measurement Models .......... 136
     5.5.4 The Convergent Validity of the One-factor Models.................... 144
     5.5.5 The Discriminant Validity of the One-factor Models............... 147
     5.5.6 Factorial Validity and Higher-order Models................................. 149
     5.5.7 Discriminant Validity among Higher-order Factors.................... 153
     5.5.8 The Validity of the Final Measurement Model......................... 156
  5.6 Research Findings of the Quantitative Data Analysis............................ 159
  5.7 Conclusion.............................................................................................. 163
Chapter 6: Analysis of Qualitative Data

6.1 Introduction

6.2 An Overview of Thematic Analysis

6.3 Thematic Analysis Findings

   6.3.1 Global Theme One: Delivery of Quality Public Services

   6.3.2 Global Theme Two: Effectiveness of Public Organisations

   6.3.3 Global Theme Three: Achieving Socially Desirable Outcomes

6.4 Conclusion

Chapter 7: A New Framework

7.1 Introduction

7.2 Critical Factors

7.3 A Revised Framework

7.4 Recommendations

7.5 Conclusion

Chapter 8: Conclusion

8.1 Introduction

8.2 Research Findings

8.3 Contributions of the Research

8.4 Limitations and Future Research

References

Appendices

A The English Version of the Questionnaire

B The Sinhala Version of the Questionnaire

C The English Version of the Interview Questions

D The Sinhala Version of the Interview Questions

E The Invitation to Participate in the Research

F The Kolmogorov-Smirnov Test Results

G The Reliability of the Questionnaire

H The Re-specified One-factor Measurement Models

I Formulas for AVE and Coefficient H Calculation

J The Discriminant Validity Tests Results of the First-order Factors

K The Higher-order Measurement Models
# List of Publications


List of Abbreviations

ADF : Asymptotically distribution free
AGFI : Adjusted goodness of fit index
AMOS : Analysis of Moment Structures
ASO : Achievement of socially desirable outcomes
CD : Compact disk
CFA : Confirmatory factor analysis
CR : Critical ratio
CFI : Comparative fit index
CIO : Chief innovative officer
CM : Constrained model
CO₂ : Carbon Dioxide
CR : Critical ratio
G2B : Government-to-business
DCS-SL : Department of Census and Statistics of Sri Lanka
Df : degree of freedom
DPS : Delivery of quality public services
EPO : Effectiveness of public organisations
ENVIR : Environmental sustainability
EQUIT : Equity
FAQs : Frequently asked questions
G2G : Government-to-government
GFI : Goodness-of-fit index
GLS : Generalized least square
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tr>
<td>GOF</td>
<td>Goodness-of-fit</td>
</tr>
<tr>
<td>G2C</td>
<td>Government-to-citizens</td>
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<td>G2CS</td>
<td>Government-to-civil society</td>
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<td>IBM</td>
<td>International Business Machines</td>
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<td>ICT</td>
<td>Information and communication technology</td>
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<td>ICTA</td>
<td>Information and Communication Technology Agency of Sri Lanka</td>
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<td>IRR</td>
<td>Internal return rate</td>
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<td>K-S</td>
<td>Kolmogorov-Smirnov</td>
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<td>LGN</td>
<td>Lanka Government Network</td>
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<td>MBA</td>
<td>Master of Business Administration</td>
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<td>MI</td>
<td>Modification indices</td>
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<td>ML</td>
<td>Maximum likelihood</td>
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<td>NFI</td>
<td>Normed fit index</td>
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<td>NPV</td>
<td>Net present value</td>
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<td>NRI</td>
<td>Network readiness index</td>
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<td>OPENN</td>
<td>Organisational openness</td>
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<td>ORGCEF</td>
<td>Organisational efficiency</td>
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<td>P</td>
<td>Probability value</td>
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<td>PARTI</td>
<td>Participatory democracy</td>
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<tr>
<td>PASW</td>
<td>Predictive Analytic Software</td>
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<td>PNFI</td>
<td>Parsimony normed fit index</td>
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<td>PUBVAL</td>
<td>Public value</td>
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<td>QUAL</td>
<td>Qualitative</td>
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<td>QUAN</td>
<td>Quantitative</td>
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<td>QUALI</td>
<td>Quality of information</td>
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<td>RESPO</td>
<td>Organisational responsiveness</td>
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<td>Abbreviation</td>
<td>Description</td>
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<td>RFI</td>
<td>Relative fit index</td>
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<td>RMSEA</td>
<td>Root mean square error of approximation</td>
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<td>RTN</td>
<td>Rural telecommunication network</td>
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<td>SE</td>
<td>Standard error</td>
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<td>SELFED</td>
<td>Self-development</td>
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<td>SEM</td>
<td>Structural equation modelling</td>
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<td>SERVI</td>
<td>Functionalities of e-services</td>
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<td>SFL</td>
<td>Standardised factor loadings</td>
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<td>SLS</td>
<td>Sri Lanka Standards</td>
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<td>SLS</td>
<td>Scale free least square</td>
</tr>
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<td>SR</td>
<td>Standardised residuals</td>
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<td>SRMR</td>
<td>Standardised root mean residual</td>
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<td>SRW</td>
<td>Standardised regression weights</td>
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<td>TLI</td>
<td>Tucker-Lewis index</td>
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<td>TRUST</td>
<td>Trust</td>
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<td>ULS</td>
<td>Un-weighted least square</td>
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<td>UN</td>
<td>Un constrained model</td>
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<td>URW</td>
<td>Un-standardized regression weight</td>
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<td>USAID</td>
<td>United States Agency for International Development</td>
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<td>USERO</td>
<td>User-orientation</td>
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<tr>
<td>URL</td>
<td>Uniform resource locator</td>
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<tr>
<td>WLS</td>
<td>Weighted least square</td>
</tr>
<tr>
<td>W3C</td>
<td>World Wide Web Consortium</td>
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<tr>
<td>$X^2$</td>
<td>Chi-square</td>
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<tr>
<td>$X^2/df$</td>
<td>Normed chi-square or the ratio of $X^2$ to degree of freedom</td>
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<tr>
<td>$\Delta X^2$</td>
<td>Chi-square difference</td>
</tr>
</tbody>
</table>
List of Tables

Table 2.1  Challenges for developing countries in implementing e-government...25
Table 2.2  Strengths and limitations of public value evaluation frameworks......63
Table 3.1  A summary of the theoretical background of the research.................71
Table 3.2  A summary of the elements in the theoretical framework.................79
Table 3.3  An overview of the hypotheses......................................................82
Table 4.1  The subpopulation stratified from the population.........................103
Table 5.1  The recommended GOF values.....................................................118
Table 5.2  A summary of the indicators in the full measurement model..........134
Table 5.3  The standardised factor loadings for the QUALI............................140
Table 5.4  The standardised residuals among indicator variables....................140
Table 5.5  The GOF results of initial and re-specified measurement models.....143
Table 5.6  The convergent validity results of re-specified one factor models.....146
Table 5.7  The chi-square difference test results among higher-order factors....155
Table 5.8  The GOF of higher-order correlated measurement models.............156
Table 5.9  A comparison of GOF of initial and final measurement models......157
Table 5.10 The hypotheses test results.......................................................161
Table 7.1  The critical factors identified from QUALI and QUAN studies.......209
Table 7.2  A summary of the indicators in the framework.............................216
Table F.1  The Kolmogorov-Smirnov test results.........................................281
Table G.1  The reliability of the questionnaire.............................................282
Table J.1  The discriminant validity test results of the first-order factors....288
# List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1.1</td>
<td>The research methodology</td>
<td>09</td>
</tr>
<tr>
<td>Figure 2.1</td>
<td>An overview of e-government</td>
<td>19</td>
</tr>
<tr>
<td>Figure 2.2</td>
<td>An overview of e-government development in Sri Lanka</td>
<td>28</td>
</tr>
<tr>
<td>Figure 2.3</td>
<td>An evolution of e-government evaluation</td>
<td>35</td>
</tr>
<tr>
<td>Figure 2.4</td>
<td>Sources of public value creation</td>
<td>51</td>
</tr>
<tr>
<td>Figure 2.5</td>
<td>The framework of Kearns (2004)</td>
<td>55</td>
</tr>
<tr>
<td>Figure 2.6</td>
<td>The framework of Golubeva (2004)</td>
<td>55</td>
</tr>
<tr>
<td>Figure 2.7</td>
<td>The framework of Karunasena et al. (2011)</td>
<td>57</td>
</tr>
<tr>
<td>Figure 2.8</td>
<td>The framework of European Commission (2006)</td>
<td>58</td>
</tr>
<tr>
<td>Figure 3.1</td>
<td>The theoretical background of the framework</td>
<td>68</td>
</tr>
<tr>
<td>Figure 3.2</td>
<td>The framework for evaluating public value of e-government</td>
<td>73</td>
</tr>
<tr>
<td>Figure 4.1</td>
<td>An overview of the three mixed-methods methodologies</td>
<td>92</td>
</tr>
<tr>
<td>Figure 4.2</td>
<td>An overview of the research methodology implementation</td>
<td>96</td>
</tr>
<tr>
<td>Figure 4.3</td>
<td>Purposive-mixed-probability sampling continuum</td>
<td>101</td>
</tr>
<tr>
<td>Figure 5.1</td>
<td>The SEM analysis flowchart</td>
<td>120</td>
</tr>
<tr>
<td>Figure 5.2</td>
<td>The geographical distribution of the respondents</td>
<td>127</td>
</tr>
<tr>
<td>Figure 5.3</td>
<td>The age profile of the respondents</td>
<td>128</td>
</tr>
<tr>
<td>Figure 5.4</td>
<td>The educational profile of the respondents</td>
<td>128</td>
</tr>
<tr>
<td>Figure 5.5</td>
<td>The employment profile of the respondents</td>
<td>129</td>
</tr>
<tr>
<td>Figure 5.6</td>
<td>The full measurement model</td>
<td>133</td>
</tr>
<tr>
<td>Figure 5.7</td>
<td>The estimated initial congeneric measurement model for QUALI</td>
<td>137</td>
</tr>
<tr>
<td>Figure 5.8</td>
<td>The re-specified congeneric measurement model of QUALI</td>
<td>141</td>
</tr>
<tr>
<td>Figure 5.9</td>
<td>The UNM for discriminant validity among QAULI and SERVI</td>
<td>148</td>
</tr>
</tbody>
</table>
Figure 5.10  The CM for discriminant validity between QAULI and SERVI1…. 148
Figure 5.11  The higher-order factor measurement model for DPS………………... 150
Figure 5.12  The estimated higher-order measurement model for DPS………… 151
Figure 5.13  The unconstrained higher-order model……………………………. 152
Figure 5.14  The final measurement model…………………………………………. 158
Figure 5.15  The estimated structural equation model……………………………... 160
Figure 6.1  A sample thematic map……………………………………………………. 169
Figure 6.2  The thematic analysis flowchart…………………………………………. 171
Figure 6.3  Critical factors for evaluating the public value of e-government….. 176
Figure 6.4  A thematic network of the delivery of quality public services…… 182
Figure 6.5  A thematic network of effectiveness of public organisations…….. 187
Figure 6.6  A thematic network of the achievement of outcomes……………… 197
Figure 7.1  Critical factors for evaluating the public value of e-government…. 201
Figure 7.2  The revised framework…………………………………………………... 213
Figure H.1  The re-specified measurement model of SERVI………………….. 283
Figure H.2  The re-specified measurement model of SERVI 1………………….. 283
Figure H.3  The re-specified measurement model of SERVI 2………………….. 283
Figure H.4  The re-specified measurement model of USERO………………….. 284
Figure H.5  The re-specified measurement model of ORGEF………………….. 284
Figure H.6  The re-specified measurement model of OPENN………………….. 284
Figure H.7  The re-specified measurement model of RESPO………………….. 285
Figure H.8  The re-specified measurement model of EQUIT………………….. 285
Figure H.9  The re-specified measurement model of SELFD………………….. 285
Figure H.10 The re-specified measurement model of TRUST………………….. 286
Figure H.11 The re-specified measurement model of PARTI………………….. 286
Figure H.12  The re-specified measurement model of ENVIR.........................286
Figure K.1   The un-estimated higher-order model for EPO..........................289
Figure K.2   The estimated higher-order model for EPO..............................289
Figure K.3   The un-estimated higher-order model for ASO........................290
Figure K.4   The estimated higher-order model for ASO............................291
Figure K.5   The higher-order model with DPS and EPO constrained.............292
Figure K.6   The higher-order model with DPS and ASO constrained............293
Figure K.7   The higher-order model with EPO and ASO constrained............294
Abstract

Electronic government (e-government) refers to the use of information and communication technologies for transforming public organisations to make them more accessible, effective and accountable. It has been developed rapidly around the world, exemplified by more than 98% of the United Nations member countries with some kinds of e-government presence online. Following the global trend in e-government developments, Sri Lanka has invested heavily in implementing numerous e-government projects over the past few years for improving the performance of its public organisations. How these implemented e-government projects perform from the perspective of its citizens, however, is unclear as there has been no rigorous assessment of the performance of e-government developments in Sri Lanka.

This research aims to investigate the public value of e-government in Sri Lanka. Specifically it aims to (a) identify the critical factors for evaluating the public value of e-government, (b) develop a framework for evaluating the public value of e-government, and (c) provide Sri Lanka government with some appropriate recommendations for improving the performance of e-government. To fulfill these aims of the research, a mixed-methods methodology is adopted. A theoretical framework is developed by hypothesising the critical factors for evaluating the public value of e-government. With the use of survey data collected in Sri Lanka, the theoretical framework is tested and validated using structural equation modelling. To further validate the research findings from the quantitative analysis, thematic analysis is carried out on the interview data collected simultaneously. The quantitative findings
and the qualitative findings are triangulated for better investigating the public value of e-government in Sri Lanka.

The study reveals that the quality of information, functionalities of electronic services, information and services provided over e-enable front-office counters, user orientation of public information and services, organisational efficiency, openness, and responsiveness, equity, self-development, trust, confidentiality, and environmental sustainability are critical for evaluating the public value of e-government in Sri Lanka. Based on the critical factors identified, a new framework for evaluating the public value of e-government in Sri Lanka is developed. The new framework consists of three main dimensions including (a) delivery of quality public services, (b) effectiveness of public organisations, and (c) achievement of socially desirable outcomes. Using the proposed framework, the current status of the e-government development in Sri Lanka is assessed. This leads to the development of some specific recommendation for improving the public value of e-government in Sri Lanka.

This study has made a major contribute to the e-government research domain from both the theoretical and practical perspectives. From the theoretical perspective, this study demonstrates the applicability of the concept of public value for evaluating the performance of e-government. It develops a new framework capable of adequately addressing the limitations of the existing frameworks for evaluating the public value of e-government in a developing country like Sri Lanka in which the e-government development is still at the early stage.
From the practical perspective, this study presents an in-depth investigation of the public value of e-government in Sri Lanka. Such an investigation provides the Sri Lanka government with a realistic assessment of the overall performance of e-government in Sri Lanka. It leads to the development of some specific recommendations for enhancing and improving the public value of e-government in Sri Lanka. Such findings are not only significant for the continuous development of e-government in Sri Lanka and for satisfying the expectation and demand of the funding organisations for the development of e-government in Sri Lanka, but also critical for other developing countries in their endeavours to develop e-government in their countries.
Chapter 1
Introduction

1.1 Research Background

Electronic government (e-government) is generally referred to as the use of information and communication technologies (ICT) for transforming public organisations to make them more accessible, effective and accountable (Aichholzer & Schmutzer, 2000; Gunter, 2006; Deng, 2008; Golra, 2008; Wangpipatwong, Chutimaskul, & Papasratorn, 2009). It can be used not only for improving the delivery of public services and enhancing the effectiveness of public organisations through increasing their efficiency, accountability and transparency (World Bank, 2005; Kaaya, 2009), but also for achieving various socially desirable outcomes such as improving the quality of life, providing better access to education, encouraging and facilitating active participation of citizens in government, bridging the digital divide, eradicating distance, and reducing the communication and information costs (Norris, 2001; Jaeger & Thompson, 2003; Hanna, 2008). These potential benefits of e-government motivate governments worldwide to develop and implement various e-government strategies and policies for making e-government more citizen-oriented with real value to citizens (United Nations, 2010; Zhao, 2010).

Following the global trend of developments in e-government worldwide, the government of Sri Lanka in 2002 officially launched the e-Sri Lanka initiative with the assistance of the World Bank for improving the delivery of public services and
achieving a wide range of socially desirable outcomes (ICTA, 2005; Hanna, 2007). Five distinct programs including (a) a re-engineering government program, (b) an information infrastructure development program, (c) a human resources capacity building program, (d) a regulatory environment development program, and (f) an e-society development program in the e-Sri Lanka initiative are adopted. Numerous e-government projects have been implemented over the past few years (ICTA, 2005).

With the implementation of various e-government projects in Sri Lanka, the urgency and necessity for adequately evaluating the performance of e-government become clear (Karunasena, Deng, & Karunasena, 2012). Such a study not only helps the Sri Lankan government to understand the value for their investment in their e-government projects. It can also facilitate identifying the relative performance of individual governments in different countries in e-government development so that effective strategies and policies can be formulated for improving the performance of e-government (Deng, 2008). Although there are several studies on the lessons learnt and experiences accumulated from the implementation of the e-Sri Lanka initiative (Hanna, 2007; 2008; Weerakkody, Dwivedi & Karunananda, 2009), how this initiative has created real value for Sri Lankan citizens is unclear as there is no rigorous assessment of this kind in Sri Lanka.

Chapter 1

Introduction

benchmarking study on assessing the e-government performance using an objective multi-criteria analysis approach. The United Nations (United Nations, 2003; 2005; 2008) uses a web measurement model for assessing the performance of e-government of its member countries. These studies have shown their respective merits in evaluating the performance of e-government from different perspectives. They, however, have not really addressed the issue of evaluating the performance of e-government from the perspective of creating value for citizens (Karunasena & Deng, 2012a) which is the main motivation for governments worldwide in developing their e-government (United Nations, 2003; Yu, 2008).

The concept of public value is a popular means for evaluating the performance of public services (Moore, 1995). It provides a comprehensive framework for examining the performance of public organisations on the creation of public value for citizens (Kelly, Mulgan, & Muers, 2002; Alford & O’Flynn, 2009). With the use of this concept, the performance of public services can be assessed with respect to the creation of public value through different sources (Moore, 1995; Kelly et al., 2002; Try & Radnor, 2007). E-government offers numerous opportunities for governments to improve the delivery of public services through automating numerous processes for delivering public services in government (Kearns, 2004). With the rapid development of e-government, adopting the concept of public value for evaluating the performance of e-government from the perspective of citizens is not only appropriate but also necessary (Karunasena, Deng, & Singh, 2011).

The public value of e-government has not been fully materialised (Heeks, 2008a). As a result, various stakeholders start to question the value of their investment in e-
government (Heeks, 2008a). This leads to much research on the development of various frameworks for evaluating the public value of e-government. Kearns (2004), for example, proposes a framework for examining the public value of e-government in United Kingdom from the perspective of delivery of services, achievements of outcomes and development of trust. Golubeva (2007) proposes a theoretical framework for examining the public value of web portals in the Russian Federation by focusing on the usability, transparency, interactivity, and the level of e-services development. The European Commission (2006) proposes a theoretical framework for examining the public value created through specific e-government projects by considering their contributions to efficiency, democracy and effectiveness. These studies are conducted for evaluating the performance e-government in developed countries. There is a lack of studies in assessing the public value of e-government in developing countries although such a study would be of significant importance to developing countries in the pursuit of improving their e-government practices.

This research aims to evaluate the public value of e-government in Sri Lanka. To fulfil the aims of the study, several research questions have been formulated. To answer the research questions, a mixed-method methodology is used by taking into account the need of using both quantitative and qualitative data to answer the research questions. Based on the extensive review of related literature, a theoretical framework is developed by hypothesising the critical factors for evaluating the public value of e-government in Sri Lanka. With the use of the survey data collected in Sri Lanka, the theoretical framework is tested and validated using structural equation modelling (SEM) techniques (Jöreskog, 1977). To further validate the research findings from the quantitative analysis, deductive thematic analysis (Boyatzis, 1998) is conducted on
the interview data collected in Sri Lanka. The overall research findings are then derived by comparing the quantitative and qualitative research findings.

In what follows, the motivation to undertake this research is presented followed by a presentation of the aims of the research and research questions. The research approach taken in this research to answer the research questions is then presented. Finally, the structure of the thesis is presented with a summary of the content for each chapter.

1.2 **Motivation of the Research**

The motivation to undertake this research is due to three main reasons. Firstly, no rigorous assessment of the public value of the e-Sri Lanka initiatives is available so far although there is much literature that discuss the e-government usage in the public sector in Sri Lanka (ICTA & MGC, 2008a), citizens’ usage of e-government (ICTA & MGC, 2008b), and the uniqueness and lessons to be learned from the e-government projects in Sri Lanka (Hanna, 2007, 2008; Weerakkody et al., 2009). As the implementation of the e-Sri Lanka initiative for developing e-government in Sri Lanka is at the final stage, understanding how the e-Sri Lanka initiatives perform in creating public values for citizens can help Sri Lanka improve its e-government practice in the next stage of e-government development (Karunasena & Deng, 2009b). Furthermore, such a study would greatly benefit the donor organisations in their tireless efforts to help other developing countries such as Pakistan, Rwanda, Ghana and Cuba to effectively pursue their e-government developments (Hanna, 2008; Karunasena & Deng, 2009b).
Secondly, there is a need for new frameworks in order to adequately evaluate the public value of e-government from the perspective of citizens. Although several frameworks exist in the literature for evaluating the public value of e-government, these frameworks have various shortcomings which hinder their applicability to adequately evaluate the public value of e-government (Heeks, 2008a). The framework proposed by the European Commission (2006), for example, is often criticised for its bias towards e-administration (Heeks, 2008a). The framework of Golubeva (2007) focuses only on the supply side of e-government. Furthermore, most of these frameworks fail to consider different kinds of public value commonly found in the literature in the evaluation process. As a result, the development of an appropriate framework for adequately evaluating the public value of e-government is desirable.

Thirdly, there is a lack of research in evaluating the public value of e-government from the perspective of developing countries although such a study would be of great benefits to these developing countries in their developments of e-government. Existing frameworks (Kearns, 2004; European Commission, 2006; Golubeva, 2007) are designed to be used in countries where e-governments are mature. Such frameworks are therefore inappropriate for developing countries like Sri Lanka where the e-government development is just at its early stage. This creates the necessity of developing new frameworks for evaluating the public value of e-government in developing countries. Developing new frameworks which are capable of considering the uniqueness of the e-government development in developing countries can contribute to a better understanding of e-government developments and therefore justifies the need for undertaking this research.
1.3  Research Aims and Research Questions

The primary aim of this research is to investigate the public value of e-government in Sri Lanka. The secondary aims of this research are to (a) identify the critical factors for evaluating the public value of e-government, (b) develop a theoretical framework for evaluating the public value of e-government projects, and (c) provide policy recommendations to the Sri Lanka government for maximising the public value of its e-government projects.

To fulfil these aims of the research, a primary research questions has been formulated as follows:

*What is the public value of e-government in Sri Lanka?*

To facilitate answering the primary research question as above, several secondary research questions have been formulated as follows:

(a) *What are the public values of e-government from the perspective of citizens?*

(b) *How do e-government projects in Sri Lanka create public value for its citizens?*

(c) *What are the critical factors for evaluating the public value of e-government in Sri Lanka?*

(d) *What is the appropriate framework for evaluating the public value of e-government in Sri Lanka?*

(e) *How can the existing practices in implementing e-government projects in Sri Lanka be improved for delivering better public value to its citizens?*
1.4 Research Methodology

Figure 1.1 presents an overview of the approaches to this research. The research is initiated due to the motivational factors discussed earlier such as the lack of assessment of e-government projects in Sri Lanka from the perspective of public value creation and the need for developing a new framework for effectively evaluating the public value of e-government by addressing the limitation of the existing frameworks. This leads to the formulation of the research aims and a set of research questions for fulfilling the aims of the research.

The research questions formulated in this research are both confirmatory and exploratory in nature (Teddlie & Tashakkori, 2006). It is therefore necessary to use both quantitative and qualitative data to adequately answer the research questions. As a result, this research uses the convergent parallel mixed-methods methodology (Creswell & Plano Clark, 2011). Based on a comprehensive review of the literature on the concept of public value, the specific nature of the e-government development in Sri Lanka, and limitation of the existing public value evaluation frameworks a theoretical framework is developed by hypothesising the critical factors for evaluating the public value of e-government. With the use of survey data collected in Sri Lanka, the theoretical framework is validated and tested using SEM for answering the confirmatory type research question. At the same time exploratory type research questions are answered by performing deductive thematic analysis (Boyatzis, 1998) using the qualitative data collected through face-to-face interviews with e-government users in Sri Lanka. Finally, the quantitative and qualitative findings are merged for deriving the conclusion for answering the research question.
1.5 Structure of the Thesis

The thesis follows the structure recommended for mixed-methods research (Creswell & Plano Clark, 2011) with eight chapters. Chapter One is the introductory chapter.
focusing on the background to the research, the motivation and aims of the research, the research questions, the research methodology and the structure of the thesis.

Chapter Two provides a comprehensive review of the literature in e-government, the developments of e-government in Sri Lanka, existing e-government performance evaluation methodologies, and the concept of public value. The existing methodologies for evaluating the public value of e-government, their strengths and limitations, and the need for a new theoretical framework for effective evaluation of public value of e-government in Sri Lanka are explicitly discussed in this chapter.

Chapter Three develops a theoretical framework for evaluating the public value of e-government in Sri Lanka by addressing the limitations of the existing frameworks for evaluating the public value of e-government. The theoretical framework developed in this chapter, on one hand, serves as the foundation for developing the survey instrument for testing and validating the theoretical framework using SEM. On the other hand, it helps to develop the interview questions and facilitates the analysis of interview data using deductive thematic analysis.

Chapter Four focuses on the research methodology. An overview of different approaches to research is presented with the intention of selecting a suitable research methodology for the research. A discussion of the mixed-methods approach is presented with an emphasis on the convergent parallel mixed-methods methodology which is selected in this research for answering the research questions. The actual implementation of the research methodology is then discussed by detailing how the
quantitative and qualitative aspects are implemented in this research to adequately answer the research questions.

**Chapter Five** presents the quantitative data analysis. It discusses the procedures undertaken to analyse the quantitative data and reports the quantitative study results. The chapter begins by presenting an overview of the data analysis procedures carried out in this research, followed by a presentation of how raw quantitative data was prepared for SEM analysis. The chapter then demonstrates how the data is analysed with the use of confirmatory factor analysis (CFA) and SEM.

**Chapter Six** focuses on the analysis of the qualitative data collected through interviews. This chapter discusses the procedures undertaken to analyse the qualitative data and reports the qualitative study findings. An overview of the thematic analysis technique followed by a discussion of the approach to thematic analysis is then presented. The findings from the thematic analysis are then reported with the use of a set of themes presented on several thematic maps.

**Chapter Seven** presents a new framework for evaluating the public value of e-government. By merging the findings obtained from the independently analysed quantitative and qualitative data, critical factors for evaluating the public value of e-government are identified. With the use of the identified critical factors a new framework for evaluating the public value of e-government in Sri Lanka is developed. Some recommendations for maximising the public value creation through e-government are also made in this chapter.
Chapter Eight concludes the thesis. This chapter revisits the research questions to confirm what has been accomplished in this research. It presents a summary of the research findings, the contribution of the research to the body of knowledge in e-government research and discusses the limitations of the research. Some suggestions for further research in this domain are also presented.
Chapter 2

The Literature Review

2.1 Introduction

E-government has developed rapidly around the world over the past decade (Stojanovic, Stojannovic, & Apostolou, 2006; Nasim & Sushil, 2010; Hassan, Shehab, & Peppard, 2011; Zhao, 2011). This can be demonstrated by more than 98% of the United Nations member countries with some kinds of e-government presence online (United Nations, 2010). Such a rapid development worldwide in embracing e-government is due to the capacity of e-government for creating public values such as efficiency, accountability, democracy, responsiveness, and equity for citizens (Nour, AbdelRahman, & Fadlalla, 2008; Karunasena & Deng, 2012b).

With the rapid development of e-government worldwide, a growing body of scholarly literature on e-government has emerged (Karacapilidis, Loukis, & Dimpoulos, 2005; Norris & Lloyd, 2006). In general, existing research in e-government can be classified into various perspectives including conceptualising the nature of e-government (Heeks, 2001, 2008b), theorising the evolution of e-government (Layne & Lee, 2001; Howard, 2001; Andersen & Henriksen, 2006), exploring the nature of e-government (Ndou, 2004; Chen, Chen, Ching, & Huang, 2007; Kaaya, 2009), and evaluating the performance of e-government from various perspectives (West, 2004; Horan & Abhichandani, 2006; Wangpipatwong et al., 2009; Kuzma, 2010).
There are various methodologies for evaluating the performance of e-government from different perspectives (Rorissa, Demissie, & Pardo, 2011). Wangpipatwong et al. (2009), for example, propose a methodology for evaluating the quality of e-services by assessing the government websites in Thailand. Gauld, Gray and McComb (2009) propose a methodology for evaluating the responsiveness of e-government in Australia and New Zealand. La Porte, Demchak and De Jong (2002) propose a methodology for conducting a cross-national comparison of the openness of public organisations through e-government. Recently much attention is being drawn towards the evaluation of the performance of e-government with reference to the concept of public value (Bonina & Cordella, 2008; Heeks, 2008b; Karunasena et al., 2011). Despite some progresses having been made on the development of specific methodologies and frameworks for evaluating the public value of e-government, there is a lack of research on evaluating the public value of e-government from the perspective of developing countries in which the development of e-government is still at an early stage (Karunasena & Deng, 2009a, 2012a).

Sri Lanka is no exception to the global trend in rapidly developing e-government (Karunasena et al., 2012). As a result of launching the e-Sri Lanka initiative, numerous e-government projects have been implemented over the past few years (ICTA, 2010a). A United Nations’ e-government survey reveals that Sri Lanka is the second runner up in the South Asian region in e-government developments (United Nations, 2010). The network readiness survey shows that Sri Lanka was at the 72nd position in 2010 which is 14 positions up from the position it occupied in 2006 (Mia & Dutta, 2007, 2008, 2009, 2010). This shows that Sri Lanka has been making a steady progress in developing e-government over the recent years. There is, however,
a lack of empirical research on evaluating the performance of e-government in Sri Lanka from the perspective of the public value that it creates for citizens.

This research aims to investigate the public value of e-government in Sri Lanka by identifying the critical factors for evaluating the public value of e-government and developing a theoretical framework for evaluating the public value of e-government in Sri Lanka. Based on the findings of the research, some policy recommendations will be made to the Sri Lankan government for maximising the public value creation through the adequate implementation of the e-government projects.

The rest of the chapter is organised as follows. An overview of the literature on e-government is first presented followed by a comprehensive review of the development of e-government in Sri Lanka. The literature on various e-government performance evaluation methodologies is analysed with a specific focus on evaluating the public value of e-government in relation to the theory of public value, sources of public value creation, and public values in the society. The need for developing a revised framework for better evaluating the public value of e-government in Sri Lanka is then discussed. Finally, a summary of the literature reviewed in this chapter is presented.

### 2.2 An Overview of e-Government

The term e-government first came to use in the United States in 1993 (Ho, 2002; Heeks & Bailur, 2007). It has been defined in many different ways in the literature (Moon, 2002; Halchin, 2004; Yildiz, 2007). West (2004), for example, defines e-government as the delivery of government information and services through the
internet or other digital means. The World Bank (2005) defines e-government as the use by public organisations of ICTs including internet and mobile computing that have the potential to transform the relationship between citizens, businesses and governments. Schuppan (2009) defines e-government as a way of strengthening the public sector performance for accomplishing social and economic developments in a country. However, no matter how e-government is defined, the ultimate goal of e-government is to create public values for citizens (United Nations, 2003).

E-government has been becoming increasingly popular worldwide (Weerakkody et al., 2009) due to its capacity to deliver public values for citizens (Karunasena & Deng, 2012a). It can bring individual governments and their citizens numerous benefits including improving the quality of government service delivery (Irani et al., 2005; Shim & Eom, 2008), increasing citizens’ participation in the political process (Heeks, 2001; Tung & Rieck, 2005; Sharifi & Manian, 2010), strengthening the openness of government functions by raising citizens’ awareness of public sector decision making (West, 2004; Shim & Eom, 2008; Bertot, Jaeger, & Grimes, 2010), improving the efficiency and responsiveness of public organisations (Landsbergen & Wolken, 2001; Edmiston, 2003; Gauld, Gray, & McComb, 2009), enhancing citizens’ education, learning and knowledge sharing (Symonds, 2005; Evans & Yen, 2006; Gupta, Dasgupta, & Gupta, 2008), facilitating the control of environmental threats (Lim & Tang, 2007), and promoting social developments and reducing poverty (Schuppan, 2009). This effectively leads to the real public values being created for citizens.

E-government can be approached from different perspectives including (a) e-citizens, (b) e-services, (c) e-administration, and (d) e-society (Heeks, 1999, 2001, 2002,
2008b; Prattipati, 2003; Ndou, 2004; Jones, Hackney, & Irani, 2007). The e-citizens approach to e-government focuses on connecting citizens with public organisations by obtaining citizens’ inputs for public discussions, supporting accountability, encouraging participation, supporting democracy, and improving public services (Heeks, 2002; Jones et al., 2007). The e-services approach to e-government concentrates on delivering high quality e-services to customers in an efficient and innovative manner (United Nations, 2003; Jones et al., 2007). The e-administration approach strives to improve the efficiency of public organisations by cutting costs, eliminating redundancy and duplication, linking public organisations, and empowering public employees (Heeks, 2002, 2008b). The e-society approach encompasses efforts to build relationships between public agencies and, civil societies and non-profit organisations by developing civil communities, building government partnerships and working better with non-profit organisations (Heeks, 2002; Ndou, 2004; Jones et al., 2007; Karunasena & Deng, 2011a).

There are different types of e-government dependent on the nature of interactions in e-government including government-to-citizens (G2C), government-to-government (G2G), government-to-business (G2B), and government-to-civil society (G2CS) (Tan, Pan, & Lim, 2005; Evans & Yen, 2006; Kaaya, 2009; Gupta et al., 2008; Wang & Liao, 2008). The G2C e-government involves in facilitating the communication between the government and citizens electronically in an efficient manner (Evans & Yen, 2006). This includes not only the delivery of public services, but also citizens’ participation in the decision-making process in government (Kaaya, 2009). One common example of G2C e-government is the facility to submit applications online that previously could only be done by physically visiting public organisations and
waiting in long queues. Another example of G2C e-government is the facility for citizens to express their opinions on public policies using online tools.

The G2B e-government focuses on improving the efficiency and effectiveness of the delivery of services to businesses and reducing the burden on businesses (Evans & Yen, 2006; Lu, Shambour, Xu, Lin, & Zhang, 2010). G2B e-government involves in the provision of information, and facilitating the government to conduct business-specific transactions such as provision of tax returns to businesses, paying for the goods and services procured for public organisations, and facilitating businesses in their dealings with the government (United Nations, 2003; Evans & Yen, 2006; Esteves & Joseph, 2008). There are many examples for G2B e-government worldwide. The electronic procurement system of Malaysia facilitates the ministries and businesses to transact in an efficient and effective manner (Sambasivan, Wemyss & Rose, 2010). The Australian Government Business Portal (2010) facilitates businesses to register online to obtain an Australian business number which is essential to claim goods and services tax credits, and obtain tax returns for businesses.

G2G e-government involves building the backbone of e-government by developing the ICT infrastructure at the organisational level (Ray, Gulla, Dash, & Gupta, 2011). Improving the ICT infrastructure facilitates the creation of a connected government to share data and conduct electronic transactions between and among public organisations (United Nations, 2003; Evans & Yen, 2006; Beynon-Davies, 2007; Al Nagi & Hamdan, 2009). This involves in inter-governmental information exchanges and intra-governmental information exchanges at the national, provincial and local levels (United Nations, 2003; Siau & Long, 2005; Kaaya, 2009). This leads to greater
coordination and communication among public organisations, avoidance of duplication, simplification of bureaucratic procedures, and greater efficiency for public organisations (United Nations, 2008). A common example of G2G e-government is the collaboration of the Federal Bureau of Investigation of the United States with the relevant law enforcement agencies and the federal government to prevent terrorist attacks, cybercrime-based attacks and high technology crimes, and to protect civil rights (Reddick, 2004; FBI, 2010).

G2CS e-government facilitates the development of the knowledge-based society (United Nations, 2003; Basu, 2004; Yildiz, 2007; Heeks, 2008b; Esteves & Joseph, 2008; Nagi & Hamdan, 2009). It aims to develop civil societies, improve the quality of life of rural communities, and deliver specific services for satisfying the needs of the most vulnerable groups including the rural children, women, displaced persons, persons with disabilities, other minorities in a society (Hanna, 2007; Al Nagi & Hamdan, 2009). The ‘Shilpa Sayura’ project of Sri Lanka is an example of G2CS e-government where the government provides e-learning content for rural children to support their education (Karunasena & Deng, 2012b). Figure 2.1 presents an overview of e-government from these four perspectives (Heeks, 2001, 2006, 2008b).

![Figure 2.1](image_url)  
**Figure 2.1** An overview of e-government [Adapted from Heeks (2006)]
The development of e-government is an evolutionary process with various features, functions and services (Esteves & Joseph, 2008). This evolutionary process involves in several stages including (a) the catalogue stage where the government provides static information online, (b) the transactional stage where electronic transactions with the government are possible, (c) the vertical integration stage where local government systems are connected to the national government systems, and (d) the horizontal integration stage where different systems at the same level are connected for providing a one-stop service (Layne & Lee, 2001; Kaisara & Pather, 2011).

E-government gradually passes these stages throughout its development processes (Layne & Lee, 2001; Moon, 2002; Gupta & Jana, 2003; Akman, Yazici, Mishra, & Arifoglu, 2005; Affisco & Soliman, 2006). It begins with the catalogue stage and evolves through the transactional, vertical integration and horizontal integration stages over the years (Layne & Lee, 2001; Kaisara & Pather, 2011). In the catalogue stage, governments focus on establishing an online presence by presenting information about the public organisation and their activities (Reddick, 2004; Beynon-Davies, 2007). The information on the websites is generally categorised by service types or events (Beynon-Davies, 2007). Online forms for downloading and search facilities for searching information are lack on the websites in the catalogue stage of e-government (Akman et al., 2005; Al Nagi & Hamdan, 2009; Kaisara & Pather, 2011).

E-government at the transaction stage focuses on facilitating transactions between governments and citizens electronically (Layne & Lee, 2001; Gupta & Jana, 2003; Akman et al., 2005). In this stage citizens play an active role in transacting with the government by paying taxes, fines, and fees online or submitting applications online.
Electronic transactions generate greater efficiency for citizens by saving the time and money that citizens have to spend for physically visiting public organisations and waiting in queues to transact with the government (Reddick, 2004). They can also help improve the efficiency of public organisations by processing citizens’ transactions faster and in a cost effective manner in contrast to the traditional manual systems.

At the vertical integration stage of e-government, the local e-government systems are seamlessly connected to immediate higher-level e-government systems for sharing common information sources (Layne & Lee, 2001; Akman et al., 2005; Kaisara & Pather, 2011). Vertical integration usually happens in relation to similar functionalities between public organisations at different levels of government (Beynon-Davies, 2007). For example, e-government systems at the provincial offices of the department of Motor Traffic are connected to e-government systems at the national level for providing integrated services. This helps citizens to obtain national and local level public services through a single portal (Gupta & Jana, 2003).

Conversely, at the horizontal integration stage e-government systems of different government organisations, which are at the same level but provide different services, are connected for providing true one-stop service for citizens (Layne & Lee, 2001; Akman et al., 2005). Transactions with one public organisation, for example, can be traced by another government organisation when the horizontal integration is accomplished (Akman et al., 2005). As a result the most desirable feature for citizens, the real one-stop shopping is possible where all the government services can be
accessed through a one-stop portal or a front office counter installed at any government organisation (Reddick, 2004; Beynon-Davies, 2007).

Developing e-government by following a defined set of stages is not a simple task for many countries worldwide. It is a complex task particularly in many developing countries (Heeks, 2003; Khan, Moon, Rhee, & Rho, 2010; Sein, 2011). This is due to (a) the historical and cultural background of the developing countries, (b) inadequate human resources for the development of e-government, (c) poor ICT infrastructure at organisational and national levels for implementing e-government, and (d) lack of readiness among citizens to use e-government (Basu, 2004; Chen et al., 2007; Kannabiran, Xavier, & Banumathi, 2008). As a result, developing e-government is a challenging activity for many developing countries.

Many developing countries are characterised by emerging economies with low economic growth and poor standards of living (Chen et al., 2007). Public administration in these countries is often inefficient, bureaucratic, less transparent, and is afflicted with a high level of corruption (Chen et al., 2007). Furthermore, most of these countries have a short history of democracy. Implementing e-government in such conditions is extremely difficult and challenging in contrast to implementing e-government in developed countries which have developed economies, a constant rate of economic growth, a high-level of productivity in public services, transparent government processes, and a high quality standard of living among citizens.

A shortage of skilled and qualified human resources for facilitating e-government developments further increases the challenges that developing countries face in
developing e-government (Dada, 2006a; Chen et al., 2007; Kannabiran et al., 2008). ICT and technical skills, and skills for leading and managing e-government projects, evaluating e-government, developing e-government policies, negotiating with stakeholders, managing organisational change, managing risk, budgeting and financing, along with an ability to win the political will and support for e-government project implementation are also essential for developing e-government initiatives (Settles, 2005). Many developing countries lack such human resource skills. Employees in developing countries have inadequate opportunities for ICT training. Moreover, such countries do not have the financial capacity to outsource skilled human resources (Dada, 2006a; Chen et al., 2007; Schuppan, 2009).

A lack of ICT infrastructure at the organisational and national level is another challenge for implementing e-government (Chen et al., 2007). Properly placed ICT infrastructure such as computer peripherals, networks, databases and information systems is necessary for creating an enabling environment for e-government development (Basu, 2004; UNESCO, 2005; Chen et al., 2007). Many developing countries suffer from inadequate infrastructure (Ndou, 2004; UNESCO, 2005; Dada, 2006a). Furthermore, widespread national level ICT infrastructure such as telecommunication networks is essential for providing citizens and businesses with access to the internet. In Sri Lanka, for example, only 6 (≈ 5.72) inhabitants per 100 have access to the internet and only 0.50 inhabitants per 100 have fixed broadband connectivity. In the United States which is a recognised as a developed country, there are 72 inhabitants per 100 with access to the internet, and nearly 25 inhabitants per 100 with fixed broadband connectivity (United Nations, 2010).
Lack of readiness among citizens to use e-government is common in developing countries (Chen et al., 2007). The gap between those who have access to e-government and those who do not have is the widest in developing countries (Hornung & Baranauskas, 2011). Many citizens in developing countries suffer from the digital divide as a result of an inadequate access to computers and internet or poor ICT literacy (Ndou, 2004). Furthermore, developing countries typically have a larger rural population in comparison with developed countries and a majority of such rural population suffer from poverty (Gupta et al., 2008). Delivering essential public services and offering opportunities for economic and social developments to these rural communities through e-government are extremely challenging (Hanna, 2007; Kannabiran et al., 2008). Furthermore, citizens’ lack of trust in e-government is evident in developing countries. As a result, poor uptake of e-government services and low participation of citizens in the governmental policy-making through e-government prevail in developing countries (Chen et al., 2007). Table 2.1 summarises the obstacles and challenges that hinder an effective implementation of e-government in developing countries (Chen et al., 2007).

Due to the existence of various obstacles to the implementation of e-government, many developing countries nowadays are implementing e-development programs which include e-government development as one component (Heeks, 2001; Hanna, 2007; 2008; Kannabiran et al., 2008; Schuppan, 2009). These e-development programs aims to create an enabling environment for e-government development by developing human resources capacity at public organisations, building national and organisational level ICT infrastructure, and improving citizens’ ICT readiness (Hanna, 2007). Following the global trend, the government of Sri Lanka launched an e-
government development program that encapsulates several e-development strategies for overcoming the obstacles that Sri Lanka faces as a developing country in implementing e-government.

Table 2.1 Challenges faced by developing countries in implementing e-government

<table>
<thead>
<tr>
<th>Factor</th>
<th>Developed countries</th>
<th>Developing countries</th>
</tr>
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<tbody>
<tr>
<td>History and culture</td>
<td>Developed economies, a constant rate of growth, higher productivity and higher living standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Long history of democracy, and transparent government processes, procedures, policies and rules</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Emerging economies, no significant economic growth or productivity, poor standards of living</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Short history of democracy, less transparent government processes, procedures, policies and rules</td>
<td></td>
</tr>
<tr>
<td>Human resource</td>
<td>Skilled and qualified personnel</td>
<td>Shortage of skilled personnel</td>
</tr>
<tr>
<td></td>
<td>Relatively highly competent staff</td>
<td>Lack of competent staff</td>
</tr>
<tr>
<td></td>
<td>Sufficient professional training</td>
<td>Lack of professional training</td>
</tr>
<tr>
<td></td>
<td>Government has the capacity to outsource appropriate human resources for e-government</td>
<td>Government has relatively poor capacity to outsource appropriate human resources for e-government</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Highly sophisticated ICT infrastructure</td>
<td>Poor ICT infrastructure</td>
</tr>
<tr>
<td></td>
<td>Relatively developed ICT infrastructure nationwide</td>
<td>Poor ICT infrastructure nationwide</td>
</tr>
<tr>
<td>Citizens</td>
<td>High level of internet access and ICT literacy</td>
<td>Poor internet access and ICT literacy</td>
</tr>
<tr>
<td></td>
<td>Digital divide exists</td>
<td>Many suffering with digital divide</td>
</tr>
<tr>
<td></td>
<td>Active participation in governmental policy making process through e-democratic initiatives</td>
<td>Poor participation in governmental policy making process through e-democratic initiatives</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lack of trust in online initiatives</td>
</tr>
</tbody>
</table>
2.3 Developments of e-Government in Sri Lanka

Sri Lanka has used computing in government for nearly 48 years, even before the notion ‘e-government’ came into play. Using computers in the Sri Lankan public sector was initiated in 1962, with the introduction of IBM (International Business Machines) accounting machines to the Insurance Corporation, followed by the introduction of computers to some other public organisations such as the Engineering Corporation, and the Department of Statistics (Hanna, 2008). Subsequently many computerisation programs in the public sector were initiated. Most of these initiatives, however, failed to make any significant contribution to the overall development of e-government in Sri Lanka until the e-Sri Lanka initiative was launched in 2002.

The e-Sri Lanka initiative is originated from the private sector with the involvement of the National Chamber of Commerce, the local software industry leaders, and the United States Agency for International Development (USAID) (Hanna, 2007). Motivated by the achievements that the Indian software industry has made, the initial e-Sri Lanka initiative mainly focuses on developing the software industry in Sri Lanka (Hanna, 2007). With the active involvement of the World Bank, public services, civil societies, consultative groups and many donor agencies, the e-Sri Lanka initiative is revised and expanded (Hanna, 2007) by recognising ICT as the key for achieving growth, equity and peace through technological transformation of all sectors in Sri Lanka (MOST, 2002). As a result, improving the delivery of public services, bridging the digital divide, uplifting the quality of life of citizens, improving social development, and supporting the country’s growth and poverty reduction through the development of e-government become the objectives the e-Sri Lanka initiative (ICTA, 2005; Hanna, 2007, 2008).
To achieve the objectives of the e-Sri Lanka initiative, six e-development programs have been adopted including (a) a re-engineering government program for providing transparent, effective, and efficient public services, (b) an information infrastructure development program for ensuring affordable access to information, communication, e-services and other content, (c) an e-society development program for empowering the most vulnerable communities in Sri Lanka, (d) a human resources capacity building program for building up a skilled workforce, (e) a private sector capacity development program for developing the domestic ICT sector to ensure a sustainable economic growth in the country, and (f) a regulatory environment development program for creating policy and regulatory environment, and developing leadership and institutional capacity building to support ICT based developments and reforms (Karunasena & Deng, 2009a; ICTA, 2010f). The Information and Communication Technology Agency of Sri Lanka (ICTA) is established under the Information Communication Technology Act 27 for coordinating e-Sri Lanka initiatives. Figure 2.2 shows an overview of the e-government development in Sri Lanka.

Sri Lanka has implemented a unique e-government initiative with the implementation of the re-engineering government program (Karunasena & Deng, 2009a, 2010a). The uniqueness of the e-government initiative is due to the specific situation that Sri Lanka is in as a developing country with a majority of citizens living in rural areas, low ICT literacy among citizens, low householder internet users, poor information infrastructure, and low e-readiness in government (Hanna, 2007, 2008). Implementing e-government initiative is bound to have a significant impact on Sri Lankan citizens and society (Karunasena & Deng, 2009a; Karunasena et al., 2011). The re-engineering the government program is facilitated by other e-development programs which aim to
develop information infrastructure, develop human resources capacity in the public sector, formulate strategies and policies, and develop the regulatory environment and an e-society. These four programs create an enabling environment for the effective development of e-government in Sri Lanka.

Figure 2.2 An overview of e-government development in Sri Lanka

The re-engineering government program aims to improve the efficiency and effectiveness of the delivery of public services by the implementation of various e-
government applications (ICTA, 2010a). A number of e-government projects are initiated including website development, call centre services, data hubs, e-services developments, and governmental process re-engineering. Some of the e-services projects include (a) the e-divisional secretariat project for facilitating an efficient and effective delivery of public services at the grass root level public organisation, (b) the e-Samurdhi project for maintaining up-to-date data relating to income and livelihood of low income communities, (c) the e-population registry project for maintaining unique identity numbers and basic information of citizens enabling the registration of life events such as births, marriages and deaths, and enabling access and exchange of citizen information by relevant agencies regardless of their geographic locations, (d) the e-foreign employment project for helping people seek jobs overseas, (e) the e-pension project for developing a high responsive pension application process system, (f) the e-motoring project for maintaining motor vehicle registration and issuing drivers’ licenses, (g) the e-human resources management project for effectively managing the records of 40,000 public sector employees who belong to 14 all island services and working in public agencies scattered all over the island, (h) the ‘Laksala’ project for promoting and protecting Sri Lankan handicrafts, and (i) the birth, marriage and death certificate issuing project for increasing the efficiency and effectiveness of issuing certificates.

The information infrastructure development program promises (a) efficient and effective ICT infrastructure for public organisations and (b) an affordable access to information, modern communication and electronic services at any time regardless of their geographical locations (ICTA, 2010b). In this context the Lanka Government Network (LGN) development project is implemented for setting up an underlying
information infrastructure for connecting all the public organisations in a cost-effective manner to provide internet, email, IP based voice services, and exchange e-government data in a secure and reliable manner (ICTA, 2010b).

The Regional Telecommunication Network project (RTN) has been identified as a priority under the information infrastructure development program which seeks to ensure an affordable access to telecommunication, internet services, e-services, and e-content to all rural communities. This project invests on laying two fibre backbones along with the necessary infrastructure covering rural Sri Lanka. The development of this project is extremely important since access to the telecommunication and other ICT infrastructure is unaffordable to citizens in rural areas. Sri Lanka is a country where 84.9% of the total population live in rural areas and the total contribution by rural sector to total poverty of the country is at 82.1% (DCS-SL, 2007). The development of affordable information infrastructure is, therefore, highly important.

The Nenasala’ (Knowledge centre/tele centre) development project is introduced for ensuring an equal and affordable access to e-government resources for rural and semi-urban communities. A Nenasala centre is supplied with telephone connections, a minimum of five computers, broadband internet connectivity, a scanner, a photocopier, webcams, and other computer devices to facilitate rural and semi-urban citizens’ access to the computers, internet and e-services (Nenasala, 2007). The development of this project is necessary because of the low ICT readiness among citizens. As at 2003 there were only 13.2 personal computers and 10.56 internet users per 1000 persons in Sri Lanka (United Nations, 2003). Moreover, only 3.1% of rural households had computers in 2004 (Satharasinghe, 2007).
The policy and institutional development program focuses on developing policies and the institutional environment necessary for achieving the overall objective of e-government in Sri Lanka. One of these goals is “to create a pro-active policy and a regulatory environment that is supportive of ICT reform and ICT-based developments, to develop ICT leadership and capacity, and to communicate these initiatives and policies to the wider stakeholder audience” (ICTA, 2010c). The success of e-government projects very much depends on the government’s effort in ensuring a proper regulatory and legal framework for their operations (Basu, 2004, p 120). In the context of a legal and regulatory environment, the government has developed laws and regulations relating to electronic transactions, data protection, computer crimes, payment devices frauds, payment and settlement, privacy and intellectual property rights protection (ICTA, 2010c). Such laws are essential to protect e-government users. Intellectual property rights protection laws are extremely important for generating innovations in terms of overall ICT developments in the country (Mia & Dutta, 2010). Adequate training is provided to judges, lawyers and other law enforcement personnel for properly executing these e-laws.

As shown in Figure 2.2, supporting local languages is another sub-program of the policy and institutional development program. Under the local language sub-program the Sri Lanka government has facilitated the development of ICT standards for Sinhala (SLS 1134: 2004) and Tamil (SLS 1326: 2008) languages, and Unicode compliance fonts. Training is provided to local font developers (ICTA, 2010c). All these activities are useful as they facilitate the delivery of e-government information and services in local languages.
The ICT related policy development is another sub-program of the policy and institutional development program. The e-government policy document is extremely important for the effective development of e-government at the organisational level. This document acts as a blueprint for government institutions for planning, developing, procuring, using e-government, and creating an enabling environment for e-government development at the organisational level. The e-government policy approved by the Cabinet in 2009 emphasises that all government organisations should (a) establish an ICT unit and appoint a chief innovative officer (CIO) to lead e-government related activities in their organisations, (b) draft and implement an annual ICT plan which indicates how ICT is used for realizing the organisation’s mission and vision, (c) allocate an adequate budget for e-government related activities, (d) use e-mail for all types of official communications, (e) develop trilingual websites which comply with the government’s website standards and register them under ‘gov.lk’ domain, (f) use Sinhala and Tamil Unicode fonts, (g) connect to the LGN for using government’s common network service, (h) use Lanka Gate as the middleware infrastructure and the country portal for delivering government services through electronic means, (i) use licensed software or use open source software, and (j) assess the training and skills needs of public staff at all levels and incorporate them in the annual ICT plan (ICTA, 2010b).

The human resources development program is aligned with the e-government development program. The prime objective of this program is to develop an e-leadership capability in government staff for leading and driving the process of e-government developments. Under this initiative, the government has appointed CIOs across all government ministries, departments, statutory bodies, and other grass root
level public organisations for driving e-government and ICT based transformation processes within those organisations. As a result, empowering CIOs with strategic ICT planning, e-government practices, IT project management, outsourcing and managing projects, government process re-engineering, change management, and knowledge management is a key objective of this program (ICTA, 2010d).

The e-society development program is implemented under the e-Sri Lanka initiative. Although it does not directly contribute to the adoption of e-government, it facilitates the social development of most vulnerable groups in Sri Lanka using ICT (ICTA, 2010e). Among many other objectives of this program, increasing awareness among disadvantaged groups of how ICT can improve the quality of their lives, empowering women and youth with ICT, increasing economic opportunity and equity by facilitating wide use of ICT in agriculture, health and education, and developing local content are important (ICTA, 2010e).

The e-government development in Sri Lanka is at a crucial stage since the current e-Sri Lanka initiative is at the final stage of implementation (Karunasena & Deng, 2009b). With the increasing pressure on the accountability for government investments nowadays, it is essential to evaluate the performance of e-government based on the value it creates for citizens. Such an investigation helps the government to justify its investment in e-government and provides aid organisations with convincing arguments on the value for their money.

There have been many attempts to evaluate the performance of e-government in Sri Lanka. Davidrajuh (2004), for example, critically analyses the e-government

2.4 Evaluating the Performance of e-Government

The rapid developments of e-government worldwide create an urgent need for the continuous monitoring and evaluation of the performance of those e-government initiatives (Deng, 2008). As a result e-government practitioners and academics have developed various approaches for evaluating the performance of e-government from many different perspectives (Kunstelj & Vintar, 2004; Torres, Pina, & Acerete, 2005; Bannister, 2007; Heeks, 2008a). Four approaches can be identified in the literature for evaluating the performance of e-government, namely, (a) readiness assessment, (b)
availability assessment, (c) demand assessment, and (d) impact assessment (Kunstelj & Vintar, 2004; Heeks, 2006, 2008a). As shown in Figure 2.3, e-government performance evaluation with the use of these approaches has evolved over time starting from evaluating the readiness of individual countries at the early stage of e-government development, moving to availability and demand evaluations, and then to evaluating the impact of e-government on citizens from the social and democratic perspectives (Kunstelj & Vintar, 2004; Capgemini, 2006; Heeks, 2006, 2008b). Some of the existing e-government performance evaluation approaches, however, are not mutually exclusive (Kunstelj & Vintar, 2004; Bannister, 2007).

![Figure 2.3 An evolution of e-government evaluation [Adapted from Heeks (2006)]](image-url)
The readiness evaluation examines the maturity of the environment for launching and using e-government applications (Kunstelj & Vintar, 2004). Such an approach evaluates the awareness, willingness, and preparedness of the stakeholders (government, citizens, and businesses) to participate in e-government and helps to identify the readiness of the enabling factors for the development of e-government such as infrastructure and ICT literacy (Kunstelj & Vintar, 2004). This approach is popular due to its use of a quantifiable set of indicators that are capable of providing an overview of a country’s situation (Dada, 2006b). Such indicators summarise a broad set of characteristics of e-government developments in a given country (Picci, 2006; Dada, 2006b). The readiness assessment approach, however, is often criticised for neglecting citizens’ demands from e-government and the impact of e-government on citizens and the society (Kunstelj & Vintar, 2004).

There are several popular readiness evaluation methodologies in the literature. United Nations (2003, 2005, 2008), for example, develops a comprehensive methodology to evaluate the e-government readiness by examining the “capacity and willingness of individual countries to use e-government for ICT-led developments” (2005, p 14). This methodology examines the e-government readiness with the use of three sub-indices, namely, (a) web measurement sub-index, (b) telecommunication infrastructure sub-index, and (c) human capital sub-index. The web measurement index is used to examine the readiness of government to inform citizens, and interact and transact with citizens through e-government. The telecommunication infrastructure index examines the country’s ICT infrastructure capacity by examining the number of personnel computers, internet users, telephone lines, mobile phones, and televisions. The human capital index examines the adult literacy rate, and the enrolment ratio for primary, secondary and tertiary education.
The Economist Intelligence Unit develops the network readiness index (NRI) for examining the overall e-government performance of individual countries (Mia & Dutta, 2007, 2008, 2009, 2010). In the NRI, the readiness assessment dimension is extremely useful to individual countries for assessing their readiness in implementing e-government. Several indicators are adopted in the readiness dimension including individuals’ readiness and the government’s readiness (Mia & Dutta, 2010). The individual readiness measures citizens’ preparedness to use ICT by considering those aspects of telecommunication, internet and their costs. The government readiness is reflected by the government efforts to incorporate ICT in national agenda and procure high-tech products to improve the organisational efficiency and innovation (Mia & Dutta, 2010). By examining the readiness scores offered in this methodology, individual governments not only can assess their readiness for e-government developments, but also can obtain new insights for improving their decision making and planning in implementing e-government projects.

Al-Omari and Al-Omari (2006) develop a general framework for evaluating the readiness of e-government initiatives in Jordan. This multidimensional methodology examines the e-government readiness from several perspectives, namely, from (a) organisational, (b) governance and leadership, (c) customer readiness, (d) competency, (e) technological, and (f) legal perspectives. The organisational dimension focuses on the readiness of re-engineered business processes and appropriate organisational structures. The governance and leadership dimension examines the readiness of the leadership and governance for implementing e-government. For the customer dimension, accessibility, trust and security aspects are considered. In the competency dimension, the readiness of public organisation’s staff
with appropriate qualifications and skills is considered. From the technology perspective, the readiness of individual organisations in terms of the availability of various computer technologies such as hardware, software, communication, data sharing applications, security infrastructure are considered. Finally, the legal readiness emphasises the importance of having an appropriate legal system for implementing and operating e-government projects.

The availability evaluation focuses on the supply side of e-government (Reece, 2006). It examines the availability of e-government channels such as websites, mobile channels and kiosks in order to deliver e-government services, the maturity of the available e-government services, content provided through e-government channels, the characteristics of individual e-government channels (Kunstelj & Vintar, 2004; Gauld, Goldfinch, & Horsburgh, 2010), and the availability of electronic participation tools (Janssen, Rotthier, & Snijkers, 2004). The availability evaluation approach is often criticised for failing to consider the users’ perspective, and for neglecting the important aspects of national context and the specific priorities of individual countries (Codagnone & Undheim, 2008).

There is much research on evaluating the supply side of e-government. West (2003a), for example, conducts a comprehensive analysis of 2,166 government websites of 198 nations worldwide by examining the content available on those government websites and the variations among and between those websites. The analysis reveals that 16% government websites offer complete executable e-services, 89% websites provide access to publications, 73% have links to databases, 12% show privacy policies and 6% have security policies (West, 2003a). This methodology, however, does not
consider citizens’ uptake of e-government and their satisfaction with e-government in the evaluation process (Rorissa et al., 2011).

The latest United Nations’ e-government survey (2010) employs an online service measurement instrument to evaluate the level of e-service development in United Nations member countries. It examines whether the government in the relevant country uses the internet to deliver public services, provides basic information services online, connects public service functions, uses multimedia technology, promotes two-way transactions with citizens, obtains input on matters of public interest, and so forth. By analysing the e-service development of 193 member countries, the study concludes that a majority of countries have progressed in the areas of publishing significant amounts of information online and developing web portals and e-services. It further reveals that developing countries need to make additional efforts to increase the supply of transactional services.

Electronic participation (e-participation) has been considered in many evaluation methodologies that focus on the supply side of e-government. It refers to citizens’ participation in the democratic decision making by providing feedbacks on government policies and the empowerment of citizens by providing information using e-participation tools (Macintosh & Whyte, 2008). The United Nations’ (2005, 2008) e-participation index is a popular methodology for benchmarking citizens’ participation in democratic decision making through e-government. This framework consists of three benchmarking stages, namely, (a) e-information, (b) e-consultation, and (c) e-decision making. E-information is evaluated by examining the government websites that offer information on upcoming policies, laws and regulations, and the
availability of e-participation tools such as email groups, blogs, and web forums. E-consultation is assessed by examining the availability of facilities to set up agendas for public discussion, and the extent to which the government maintains archives of discussions and provide feedback to citizens. E-decision making is evaluated by examining the government’s willingness to take into account citizens’ inputs in democratic decision making, by examining whether the government informs citizens what decisions have been taken based on the citizens’ inputs, and examining whether government publishes results of citizens’ opinions on websites. This framework is extremely useful for assessing the usefulness of e-participation initiatives in getting citizens involved in democratic decision making.

Much supply side e-government research is on evaluating the contribution of e-government to enhance the openness of public organisations. In this context, openness refers to the extent to which public organisations demonstrate transparency in decision making through e-government (Ball, 2009; Armstrong, 2011). La Porte et al. (2002), for example, evaluate the openness of public organisations by examining the content of websites with the use of transparency and interactivity indicators. In this research transparency is evaluated through the online availability of the contact information of public officials, organisational and operational information (organisational structures, goals, and mission and vision), and information on what citizens are required to do to comply with laws and regulations, and the availability of up-to-date information. Interactivity is measured by examining the extent to which the users can reach deep inside an agency’s website to get in touch with a variety of staff, how easily users can find the organisational structure on the website, whether users can contact a variety of
staff through emails, and whether users can download government instructions on complying with the law or connect to appeals processes.

Jaeger and Bertot (2010) present an analysis of how e-government services have opened up access to the United States government. The study reveals that e-government websites such as www.usaspending.gov and it.usaspending.gov are developed with the intention of disclosing government spending. Citizens are allowed to monitor the government spending by accessing data available on the website. Moreover, e-government initiatives are implemented for conducting online meetings and soliciting online comments to get public feedbacks on proposed policies and regulations. The study reveals that to make a real impact on openness, future policies need to be focused on the human dimension of transparency such as the need of developing the skills of citizens, availability of access, and usage of e-government.

In contrasts to the supply side e-government research, the demand side e-government research evaluates e-government from the perspective of users (Reece, 2006; Cheng, Cheng, & Yang, 2007; Gauld et al., 2010). This type of research focuses on assessing the degree to which e-government is used by citizens, the reasons for the low use of e-government by citizens, as well as citizens’ satisfaction, perceptions, requirements, and needs (Kunstelj & Vintar, 2004; Cheng, Cheng, & Yang, 2007). Governments may be heavily investing on increasing the supply of online information and services. The demand for e-government services, however, may not be there for such services (Reddick, 2005). Such e-government research is, therefore, extremely useful to gauge the extent to which e-government satisfies the desires of citizens.
Much demand side e-government performance evaluation methodologies focus on examining user perceptions on the quality of e-government services. Barnes and Vidgen (2003), for example, examine the quality of e-government services by considering citizens’ perceptions on information quality, usability, and service interaction of websites. Information quality is measured by examining whether the websites provide believable, timely, relevant, and easy to understand information with the right level of detail. Usability is measured by considering the attractiveness of the site, availability of clear and easy to understand content, ease to operate the site, and easy navigation among pages and so forth. Service interaction is measured through citizens’ perceptions on reputation, safeness, and sense of personalisation of websites.

Wangpipatwong et al. (2009) examine the quality of e-government services by considering information quality, system quality, and service quality perspectives. Information quality is examined through the citizens’ perceptions on accuracy, timeliness, relevance, understandability and completeness of information. System quality is measured by examining the functionalities of the services (forms for downloading, online transactions), usefulness of services, ease of use, and dependability (accuracy of the system). Service quality is measured by the reliability, responsiveness, assurance (knowledge and courtesy of employees), empathy (attention paid by the service provider to users), and tangibles (physical facilities, appearance of personal) of e-government services.

Papadomicelaki and Mentzas (2009, 2011) evaluate the quality of e-government services by examining the users’ perceptions on the content, interactivity, ease-of-use, functionality, reliability, and trust. Content is measured by accuracy, conciseness,
relevance, and up-to-datedness of the information, ease of understanding the content, and the way the content is presented such as colours, graphics, and so forth. In this research ease-of-use and interactivity indicators measure the user friendliness. Ease-of-use is measured by examining the availability of site-maps, search facilities and links, and easy to remember uniform resource locators (URLs). Interactivity is measured by the availability of frequently asked questions, transaction tracking facility, and the existence of contact information and so forth. Functionality is measured by examining the extent to which citizens’ information is reused by the system, availability of automatic calculation forms, and so forth. Reliability is measured by considering the ability to perform the services accurately, on time service delivery, accessibility of the site, and system compatibility. Trust is measured by examining the extent to which citizens’ personal data are secured through the availability of procedures for acquiring usernames and passwords, implementing access controls and conducting correct transactions.

The responsiveness of public organisations focuses on the demand side e-government performance evaluation. E-government is expected to significantly improve the capacity of public organisations to respond to citizens’ needs and demands in a more efficient and effective manner (Gauld, et al., 2009). Many methodologies are developed for evaluating how e-government has increased the responsiveness of public organisations (Andersen, Medaglia, Vatrapu, Henriksen, & Gauld, 2011). Examining the extent to which the public organisations respond to citizens’ queries and comments made through emails, web forms, and e-forums is a popular way of evaluating the impact of e-government on responsiveness (Decman, 2007).
West (2004) evaluates the responsiveness of public organisations by examining how they respond to citizens’ emails. The degree to which public organisations respond to citizens’ emails, and the number of business days taken by individual organisations are used to measure the responsiveness of e-government. Decman (2007) evaluates the responsiveness of public administration staff across the parliament, ministries, administrative districts and municipals in Slovenia. In Decman’s study, the responsiveness of public administration staff is evaluated by sending emails to public sector staff with email containing a short questionnaire and another email containing a real case question from an imaginary citizen. Analysis is carried out based on the length of time that the public officials took to send replies to the researcher.

Gauld et al. (2009) provide a comparative assessment of the responsiveness of public organisations through e-government in Australia and New Zealand by examining both the supply and demand sides of e-government. In their research the responsiveness of e-government is evaluated by examining the availability of email addresses of public official to citizens, the amount of time that users have to spend to locate email address on websites, the degree to which public organisations replied to citizens’ emails, the availability of auto responses, time taken by public officials to reply, and overall quality of the response (Gauld et al., 2009). A much similar study is done by Andersen et al. (2011) to evaluate the responsiveness of the digital public services in Denmark, Australia and New Zealand with the use of a similar set of indicators.

With the rapid development of e-government over the years, modern e-government performance evaluation methodologies focus more on the impact that e-government have on the government itself, citizens and societies (Heeks, 2008a). The impact
assessment not only concentrates on the cost and benefit, efficiency and effectiveness of e-government efforts, but also on the impact of such efforts on the social and democratic dimensions of individual countries (Kunstelj & Vintar, 2004; Heeks, 2008a). Improving democracy, enhancing trust, ensuring equity, enhancing personal development and producing value for citizens through e-government, for example, are the focuses of much e-government impact assessment approaches.

The adoption of e-government dramatically transforms the way that government interacts with citizens. As a result, the entire public administration is gradually brought under the umbrella of internet. This causes many equity issues in societies worldwide (Edmiston, 2003). Increasing the provision of government information and services through the internet creates the possibilities of e-government excluding specific groups (Holden, Norris, & Fletcher, 2002; Rubaii-Barrett & Wise, 2008). Those specific groups that may be excluded as a result of e-government are minorities with diverse social and cultural backgrounds, rural citizens with inadequate access to the internet and ICT, low-income people, physically disable people, and under-educated people who lack skills (Edmiston, 2003; Norris & Curtice, 2006; Zambrano, 2008). As a result, ensuring equity through e-government is extremely challenging and problematic in many developing countries worldwide (Edmiston, 2003). The effectiveness of e-government can be realized only if it is capable of achieving the desired goals and objectives that a society largely expects (Falivene & Silva, 2008).

Much research is done on how e-government can lead to the achievement of equity (Leigh, 2010). Gamage and Halpin (2007), for example, assess the impact of kiosk in rural areas that provide poor rural citizens equal access to e-government in Sri Lanka.
The study reveals that establishment of kiosks in public places in rural areas is a cost-effective way to narrow the digital divide and ensure equity by providing citizens with access to computers and to the internet. Naik, Joshi and Basavaraj (2011) evaluate the impact of tele-centres in rural India and reveal that equity and sustainability can only be achieved if these telecenters provide citizens with G2C service.

Subramanian and Saxena (2008) evaluate the impact of ‘online information centres’ (tele-centres) established in most backward regions in Chhattisgarh state of India on reducing the gap between the rich and the poor in terms of creating a more inclusive e-governance. The study reveals that as a result of e-government systems implemented in these centres, the citizens’ applications for obtaining government services are processed in the sequence of their submission and that the earlier patronage based unfair practices - processing the applications of the favourites on a priority basis – have been completely eliminated. As a result every citizen gets treated equally (Subramanian & Saxena, 2008).

The existence of multiple ethnic groups with many different local languages also challenges an equal provision of government services through e-government. A study by West (2004) on assessing the state and federal government websites in the United States reveals that only 6% websites provide foreign language translation facilities to non-English speaking users. West (2004) recommends that the government organisations should provide multilingual content in their websites for those who do not speak English to ensure equity through e-government.
Kuzma (2010) conducts an evaluation of the accessibility design in government websites in the United Kingdom by considering whether government websites have the potential to improve the quality of life of people with disabilities by providing opportunities for more political participation and making government information more available to them. The study reveals that many government websites do not meet standards stipulated by accessibility guidelines such as the World Wide Web Consortium (W3C). Rubaii-Barrett and Wise (2008) examine the responsiveness of the United States government websites to the needs of people with disabilities. The study reveals that state websites and web portals generally do not recognise the needs of those with disabilities in their website designs. Failing to consider issues of accessibility in designing websites make e-government disadvantageous for people with disabilities (Rubaii-Barrett & Wise, 2008).

Trust is “the subjective assessment of one party (trustor) that another party (trustee) will perform a particular transaction according to his or her confident expectations, in an environment characterised by uncertainty” (Ba & Pavlou, 2002, p. 245). Trust is at the heart of the relationship between citizens and government (Kelly et al., 2002). Citizens expect their information to be protected by public authorities (Jorgensen & Bozeman, 2007). Citizens trust that e-government will provide credible information, data will be secured and transactions will be conducted in a secure manner (Segovia, Jennex & Beatty, 2009). Internet is, however, not the safest place and it brings many threats to the privacy and security of citizens’ information (Kearns, 2004; Marsh, Patrick, & Briggs, 2007). Citizens will not embrace e-government if their information cannot be securely kept (Sakowicz, 2002; United Nations, 2003).
Much research has been done on evaluating the impact of e-government to develop citizens’ trust. Be’langer and Carter (2008), for example, conduct an investigation of trust in e-government adoption by identifying two targets of trust, namely, citizens’ trust of the internet media and citizens’ trust of the government. Trust of the internet is measured through (a) citizens’ perceptions about the capacity of the internet to safeguard their transactions with the government, (b) perceptions of citizens about the adequacy of the legal and technological structures in protecting them from the security threats on the internet, and (c) the citizens’ overall perceptions about the internet as a robust and safe environment to transact with the government. Trust of the government is measured through (a) citizens’ perceptions of the trustworthiness of public organisations, and (b) their perceptions on the good faith of the government in carrying out online transactions.

Shim and Eom (2008) evaluate the impact of e-government on reducing corruption at public organisations. In this study, e-government is viewed as an effective tool for reducing corruption and increasing openness of public sector by strengthening the relationship with citizens and by more effectively controlling and monitoring public employees’ behaviour. Using e-government systems to handle government tenders and publishing tender outcomes online, for example, make it difficult for corrupt employees to grant favours to specific contractors (Shim & Eom, 2008; Anderson, 2009; Bertot et al., 2010). The study reveals that e-government has had a positive impact on corruption reduction at public organisations. A much similar study by Kim et al. (2009) evaluates how e-government is used for increasing the transparency by combating corruption in Seoul Metropolitan government.
Some developed countries worldwide have attempted to facilitate the development of citizens through e-government. The United States, for example, has explored the potential of e-government for raising the level of education and skills (United Nations, 2003; Evans & Yen, 2006). With the involvement of schools, universities and government, various e-government applications such as distance-learning systems are developed for helping children too ill to attend school rural children who live too far away from a school, and senior citizens who have difficulty leaving their home but wish to continue their learning (Evans & Yen, 2006).

The contribution of e-government to the management of environmental threats is becoming increasingly important worldwide. E-government can bring many environmental benefits to public organisations by helping to limit duplication of effort and resources, share data and resources, automate repetitive tasks, centralise tasks and services, increase the efficiency in the sharing resources, decrease the use of paper, to dematerialise (ITU, 2008), increase citizens’ awareness of neighbourhood pollution data through government websites (Reeder, 2001), and to obtain citizens’ inputs for environmental policy formulation (Lim & Tang, 2007).

Lim and Tang (2007) analyse the impact of e-government on making environmental decisions in Korea. Their study assesses the content and functionalities of government websites that influence the performance of environmental decision making. It reveals that websites, which contain environmental policy information, educate citizens and help to overcome the information asymmetry between citizens and the government. Furthermore, online forums enable citizens to effectively engage in policy discussion and present their ideas to policy makers. Their study also reveals that the overall
quality of the websites is critical for effective environmental decision making through e-government. High quality websites provide information which is extremely useful for decision making and thereby, improve the quality of the decision.

2.5 Evaluating the Public Value of e-Government

The concept of public value is a normative theory for measuring the performance of public services (Moore, 1995; Alford & O’Flynn, 2009). It is used to measure the “context specific preferences of individuals concerning, on the one hand, the rights, obligations, and benefits to which citizens are entitled, on the other hand, obligations expected of citizens and their designated representatives” (Bozeman, 2007, p. 13). The underlying principle of the public value concept is that the value to citizens should guide the operations of public organisations on the delivery of public services (Moore, 1995). This is because the ultimate goal of public programs including e-government initiatives is to create value for citizens (Moore, 1995; Try & Radnor, 2007; Try, 2008; Meynhardt, 2009). Citizens derive value from their personal consumption of public services (Kelly et al., 2002; Alford & O’Flynn, 2009).

This concept is becoming popular in the United States, European nations, Australia, and even in developing nations in evaluating the performance of public services due to its capacity for examining the performance of public services from the perspective of citizens (Kelly et al., 2002; Alford & O’Flynn, 2009; Benington, 2009). It is used to measures the total impact of government activities to citizens in terms of the value it creates (Kelly et al., 2002; Alford & O’Flynn, 2009). This concept is extremely
useful for government to improve policy decisions and the relationship between
government and citizens (Kelly et al., 2002).

The concept of public value has been extended in many different ways. Kelly et al.
(2002), for example, define public value as the value created by the government for
citizens through the provision of public services, passing of laws and various other
government activities. Such a definition helps to identify the important sources of
creating public value. Delivery of quality public services creates public value (Kelly
et al., 2002; Try, 2008; O’Flynn, 2007). Achieving socially desirable outcomes is
another way to create public value (Kelly et al., 2002; Cole & Parston, 2006; Try,
2008). Effectiveness of public organisations also creates public value (Moore, 1995;
Karunasena & Deng, 2010a, 2012) Developing trust between the public and the
government creates public value (Kelly et al., 2002). It is, argued that trust is a public
value outcome rather than a source of public value creation (Grimsley & Meehan,
2007). Figure 2.4 shows these important sources of public value.

![Diagram of public value sources]

**Figure 2.4** Sources of public value creation
There are many kinds of public value in a society. In fact, Jorgensen and Bozeman (2007), for example, develop an inventory of seventy-two kinds of public value based on 230 studies in the United States, the United Kingdom and the Scandinavian countries. Kernaghan (2003) examines about thirty-two kinds of public values in West-minister style governments including Australia, New Zealand, Canada and the United Kingdom. Quality, openness, responsiveness, efficiency, user orientation, equity, citizen’s self-development, democracy, and environmental sustainability are important kinds of public value (Kernaghan, 2003; Bozeman, 2007; Jorgensen & Bozeman, 2007).

The kinds of public values in the public value inventories can be defined in many different ways. Quality is defined as meeting and exceeding citizens’ expectations (Stringham, 2004) through the delivery of public services. Openness refers to the transparency of public administration that often involves publishing what it has to publish and answering questions from the public (Jorgensen & Bozeman, 2007). Responsiveness means that public administration complies more actively with the demands of public, and responds to public opinions (Jorgensen & Bozeman, 2007). Efficiency refers to the manner in which the operations of the organisation yield more benefits than costs incurred: more for the same or the same for less (Millard, Warren, Leitner, & Shahin, 2006; Afonso, Schuknecht, & Tanzi, 2006). User-orientation is interpreted as the provision of public services in a user-friendly manner for satisfying users’ needs (Jorgensen & Bozeman, 2007). Equity requires that all citizens be treated equally (Schwartz, 1992). Self-development refers to the government leveraging of resources to develop citizens’ knowledge and skills (Benington, 2009). Participatory democracy is the willingness of public organisations to listen to the public opinion
and facilitate the public to participate in political activities (Jorgensen & Bozeman, 2007). Environmental sustainability is about leaving a clean environment and plentiful resources to our future generations, instead of wilfully destroying what was created millions of years ago (Jorgensen & Bozeman, 2007). It is however, argued that meanings and interpretations of these kinds of public value vary from state to state and from society to society (Jorgensen & Bozeman, 2007; Samaratunge & Wijewardena, 2009).

E-government has gone through a number of phases since its introduction for improving the effectiveness and efficiency of public services (IANIS, 2007; Karunasena et al., 2011). Various drivers are behind the development of e-government including technology, user and cost (IANIS, 2007; Karunasena et al., 2011). A technology-driven e-government endeavour focuses on the use of ICT for the effective and efficiency delivery of public services (Karunasena et al., 2011). A cost-driven e-government initiative strives for the efficiency of public services delivery through ICT (Karunasena et al., 2011). A user-centred e-government strategy pays more attention to the requirements and expectations of users in developing e-government initiatives (Karunasena et al., 2011).

The concept of public value is increasingly becoming an innovative driver in modern e-government endeavours (IANIS, 2007; Bonina & Cordella, 2008). As pointed out by Castelnovo and Simonetta (2007), since “public administration aims at producing value for citizens, the use of ICT to improve government is a means to improve the public value” (p 22). Yu (2008) further argues that the prime objective of e-government is to produce public value. This shows that creating public value through
e-government is vital for designing and developing e-government initiatives. “People express preferences, the government uses ICT to enhance its own capacity to deliver what people want, and eventually public value is created” (United Nations, 2003, p.1). In the light of the discussion as above, e-government is often seen as a process of creating public value with the use of modern ICT (United Nations, 2003).

With the popularisation of public value as the modern driver for e-government development, there have been several attempts at developing various approaches for evaluating the public value of e-government from different perspectives. Kearns (2004), for example, investigates the public value of e-government by directly adopting the three sources of public values creation proposed by Kelly et al. (2002), namely, delivery of quality public services, achievement of socially desirable outcomes, and development of public trust. In this framework indicators are proposed for evaluating the public value created through quality public service delivery. The public value of quality public services delivery is measured by (a) the level of information provision, (b) the extent of e-government use, (c) the availability of choice, (d) the level of user satisfaction, (e) the extent to which e-government is focused on user priorities, (f) the extent to which e-government is focused on those most in need, and (g) the cost effectiveness of e-government services. The applicability of this framework is exemplified through its use in assessing the public value of e-health initiatives in United Kingdom (Bend, 2004). Figure 2.5 shows the framework of Kearns (2004).
The framework of Kearns (2004) has been extended in different ways. Golubeva (2007), for example, proposes a framework for evaluating the public value of e-government portals which includes three main dimensions, namely, (a) quality of public services, (b) public trust, and (c) public policy outcomes. In this approach, openness, citizen-centricity and usability indicators are proposed to measure the public value of public service quality. Transparency and interactivity indicators are proposed to measure the public value of public trust. This framework is applied in the Russian Federation for evaluating the public value created through regional portals with interesting findings. Figure 2.6 shows the framework of Golubeva (2007).
Karunasena et al. (2011) extend Kearns’ (2004) framework with the inclusion of effectiveness of public organisations as a dimension of evaluating the public value of e-government. In this framework the public value of effectiveness of public organisations is evaluated by (a) efficiency, (b) accountability of public organisation, and (c) citizens’ overall perceptions about the effectiveness of the public organisation. Citizens’ trust in public organisations is evaluated through (a) security and privacy of citizens’ information, (b) transparency of e-government services, (c) trust of citizens in e-government services, and (d) participation of citizens in e-government. Similar to Kearns’ (2004) approach, the public value of public service delivery is evaluated by examining (a) the availability of information, (b) the citizens perceptions about the importance of the information, (c) availability of multiple channels for citizens to access public services, (d) cost savings, (e) fairness of the services delivery, (f) citizens’ satisfaction on e-government service delivery, and (e) the take-up of e-government services. This framework is used for evaluating the performance of e-government in Sri Lanka with the use of much secondary data. Figure 2.7 shows the framework of Karunasena et al. (2011).

Grimsley and Meehan (2007) develop a framework for evaluating the public value of e-government with a focus on (a) services, (b) user satisfaction, (c) trust, and (d) outcomes. The framework takes into account users’ experiences on the provision of public services and services outcomes for the development of public trust. The framework is validated with use of survey data collected from e-government projects in the United Kingdom. The framework reveals that trust is “related to the extent to which people feel that an e-government service enhances their sense of being well-
informed, gives them greater personal control, and provides them with a sense e-government users experience” (Grimsley & Meehan, 2007, p. 134).

The European Commission (2006) proposes a different framework for evaluating the public value of e-government in its member countries by considering three types of public values, namely finance, political, and constituency values. Three public values drivers, namely, efficiency, democracy and effectiveness are considered. In this framework efficiency is evaluated by examining the (a) cashable financial gains for public organisations, (b) extent to which public organisation empowers public employees, and (c) improvement of the ICT infrastructure in public organisations. Democracy is evaluated by examining (a) the extent to which public organisations demonstrate openness and transparency through e-government, and (b) citizens’ active participation in public sector activities. Effectiveness is evaluated by examining
(a) the reduction of administrative burden on citizens, (b) improvement of citizens’ satisfaction, and (c) the extent to which e-government provides more inclusive public services. Figure 2.8 shows an overview of this framework.

![Diagram showing the framework of European Commission (2006)](image)

**Figure 2.8** The framework of European Commission (2006)

Liu, Derzsi, Raus and Kipp (2008) propose a framework for evaluating the value of e-government projects in European Union member countries. The framework assesses the public sector IT investment by taking into account the multidimensional nature of the value of e-government projects. It focuses on the finance value, the social value, the operational value, and the strategic value of e-government projects. This framework is extremely useful for assessing the value of the G2B type of e-government projects.
Omar, Scheepers and Stockdale (2011) propose a conceptual framework for evaluating public value by examining the quality of e-government service delivery. In this framework, the public value of e-government service quality is examined by considering service quality, information quality, and system quality issues. This framework aims to evaluate public value from the view of citizens, and considers how citizens perceive and evaluate e-government services (Omar et al., 2011).

The Agency for the Development of Electronic Administration in France proposes a framework for evaluating the public value of IT (Carrara, 2007). The framework focuses on evaluating the financial benefits of French e-government projects for public sector and for citizens. The framework examines (a) finance value, (b) social and operation value, and (c) direct customer value. The financial value is measured by examining the financial savings and increase of government’s revenue using net present value (NPV) which is a method of calculating the expected net monetary gain or loss from a project, internal rate of return (IRR) which is used to calculate the discount rate which makes the NPV equals to zero (Schwalbe, 2004), and break-even point calculations. The social and operational value is evaluated by examining the impacts of improved service delivery and employee satisfaction resulting from e-government. Direct customer value is measured by assessing the benefits received by citizens such as service quality, social impacts, cost savings, time saving and so forth.

Australian Government Information Management Office (AGIMO, 2004) proposes a methodology for assisting government organisations to evaluate the demand for and the value of e-government initiatives. This methodology facilitates individual
agencies to assess the organisational financial value, users’ financial value, social value, and governance values created by their online programs.

The frameworks discussed above, however, have various shortcomings and therefore, are inadequate for evaluating the public value of e-government in Sri Lanka. The framework of Kearns (2004), for example, aims to evaluate the public value created through the delivery of quality public services. However, it does not consider e-government service quality attributes such as information quality, functionalities of the services and usability issues (Wangpipatwong et al., 2009; Papadomichealaki & Mentzas, 2009). It also fails to consider creation of public value through the operation of efficient and effective public organisations which is an important source of public value (Moore, 1995). Moreover, this framework lacks appropriate indicators to measure public trust and outcomes of e-government, although trust and achievement of outcomes are recognized in it as two main sources of public value creation. Furthermore, the framework of Kearns’ (2004) does not take into account the different public values in society such as openness, responsiveness, efficiency, user orientation, self-development, democracy, and environmental sustainability. Considering the public values in society in the evaluation process is extremely important for evaluating the true public value of e-government.

The frameworks of Golubeva (2007) and Karunasena et al. (2011), which are extensions of Kearns (2004) framework, inherit from Kearns the problem of inadequate indicators for measuring the achievement of socially desirable outcomes and service quality. Moreover, these frameworks too fail to consider the public values in society. For example, in Golubeva’s (2007) framework, equity, self-development,
responsiveness, efficiency, democracy, and environmental sustainability are not
considered. Public values such as self-development, responsiveness, and
environmental sustainability are not considered in the framework of Karunasena et al.
(2011). Furthermore, the framework of Karunasena et al. (2011) uses much secondary
data. To evaluate the true public value it is essential to find out directly from citizens
what they regard as values.

The framework of European Commission (2006) is designed to be used in European
countries where e-government initiatives are mature. This framework is, therefore,
inappropriate for use in developing countries like Sri Lanka where e-government has
not reached the maturity levels of e-government initiatives in developed countries.
Moreover, the framework of the European Commission (2006) is often criticised due
to its bias towards e-administration and failure to include government’s e-enabling of
civil society (Heeks, 2008a). Moreover, this framework allows the researcher to use
much secondary data which can be obtained from official statistics, internal
administrative records, standards cost model estimates, third party web assessments,
user satisfaction surveys and so forth. However, as noted earlier, true public value can
only be discovered by directly considering the perceptions of citizens.

The framework of Liu et al. (2008) is criticised for its bias towards the G2B
perspective of e-government. However, public value is widely defined as the value
created by the government for citizens (Moore, 1995; Kelly et al., 2002), and
therefore, taking into account G2C perspective of e-government is essential in
evaluating the public value of e-government. The framework of Omar et al. (2011)
considers only the creation of public value through quality public services. Other
sources of public value creation such achievement of socially desirable outcomes, development of trust and operating effective public organisations are not considered.

Some of the frameworks (AGIMO, 2004; Carrara, 2007) usually allocate more weight to economic value in the evaluation process rather than considering social and democratic values in the society (Jones, 2008). These frameworks use NPV, IRR, and cost benefit analysis calculations which are widely used in the private sector for evaluating economic values (Jones, 2008). Such calculations are not desirable to be deployed in the complex public service environment where citizens’ values and preferences play a critical role (Bannister, 2001). It is further argued that unlike the private sector, the public sector has to create not only economic values but also various public values for the society (Flak et al., 2009). Hence, the value of e-government projects cannot be evaluated only by examining the economic values (Esteves & Joseph, 2008; Friedland & Gross, 2010). It is essential to consider various other public values in society in the evaluation process (World Bank, 2007).

There is a lack of evidence of the validity and reliability of some of these frameworks (Kearns, 2004; Golubeva, 2007; Omar et al., 2011). How these frameworks are tested and validated, and what methodologies are used to validate the frameworks are unclear. Furthermore, the context specific nature of the public value further creates the need of testing and validating the frameworks before applying them in Sri Lanka for evaluating the public value of e-government. The meanings and interpretations of public values vary significantly from state to state, or even from society to society (Jorgensen & Bozeman, 2007). Moreover, it is further argued that values are not constant due to their dynamic nature for reflecting the societal needs (Samaratunge &
Wijewardena, 2009). The interpretations of public values adopted in other frameworks, therefore, would be different from the interpretations that should be adopted in a framework developed to be applied in Sri Lanka. To adequately address the above issues, it is essential to develop a revised framework, and empirically test and validate that framework in order to adequately evaluate the public value of e-government in Sri Lanka. Table 2.2 summarises the strengths and limitations of existing frameworks for evaluating the public value of e-government.

<table>
<thead>
<tr>
<th>Research</th>
<th>Strengths of the framework</th>
<th>Limitations of the framework</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kearns (2004)</td>
<td>o Three public value evaluation dimensions - quality of public service delivery, outcomes, and trust – are considered</td>
<td>o Important public values in the society - openness, responsiveness, democracy, user orientation, efficiency, self-development, and environmental sustainability - are not considered</td>
</tr>
<tr>
<td></td>
<td>o Quality of public service delivery is evaluated through the level of information provision, level of use, availability of choice, user satisfaction, user priorities, fairness, and cost savings</td>
<td>o E-government service quality issues – information quality, service quality, and useability – are not considered</td>
</tr>
<tr>
<td></td>
<td>o Trust and outcomes are ignored</td>
<td>o Validity and reliability issues exist in the framework</td>
</tr>
<tr>
<td>Golubeva (2007)</td>
<td>o Three dimensions of public value evaluation - public service quality, trust and outcomes – are considered</td>
<td>o Focus is limited to public value of e-portals</td>
</tr>
<tr>
<td></td>
<td>o Public service quality is measured through openness, citizen-centricity, and usability indicators</td>
<td>o Important public values in the society are not considered</td>
</tr>
<tr>
<td></td>
<td>o Public trust is measured through transparency and interactivity indicators</td>
<td>o No indicators are proposed to measure outcomes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>o Validity and reliability issues of the framework</td>
</tr>
<tr>
<td>Karunasena et al., (2011)</td>
<td>Four dimensions of public value evaluation - delivery of public service, efficiency of public organisations, development of trust, and achievement of socially desirable outcomes – are considered</td>
<td>Important public values in the society are not considered</td>
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<td>--------------------------</td>
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<td>--------------------------------------------------------</td>
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<tr>
<td></td>
<td>The indicators that measure public service quality are extended from Kearns’ (2004) framework</td>
<td>E-government service quality issues are not considered</td>
</tr>
<tr>
<td></td>
<td>Trust is measured through security and privacy, transparency, trust in e-services, and participation</td>
<td>No indicators are proposed to measure outcomes</td>
</tr>
<tr>
<td></td>
<td>Effectiveness is evaluated by efficiency, accountability, and citizens’ perceptions about effectiveness</td>
<td>Based on secondary data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Validity and reliability issues of the framework</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>European Commission (2006)</th>
<th>Public value is evaluated through three public value drivers namely efficiency, democracy, and effectiveness</th>
<th>Focus on e-government projects in developed countries. Not suitable for use in developing countries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Efficiency is evaluated by cashable financial gains, empowerment of employees, and improvement of the ICT infrastructure</td>
<td>E-government service quality issues are not considered</td>
</tr>
<tr>
<td></td>
<td>Democracy is evaluated by openness, transparency, and participation indicators</td>
<td>Critical public values such as user-orientation, trust, environmental sustainability, and self-development are not considered</td>
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<tr>
<td></td>
<td>Effectiveness is evaluated by reduction of administrative burden on citizens, improvement of citizens’ satisfaction, inclusiveness of public services</td>
<td>Indicators are biased towards e-administration</td>
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<td></td>
<td>Designed to assess e-government in developed countries</td>
<td>No indicators to measure e-enabling of civil society</td>
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<td></td>
<td></td>
<td>Used much secondary data, internal administrative records, standards cost model estimates, third party web assessments, and user satisfaction surveys etc is used</td>
</tr>
<tr>
<td>Source</td>
<td>Public Value Considerations</td>
<td>Other Considerations</td>
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<td>------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
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<tr>
<td>Liu et al. (2008)</td>
<td>- Multiple public value evaluation dimensions: financial, social, strategic, and operational values are considered</td>
<td>- G2C and G2CS perspectives of e-government are not considered</td>
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<td></td>
<td>- Focuses on G2B perspective</td>
<td>- Sources of public value creation are ignored</td>
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<td></td>
<td></td>
<td>- Critical public values in the society are not considered</td>
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<tr>
<td>Omar et al. (2011)</td>
<td>- Public value of quality public service delivery is considered</td>
<td>- Other sources of public value evaluation are ignored</td>
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<td></td>
<td>- E-government service quality issues: service quality, information quality, and system quality are considered</td>
<td>- Critical public values in the society are not considered</td>
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<tr>
<td></td>
<td></td>
<td>- Framework is at the conceptual level. Validity and reliability issues of the framework</td>
</tr>
<tr>
<td>AGIMO (2004)</td>
<td>- Value creation from economic and social perspectives of e-government</td>
<td>- Sources of public value creation are ignored</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Critical public values in the society are not considered</td>
</tr>
<tr>
<td>Carrara (2007)</td>
<td>- Financial, social and operational, and customer values are considered</td>
<td>- Sources of public value creation are ignored</td>
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<td></td>
<td></td>
<td>- Critical public values in the society are not considered</td>
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<td></td>
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<td>- Rely on private sector economic value calculation formula</td>
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</table>

### 2.6 Conclusion

This chapter aims to review the related literature on the concept of e-government, the development of e-government in Sri Lanka, the existing e-government performance evaluation approaches, and the concept of public value. The existing frameworks for evaluating the public value of e-government are also critically analysed in this chapter with the intention of selecting a suitable framework for evaluating the public value of e-government in Sri Lanka. The review of literature reveals that the existing
frameworks have various shortcomings for effectively evaluating the public value of e-government in Sri Lanka. Narrow focus on evaluating the public value of e-government projects in developed countries, inadequate consideration of critical public values in society, and validity and reliability issues, for example, make these frameworks inappropriate for use in Sri Lanka. As a result, the need for developing a revised theoretical framework emerged. Based on the literature reviewed in this chapter, a revised theoretical framework is proposed in next chapter for evaluating the public value of e-government in Sri Lanka.
Chapter 3

The Theoretical Framework

3.1 Introduction

This research aims to investigate the public value of e-government in Sri Lanka with the use of a survey and interviews. To adequately accomplish this aim, a theoretical framework is required for providing the foundation to the implementation of both the quantitative and qualitative studies. From the standpoint of the quantitative study, the theoretical framework helps to hypothesise the critical factors for evaluating the public value of e-government in Sri Lanka while guiding the development of the survey instrument. From the standpoint of the qualitative study, the theoretical framework helps to develop the interview questions and facilitates the conduct of thematic analysis on the interview data in a deductive manner.

This chapter is organised as follows. The first section presents a discussion of how the theoretical framework is developed based on the review of the related literature presented in the previous chapter. The second section describes the theoretical framework which consists of three main dimensions of public value evaluation through e-government, namely, (a) delivery of quality public services, (b) effectiveness of public organisations, and (c) the achievement of socially desirable outcomes. A set of indicators are proposed for evaluating each dimension as above. The last section summarises the theoretical framework in this research.
3.2 The Theoretical Background

The theoretical framework is developed based on four theoretical concepts, namely, (a) the theory of public value, (b) the sources of public value creation, (c) inventories of public value, and (d) dimensions of e-government as shown in Figure 3.1. In developing such a framework, the specific nature of e-government development in Sri Lanka and the strengths of existing e-government performance evaluation methodologies are considered.

The first theory for underpinning the proposed framework is the public value theory (Moore, 1995). This theory states that the ultimate goal of public service is to create values for citizens (Moore, 1995; Try & Radnor, 2007). Citizens derive value from personal consumption of public services (Kelly et al., 2002; Alford & O’Flynn, 2008). The value to citizens should therefore guide the operations of public organisations on...
the delivery of public services (Moore, 1995). It is further argued that public value cannot be created by the public program alone. The creation of public value very much depends on public organisations, various stakeholders, and their interactions in between (Jorgensen & Bozeman, 2007; Benington, 2009).

The second theoretical concept is the sources of public value creation. There are three sources of public value creation. They are the delivery of quality public services (Moore, 1995; O’Flynn, 2007), effectiveness of public organisations (Moore, 1995; Karunasena et al., 2011), and achievement of socially desirable outcomes (Kelly et al., 2002; Try, 2008). These three sources of public value creation produce public value in many different ways. For example, satisfying citizens’ expectations by delivering quality services through e-government creates public value as citizens derive benefits from their personal use of public services (Kelly et al., 2002; Kearns, 2004). Operating effective public organisations creates public value by meeting citizens’ desires for properly ordered and efficient public organisations (Moore, 1995; Jorgensen & Bozeman, 2007; Karunasena et al., 2011). Generating socially desirable outcomes by implementing various public sector projects create public values such as equity, self-development, and trust.

The third theory is about the inventories of public value in a society (Jorgensen & Bozeman, 2007; Bozeman, 2007). Such a theory proposes that there are many kinds of public value in a society (Jorgensen & Bozeman, 2007). For example, quality, user orientation, efficiency, openness, responsiveness, equity, self-development, confidentiality, democracy and environmental sustainability are representatives of public values. These public values are created through the three sources of public
value creation discussed above. Quality of information and services and user-orientation can be realised through public service delivery. Efficiency, openness, and responsiveness can be ensured by effectively operating public organisations. Equity, self-development, trust, democracy, and environmental sustainability can be achieved as they are socially desirable outcomes.

The fourth theoretical perspective is the dimensions of e-government. As mentioned in the literature review, e-government can be approached from different perspectives including (a) e-citizens, (b) e-services, (c) e-administration, and (d) e-society (Ndou, 2004; Heeks, 2008b). The e-citizens approach to e-government focuses on maintaining the relationship between public organisations and citizens by consulting and engaging with citizens, supporting accountability, encouraging participation in democratic decision making, and providing public services (Jones et al., 2007; Heeks, 2008b). The e-services approach to e-government is about delivering quality public service to citizens in an innovative and efficient manner (United Nations, 2003; Jones et al., 2007; Heeks, 2008b). The e-administration approach to e-government concentrates on improving public processes by cutting costs, linking government’s processes and interconnecting government agencies, empowering public employees and improving transparency and accountability in public organisations (Heeks, 2008a). The e-society approach focuses on the relationship between public agencies, and civil societies, and non-profit organisations. Table 3.1 summarises the theoretical background of the framework developed in this research.
### Table 3.1: A summary of the theoretical background of the research

<table>
<thead>
<tr>
<th>Research</th>
<th>Important themes</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public value theory</td>
<td>The ultimate goal of public programmes is to create values for citizens</td>
<td>Moore (1995), Try and Radnor (2007).</td>
</tr>
<tr>
<td>Sources of public creation</td>
<td>Delivery of quality public services</td>
<td>Kelly et al., (2002),</td>
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<td></td>
<td>Achievement of socially desirable outcomes</td>
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</tr>
<tr>
<td>Inventories of public value: Public values in the society</td>
<td>Quality: Meeting citizens’ expectations</td>
<td>Jorgensen and Bozeman (2007),</td>
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<tr>
<td></td>
<td>Efficiency: Organisational efficiency</td>
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<td></td>
<td>Openness: Being accountable and transparent</td>
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<td></td>
<td>Responsiveness: Responding to public demands</td>
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<td></td>
<td>Equity: Availability of resources for all, and protection and promotion of diversities of culture</td>
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<td></td>
<td>Self-development: Leveraging resources to validate knowledge and skills through training</td>
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<td></td>
<td>Participatory democracy: Giving opportunities to citizens to participate in decision making</td>
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<td>Trust: Trust between citizens and government</td>
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<td></td>
<td>Environmental Sustainability: Protecting environment for future generations</td>
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<td></td>
<td>E-services: Delivering quality public services</td>
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<tr>
<td></td>
<td>E-administration: Cutting cost, linking processes, empowering staff, and improving transparency and accountability</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E-society: Building the social and economic capacities and capital of local communities</td>
<td></td>
</tr>
<tr>
<td>E-government in Sri Lanka</td>
<td>Re-engineering the government</td>
<td>Hanna (2007, 2008),</td>
</tr>
<tr>
<td></td>
<td>Information infrastructure development</td>
<td>ICTA (2010)</td>
</tr>
<tr>
<td></td>
<td>Human resources capacity building</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E-society development</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Policy formulation and institutional development</td>
<td></td>
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</tbody>
</table>
Sri Lanka is a developing country with a majority of population living in rural areas, low ICT readiness among citizens and the public sector, and poor information infrastructure nationwide (Hanna, 2007, 2008; Karunasena et al., 2012). As a result, implementing e-government is a complex and challenging task in Sri Lanka. Hence, the government of Sri Lanka has launched a unique e-government program to overcome these barriers. The uniqueness of e-government in Sri Lanka is due to the encapsulation of several ICT development programs with the e-government development program with the aim of creating an enabling environment for e-government development. E-government development in Sri Lanka is, therefore, facilitated by developing affordable information infrastructure throughout the country, upgrading ICT infrastructure in public organisations, capacity building of public sector employees, developing e-society, formulating policies and developing the capacity of public institutions. As a result, real public values are promised for Sri Lankan citizens through this unique e-government program.

3.3 A Theoretical Framework

Based on the theoretical perspectives discussed above and the indicators derived from various e-government performance evaluation methodologies discussed in the literature review, a theoretical framework for evaluating the public value of e-government in Sri Lanka is hypothesised by addressing the limitations of the existing public value evaluation frameworks. Figure 3.2 shows the theoretical framework.
The proposed theoretical framework hypothesised that the public value of e-government can be created by the delivery of quality public services, the effectiveness of public organisations, and achievement of socially desirable outcomes. It further hypothesises that the public value created by the quality of public services delivery through e-government is reflected by the value of (a) quality of information, (b)
functionalities of e-services, and (c) user-orientation of e-government information and service delivery.

The quality of information is measured through citizens’ perceptions about the value of the available information, reflected by the timeliness, relevancy, accuracy, understandability (Wangpipatwong et al., 2009; Papadomichelaki & Mentzas, 2009; 2011), and the level of detail of the information provided (Barnes & Vidgen, 2003). The accuracy of information refers to the error freeness of the information (Wangpipatwong et al., 2009). The timeliness is about the currency of the information available (Wangpipatwong et al., 2009). The relevancy measures the degree of match between the availability of the information and the need of the user (Wangpipatwong et al., 2009). The understandability refers to the clarity of the information and the easiness to comprehend (Wangpipatwong et al., 2009). The appropriate level of detail means whether the website provides the relevant information in a sufficiently detailed manner to meet the needs of the information seeker (Barnes & Vidgen, 2003).

The public value of the functionalities of e-services can be measured by the citizens’ perceptions of the value of the complete two-way transactions which enable real-time interactions between governments and users, the ability to pay online for public services (Irani, Al-Sebie, & Elliman, 2006; Carrzales, Holzer, & Manoharan, 2008), the capacity to fill and submit forms online (Torres et al., 2005), the availability of simple interactions with public organisations (Carrzales et al., 2008), and the ability to download archives and forms (Torres et al., 2005; Wangpipatwong et al., 2009).
User-orientation is about the provision of e-government services in a user-friendly manner in order to satisfy users’ needs (Jorgensen & Bozeman, 2007; Karunasena & Deng, 2012b). It can be measured by citizens’ perceptions on features such as the user-friendliness of websites (Carrzales et al., 2008; Papadomichelaki & Mentzas, 2009), the similarity in look and feel of e-government websites (Yoo & Donthu, 2001), usefulness of frequently asked questions, availability of site maps, presence of simple and concise website addresses (Papadomichelaki & Mentzas, 2009), availability of links to other websites (Carrzales et al., 2008), and presence of a single website for providing all the information (Reddick, 2004; Hirwade, 2010).

Effectiveness of public organisations creates public values (Moore, 1995). Citizens expect (a) efficiency, (b) openness, and (c) responsiveness from public organisations (Kernaghan, 2003; Jorgensen & Bozeman, 2007). E-government can be used for improving the efficiency of public organisations by cutting processing costs, and making strategic connections between and among government agencies (Heeks, 2008b) through developing better ICT infrastructures, re-designing public functions (Al-Omari & Al-Omari, 2006), sharing public information (European Commission, 2006), and empowering public staff (European Commission, 2006; Falivene & Silva, 2008). Since public organisations run on tax payers’ money, citizens value the improved efficiency of public organisations through e-government (Gauld et al., 2010).

Openness refers to increasing the transparency of public organisations in decision making and in answering questions from the general public with the use of e-government (Jorgensen & Bozeman, 2007; Karunasena & Deng, 2011b). It can be
assessed by considering citizens’ perceptions on the publication of public policy drafts and laws and regulations online for public consultations, disclosure of organisational charts and contact information of public officials online (La Porte et al., 2002), disclosure of the budget and expenses of public organisations for showing their accountability, the ability of citizens to make complaints and comments online about government activities (Jaeger & Bertot, 2010), and the publication of tender bidding details by public organisations for increasing transparency (Shim & Eom, 2008; Anderson, 2009).

Responsiveness means that public organisations actively respond to the inquiries of the general public through e-government (Jorgensen & Bozeman, 2007; Gauld et al., 2009). The public value of the responsiveness through e-government can be examined by considering citizens’ perceptions about the value of public organisations’ timely responses to their inquiries made through e-government channels (emails, online forms in websites etc) (West, 2004; Decman, 2007; Gauld et al., 2009), automatic responses to their inquiries (Decman, 2007; Gauld et al., 2009), the ability to trace the status of applications submitted to public organisations, and through the extent to which citizens’ charters are displayed online (Karunasena & Deng, 2010a). In Sri Lanka, the citizens’ charter is a document issued by the government which specifies the minimum number of days that a particular public organisation takes to process an application or deliver a service to citizens (Karunasena & Deng, 2010a).

The achievement of socially desirable outcomes through e-government creates public value (Kearns, 2004; Try & Radnor, 2007). The achievement of the socially desirable outcome is reflected by the impacts and consequences that the public services are
designed to attain (Cole & Parston, 2006; Karunasena et al., 2011). In this regards, (a) equity, (b) self-development of citizens, (c) trust, (d) participatory democracy, and (e) environmental sustainability are the critical public value outcomes that citizens expect from e-government.

Equity means the availability of resources for all, and the protection and promotion of diversities of culture, especially within minority communities (Benington, 2009). To assess the equity of e-government, citizens’ perceptions on government websites’ compliance with accessibility standards (Rubaii-Barrett & Wise, 2008; Kuzma, 2010), on the availability of e-government initiatives in native languages (Smith, 2001; West, 2004; Stowers, 2008; Karunasena & Deng, 2010a), on the provision of appropriate content for ethnic minorities, the provision of e-government services for socially disadvantaged groups (Kearns, 2004; European Commission, 2006), and on the availability of kiosks in rural areas are considered (Edmiston, 2003; Gamage & Halpin, 2007; Subramanian & Saxena, 2008; Naik et al., 2011).

The self-development of citizens is another important public value created through e-government (Jorgensen & Bozeman, 2007; Karunasena & Deng, 2012b). It refers to the government leveraging of resources to develop civic knowledge and skills, to enable citizens to be developed through training and employment, and to improve learning and capabilities of individuals and communities (Benington 2009; Karunasena & Deng, 2011b). The public value of the self-development of citizens through e-government is measured by considering whether citizens can learn and develop their skills through e-government initiatives such as e-learning (Evans & Yen, 2006; European Commission, 2006), and whether e-government has led to the
improvement of ICT skills, development of network skills and so forth (United Nations, 2003). The availability of training for citizens which enable them to improve digital, information and strategic skills (Van Deursen & Van Dijk, 2009), ICT resources (computers, internet etc) which facilitate the improvement of citizens’ skills, e-content for children’s education, and resources for distance learning are important in this regard (Evans & Yen, 2006; European Commison, 2006).

Trust refers to the perception of citizens that the government will perform a particular transaction according to his or her confident expectations (Ba & Pavlou, 2002). The public value of trust can be examined through citizens’ perceptions on whether government organisations carry out online transactions faithfully, on trustworthiness of transactions carried out through the internet (Be´langer & Carter, 2008), on the legal structure that protects citizens (Al-Omari & Al-Omari, 2006; Be´langer & Carter, 2008), on government organisations’ efforts to ensure citizens privacy and information security in their systems (Be´langer & Carter, 2008; Zhao & Zhao, 2010), on provision of privacy and security policy statements on web pages (Zhao & Zhao, 2010), and on the credibility of the information disseminated through e-government channels (Segovia, Jennex, & Beatty, 2009).

Participatory democracy is about the willingness of public organisations to listen to the public’s opinion and give citizens opportunities to participate in the public life (Jorgensen & Bozeman 2007; Benington, 2009; Karunasena & Deng, 2011b). It can be evaluated by the citizens’ perceptions on the value of government keeping citizens informed about up-coming policies (Macintosh, 2004), their ability to participate in
online discussions (Anttirioko, 2003), and ability to post a topic or to set the agenda for public discussions online (United Nations, 2005).

The final public value hypothesised in the framework is environmental sustainability. E-government applications can bring many environmental benefits through energy saving, limiting duplication of efforts, sharing data and resources by automating repetitive tasks, reducing the use of paper (ITU, 2008), and facilitating to obtain citizens’ input for environmental decision making (Lim & Tang, 2007). As result, the public value of environmental sustainability can be measured through citizens perceptions on the value of saving energy, limiting the duplication of effort and resources, sharing data and resources, reducing the paper use, recycling consumable equipments (ITU, 2008; Molla, Cooper, & Pittayachawan, 2009), and obtaining citizens’ input for green information technology policy formulation (Lim & Tang, 2007). Table 3.2 summarises elements - dimensions, sub-dimensions, and indicators - in the theoretical framework that lead to the developement of survey questionnaire.

<table>
<thead>
<tr>
<th>Main dimension</th>
<th>Sub-dimensions</th>
<th>Indicator and references</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delivery of quality public services</td>
<td>Quality of information</td>
<td>Accuracy, timeliness, relevance, understandability (Wangpipatwong et al., 2009; Papadomichelaki &amp; Mentzas, 2009, 2011), and the level of details of information (Barnes &amp; Vidgen, 2003)</td>
</tr>
<tr>
<td>Functionalities of the e-services</td>
<td>Two way transactions, pay online (Irani et al., 2006; Wangpipatwong et al., 2009), fill and submit online forms (Torres et al., 2005), querying databases (Carrzales et al., 2008), and facility to download forms and archives (Torres et al., 2005; Wangpipatwong et al., 2009)</td>
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</tr>
<tr>
<td>User-orientation</td>
<td>User friendliness of the layout (Carrzales et al.,</td>
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</table>
2008; Papadomichelaki & Mentzas, 2009), features to support novice users (non-internet savvy people) (Stowers, 2008), common look and feel of government websites (Yoo & Donthu, 2001), frequently asked questions, site map, simple and concise websites addresses (Papadomichelaki & Mentzas, 2009), links to other websites (Carrzales et al., 2008), one stop portal (Reddick, 2004; Hirwade, 2010)

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<tr>
<th>Effectiveness of public organisations</th>
<th>Organisational efficiency</th>
<th>Re-designed government processes (Al-Omari &amp; Al-Omari, 2006) integrated services, improve ICT infrastructure (European Commission, 2006), empower public sector staff (European Commission, 2006; Falivene &amp; Silva, 2008)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Openness</td>
<td></td>
<td>Public policy drafts, laws or regulations online for public consultation, disclosure of organisational charts and contact information of public officials online (La Porte et al., 2002), online disclosure of the budget and expenses of public organisations for showing their accountability, ability of citizens to make complaints and comments online about government policies and activities (Jaeger &amp; Bertot, 2010), the publishing of tender bidding details online by public organisations for increasing transparency (Shim &amp; Eom, 2008; Anderson, 2009)</td>
</tr>
<tr>
<td>Responsiveness</td>
<td></td>
<td>Timely responses to the citizens’ inquiries made through e-government channels (West, 2004; Decman, 2007; Gauld et al., 2010), automatic responses to online submissions (Decman, 2007; Gauld et al., 2010), ability to make inquiries online (Gauld et al., 2010), ability to trace the status of applications, citizens charters displayed online (Karunasena &amp; Deng, 2010a)</td>
</tr>
<tr>
<td>Achievements of outcomes</td>
<td>Equity</td>
<td>Websites compliance with accessibility standards (Rubaii-Barrett &amp; Wise, 2008; Kuzma, 2010), availability of e-government initiatives in native languages (Smith, 2001; West, 2004; Stowers, 2008; Karunasena &amp; Deng, 2010a), provision of</td>
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</table>
### The Theoretical Framework

<table>
<thead>
<tr>
<th>Category</th>
<th>Self-development</th>
<th>Trust</th>
<th>Participatory democracy</th>
<th>Environmental sustainability</th>
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<tr>
<td></td>
<td>appropriate content for ethnic minorities, e-government services for socially</td>
<td>carry out online transactions faithfully, trustworthiness of transactions through</td>
<td>government keeping citizens informed about upcoming policies (Macintosh, 2004), citizens</td>
<td>saving energy, limiting the</td>
</tr>
<tr>
<td></td>
<td>disadvantaged groups (European Commission, 2006), the availability of kiosks in</td>
<td>the internet (Belanger &amp; Carter, 2008), legal structure that protects citizens</td>
<td>participating in online discussions (Anttiriko, 2003), and ability to post a topic or</td>
<td>duplication of effort and</td>
</tr>
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<td></td>
<td>rural areas (Edmiston, 2003; Gamage &amp; Halpin, 2007; Subramanian &amp; Saxena, 2008)</td>
<td>(Al-Omari &amp; Al-Omari, 2006; Belanger &amp; Carter, 2008), government organisations’</td>
<td>to set the agenda for public discussions online (United Nations, 2005)</td>
<td>resources, sharing data and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>efforts to ensure citizens privacy and information security (Belanger &amp; Carter,</td>
<td></td>
<td>resources, reducing the</td>
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<td></td>
<td></td>
<td>2008; Zhao &amp; Zhao, 2010), privacy and security policy statements on web pages</td>
<td></td>
<td>paper use, recycling</td>
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<td></td>
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<td>(Zhao &amp; Zhao, 2010), and on the credibility of the information disseminated</td>
<td></td>
<td>consumable equipments (ITU,</td>
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<td></td>
<td>(Segovia et al., 2009)</td>
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<td>2008; Molla et al., 2009),</td>
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<td>and obtaining citizens’</td>
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<td>input for green information</td>
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<td>technology policy</td>
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<td></td>
<td></td>
<td>formulation (Lim &amp; Tang, 2007)</td>
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</table>
In the theoretical framework, the public value of e-government is hypothesised as a third-order construct reflected by three main second-order dimensions. Each second-order dimension is reflected by several first-order sub-dimensions (Law, Wong, & Mobley, 1998; Jarvis, Mackenzie, & Podsakoff, 2003; Lu & Ramamurthy, 2011). In other words, the public value of e-government is reflected by the value of high quality public services, operating effective public organisations, and achievement of socially desirable outcomes. The public value of delivery of quality public service is, for example, reflected by the value of the quality of information, functionalities of e-services, and user-orientation. As a result, the relationships stemming from the third-order construct to the main dimensions, and from the main dimensions to the sub-dimensions formulate a series of reflective hypotheses as shown in the Figure 3.2. Table 3.3 summarises the hypotheses.

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Description</th>
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<tbody>
<tr>
<td>H1</td>
<td>The public value of the delivery of quality public service is reflected by the value of quality of information</td>
</tr>
<tr>
<td>H2</td>
<td>The public value of the delivery of quality public service is reflected by the value of functionalities of e-services</td>
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<tr>
<td>H3</td>
<td>The public value of the delivery of quality public service is reflected by the value of the user-orientation of e-government information and service delivery</td>
</tr>
<tr>
<td>H4</td>
<td>The public value of effectiveness of public organisations is reflected by the value of organisational efficiency</td>
</tr>
<tr>
<td>H5</td>
<td>The public value of effectiveness of public organisations is reflected by the value of the openness of the public organisation</td>
</tr>
<tr>
<td>H6</td>
<td>The public value of achieving socially desirable outcomes is reflected by the value of the responsiveness of the public organisation</td>
</tr>
<tr>
<td>H7</td>
<td>The public value of achieving socially desirable outcomes is reflected by the value of equity through e-government</td>
</tr>
<tr>
<td>H8</td>
<td>The public value of socially desirable outcomes is reflected by the value of the self-development through e-government</td>
</tr>
</tbody>
</table>
3.4 Conclusion

This chapter aims to develop the theoretical framework of the research. Based on the comprehensive review of literature on the concept of public value, dimensions of e-government, and nature of the e-government in Sri Lanka, the theoretical framework of the research is developed by addressing the limitations of extant public value evaluation frameworks. The framework consists of three main dimensions, sub-dimensions, and a set of indicators for evaluating the public value of e-government.

The theoretical framework developed in this chapter lays the foundation for designing and implementing the quantitative and qualitative strands of the research. In respect of the quantitative strand, the dimensions, sub-dimensions, and indicators of the theoretical framework facilitate the construction of survey questionnaire which then will be used to collect data to test and validate the framework. In respect of the qualitative strand, the framework guides the development of interview questions and facilitates the thematic analysis process in a deductive manner.
Chapter 4

Research Methodology

4.1 Introduction

A research methodology is an overall approach to addressing a research problem from the theoretical underpinning of the research to the collection, analysis and interpretation of the data (Hussey & Hussey, 1997). It includes a variety of research methods that can be used for collecting, analysing, and interpreting the data, and determining which specific research methods can be used and how these methods can be used for adequately answering the research question in the research (Hall & Howard, 2008; Creswell & Plano Clark, 2011). In general, a research methodology can be considered as a framework for guiding the researcher towards accomplishing the research objectives (Creswell, 2009).

Selecting an appropriate research methodology to a research project very much depends on the nature of the research (Srivastava & Thomson, 2009). This research aims to investigate the public value of e-government in Sri Lanka which is both confirmatory and exploratory (Tukey, 1980; Johnston, Leach & Liu, 1999; Onwuegbuzie & Leech, 2005). The confirmatory nature of the research is reflected by the objective of this research to test a hypothesised theoretical framework for evaluating the public value of e-government in Sri Lanka (Johnston et al., 1999; Rocco, Bliss, Gallagher & Pérez-Prado, 2003; Onwuegbuzie & Leech, 2005). The exploratory nature of the research is characterised in its pursuit of investigating the
perception of citizens about the public value of e-government in Sri Lanka, how e-government initiatives in Sri Lanka create public value for its citizens, and how the existing practices in implementing e-government initiatives in Sri Lanka can be improved for delivering better public value to its citizens (Creswell, 2009). The confirmatory and exploratory nature of this research therefore suggests that the adoption of a mixed-methods methodology is appropriate in this research (Teddlie & Tashakkori, 2006; Arnon & Reichel, 2009).

A mixed-methods research methodology involves the adoption of multiple research methods with the use of both quantitative and qualitative data for adequately addressing the research problem (Creswell, 2009). With the use of multiple research methods, biases inherent in quantitative and qualitative methods can be tempered (Sosulski & Lawrence, 2008). Using a mixed-methods research methodology, the power of numbers and generalisable outcomes can be balanced with the rich context of the live experiences of people (Sosulski & Lawrence, 2008). As a result, a better understanding of the research problem can be obtained (Johnson, Onwuegbuzie, & Turner, 2007). Such a methodology is recommended for studying issues related to real-word practices such as e-government performance evaluations (Gil-Garcia & Pardo, 2006; Al-Jaghoub, Al-Yaseen, & Al-Hourani, 2010).

This chapter aims to select and implement a suitable methodology for fulfilling the aim of the research. It first presents an overview of various research methodologies, leading to the selection of a mixed-methods research methodology for this research. It then discusses the implementation of the mixed-methods research methodology with a focus on the issues such as how to select a research sample, what data is collected,
why certain data is collected, how data is collected, how data will be used in the research, and what methods will be used for analysing the data in the research. To ensure the validity of the research findings, this chapter finally examines the potential validity threats for adopting the mixed-methods research methodologies and the measures that can be used for effectively addressing these threats.

The remainder of this chapter is organised as follows. First an overview of different approaches to conducting a research is presented leading the selection of suitable research methodology for the research. A discussion of the mixed-methods research methodology is then presented followed by a comprehensive discussion of the implementation of mixed methods research methodology. A discussion of the validity threats for mixed-methods research and the remedies taken to overcome the validity issues is then presented followed by a brief summary of the chapter.

### 4.2 Approaches to Research

There are three types of approaches to research including quantitative, qualitative and mixed-methods approaches (Creswell, 2009). Such approaches reflect different philosophical worldviews about the social life that specific researchers bring into the research (Neuman, 2006; Creswell, 2009). The philosophical worldview consists of a set of beliefs that guide the implementation of a research project (Morgan, 2007). In general there are three philosophical worldviews including post-positivism, social-constructivism, and pragmatism which determine the adoption of quantitative, qualitative and mixed-methods approaches respectively in research (Creswell, 2009).
Post-positivism is a deterministic philosophy whose underlying assumption is that “causes probably determine effects or outcomes” (Creswell, 2009, p 7). Post-positivism research therefore seeks to identify and assess the causes that influence outcomes (Creswell, 2009). Moreover, post-positivists believe that there are various theories that govern the world and that it is necessary to test, verify and refine these theories in order to comprehend the world (Hussey & Hussey, 1997; Creswell, 2009).

Post-positivistic approaches to research, therefore, often require a theory and involve in collecting data to prove or disprove the theory by examining the causal and correlational relationships among variables (Neuman, 2006; Geroy & Wright, 2008; Creswell, 2009). They use precise numeric measures to test theories in a specific domain (Neuman, 2006). Post-positivistic approaches also follow the philosophy of reductionism in which the objective is to narrow ideas into small and distinct sets of ideas for further testing. Such approaches, therefore, select a limited set of variables for testing specific hypothesis (Creswell, 2009).

Social-constructivists hold the philosophy that people try to understand the world in which they live by developing meanings of their experience of objects or things (Creswell, 2009). They argue that different people experience the world differently with many different meanings and interpretations (Denzin & Lincoln, 2003; Neuman, 2006; Bergman, 2008). Different meanings and interpretations of the world experienced by different people are extremely useful to obtain a more comprehensive view of the research problem being studied which is different from the view in post-positivism where the meanings are narrowed into small and distinct set of ideas (Creswell, 2009). The primary objective of this philosophy is to obtain peoples’ views
as much as possible about the research problem being studied for obtaining an in-depth understanding of the research problem (Creswell, 2009).

Pragmatism emerges out of “actions, situations, and consequences rather than antecedent conditions” (Creswell, 2009, p 10). It rejects the division between the post-positivism and social-constructivism while focusing on practical midway solutions to the research problem (Johnson et al., 2007). Pragmatism research focuses on what really works to meet the particular needs of the researcher instead of restricting the researcher to specific methods in answering the research question (Arnon & Reichel, 2009; Creswell, 2009). It allows the researcher to use a variety of research methods (multiple methods) to understand the problem being studied (Brewer & Hunter, 1989).

The quantitative approaches which are influenced by the post-positivistic worldview are usually grounded in theories. They focus on testing those theories for answering the research question (Teddlie & Tashakkori, 2006; Creswell & Plano Clark, 2011). Quantitative approaches aim to obtain numeric (hard-data) descriptions of people’s viewpoints and behaviours for testing and verifying specific theories in various situations (Creswell, 2009). Such approaches often use pre-determined questionnaires to collect hard-data and then apply statistical analysis techniques to analyse the collected data for answering the research question (Creswell, 2009).

The adoption of qualitative approaches under the influence of the social constructivism view aims to explore the socially construed nature of reality by understanding the meaning given by people to describe a research phenomenon (Denzin & Lincoln, 2003; Creswell, 2009). Qualitative approaches commonly use
interviews to obtain data on how people’s experience is created and how the social experience is given meaning (Denzin & Lincoln, 2003). Data collected through interviews are analysed for identifying themes and patterns for constructing complete meanings of the situation being studied with multiple interpretations of the experience of people (Neuman, 2006; Creswell, 2009).

Quantitative and qualitative approaches, however, are commended and criticised for their strengths and weaknesses. Creswell and Plano Clark (2011), for example, argue that quantitative approaches are often criticised for under-representing the context in which people talk. Qualitative approaches, on the other hand, are credited for an adequate representation of the context in which people talk (Creswell & Plano Clark, 2011). Qualitative approaches, however, is often condemned due to the influence of individual researchers’ biases and personal interpretations on people’s voice (Creswell & Plano Clark, 2011). In contrast, quantitative approaches are free of personal biases and interpretations (Creswell & Plano Clark, 2011). Furthermore, quantitative approach is credited for its ability to generalise findings to a large group (Creswell & Plano Clark, 2011). On the other hand, the findings of qualitative approach cannot be generalised to a large group due to its small sample (Creswell & Plano Clark, 2011).

The adoption of the mixed-methods approaches which are influenced by pragmatism, has become popular among researchers in the recent times (Mayrin, 2007; Bryman, 2008; Tashakkori & Teddlie, 2008). The popularity of mixed-methods approaches is due to the limitations associated with quantitative and qualitative approaches and the capability of mixed-methods approach to capitalise on the strengths of quantitative and qualitative approaches by combing both approaches into a single study (O´stlund,
A mixed-methods approach allows the researcher to test a theory by understanding the various factors in the theory and establishing relationships between the factors, and also to explore the reasons behind the relationships (Woolley, 2009). It therefore uses questionnaires and open-ended interview questions to collect hard-data (numbers) and soft-data (words, impressions) respectively. Mixed-methods approaches involve both quantitative data analysis techniques such as statistical analysis and qualitative data analysis techniques such as thematic analysis for answering the research questions.

This research uses the mixed-methods approach due to the capacity of the mixed-methods approach to enable the researcher to obtain a more complete view of the research problem being studied. The mixed-methods approach is widely used in research for obtaining multiple viewpoints, perspectives, and standpoints of a research problem with the use of qualitative and quantitative data (Johnson et al., 2007). Obtaining multiple viewpoints, perspectives, and standpoints of a research problem is helpful in constructing a complete picture of the problem being studied (Tashakkori & Teddlie, 2003; Farmer & Knapp, 2008; Woolley, 2009). It exposes researchers to different and wider bodies of knowledge, and enables them to investigate their subject matter in a more complete manner (Rossman & Wilson, 1985; Jonson et al., 2007; Tashakkori & Teddlie, 2008; Slonim-Nevo, & Nevo, 2009). Due to these advantages, this research adopts a mixed-methods approach for answering the research question.
4.3 A Convergent Parallel Mixed-methods Methodology

A mixed-methods approach offers several research methodologies for designing the research in order to answer the research question. Johnson et al. (2007) broadly define three types of mixed-methods research methodologies based on the weight given to the quantitative and qualitative approaches deployed in answering the research question. These methodologies are (a) a pure mixed-methods methodology, (b) a quantitative dominant mixed-methods methodology, and (c) a qualitative dominant mixed-methods methodology (Johnson et al., 2007). When quantitative and qualitative components in a mixed-methods approach are given an ‘equal status’ it is generally referred to as a pure mixed-methods methodology (Jonson et al., 2007; Creswell & Plano Clark, 2011). As shown in Figure 4.1, a pure mixed-methods methodology sits in the middle of the continuum. A qualitative dominant mixed-methods methodology relies more on a constructivist and qualitative approach. In this methodology quantitative approaches play a secondary role (Jonson et al., 2007; Creswell & Plano Clark, 2011). A quantitative dominant mixed-methods methodology is another type where the researcher places a greater emphasis on quantitative approaches and positivism while using additional qualitative approaches to play a secondary role (Jonson et al., 2007; Creswell & Plano Clark, 2011). Figure 4.1 (Jonson et al., 2007) summarises the three basic mixed-methods methodologies.

Creswell and Plano Clark (2011) provide another classification of mixed-methods methodologies including convergent parallel mixed-methods methodology and sequential mixed-methods methodology. In the sequential mixed-methods methodology data is analysed in a particular sequence (Ostlund et al., 2010) and the researcher seeks to elaborate or expand on the findings of one method with the other
method (Creswell & Plano Clark, 2011). Researchers, for example, begin with a quantitative survey for explanatory purposes and then follow up with in-depth interviews for exploratory purposes or vice versa (Creswell, 2009; Creswell & Plano Clark, 2011). A convergent parallel mixed-methods research methodology occurs when the researcher merges quantitative and qualitative data in order to provide a comprehensive analysis of the research problem. The researcher collects both forms of data at the same time and then integrates the information for the interpretation of the overall results (Creswell, 2009). In this methodology quantitative and qualitative components are given an equal weight, hence a convergent parallel methodology is a pure mixed-methods methodology (Johnson et al., 2007; Kennett et al., 2008).

![Diagram of mixed-methods methodologies](image)

**Figure 4.1** An overview of the mixed-methods methodologies

This research aims to adopt a convergent parallel-mixed-methods research methodology (Creswell & Plano Clark, 2011). In the convergent parallel mixed-methods methodology the researcher implements both quantitative and qualitative strands simultaneously giving equal weight and priority to each strand for better understanding the phenomenon of the study (Jonson et al., 2007; Hall & Howard,
Chapter 4

Research Methodology

2008; Creswell & Plano Clark, 2011). A strand generally refers to a component of a methodology that encapsulates the basic process of conducting quantitative or qualitative research by formulating specific research questions, collecting and analysing data, and interpreting the results based on the data (Creswell & Plano Clark, 2011). A convergent parallel mixed-methods methodology keeps the strands independently at the time of formulating the research question and in data collection and analysis. In this methodology the interaction between quantitative and qualitative data sources is extremely limited (Morse, 1991; Fielding & Cisneros-Puebla, 2009).

With the use of this methodology mixing quantitative and qualitative strands is done at the final stage of the research after the researcher has collected and analysed both sets of data (Creswell & Plano Clark, 2011).

There are several benefits of implementing the convergent parallel mixed-methods methodology in this study. As the convergent parallel methodology enables the researcher to obtain different but complimentary data on the same research problem, the researcher is able to get a better understanding of the problem (Creswell & Plano Clark, 2011). As a result, the parallel mixed-methods methodology is extremely useful for triangulating the results with the use of independently analysed quantitative and qualitative data (Teddlie & Yu, 2007). Triangulation is about obtaining multiple points of views of the research problem being studied for improving the validity of the research findings (Neuman, 2006). The research findings from the two different strands are useful to confirm, cross-validate or compare within a single study (Teddlie & Yu, 2007; Tashakkori & Teddlie, 2008). Moreover, triangulating results allows researchers to be confident of their results, leading to thicker and richer data, and can uncover contradictions between two different findings (Jick, 1979). It has been further
commented that a convergent parallel mixed-method methodology provides a creative way of collecting data in which both types of data are collected at the same phase in the same design (Jick, 1979; Creswell & Plano Clark, 2011). It saves a significant amount of time for the researcher. Due to these tremendous benefits this research adopts the convergent parallel mixed-methods research methodology.

There are four steps in adopting the convergent parallel mixed-methods methodology, namely (a) strand design and data collection, (b) data analysis, (c) merging of results, and (d) interpretation (Creswell & Plano Clark, 2011). The first step starts with designing both quantitative and qualitative strands. This includes formulating the research question and determining the quantitative and qualitative methods to be used with each strand. This leads to the data collection stage. After identifying an appropriate quantitative sample with the use of the research instrument quantitative data can be collected. At the same time with the use of interview protocol qualitative data can be collected by selecting an appropriate sample.

The second step is to analyse each data set separately and independently (Creswell & Plano Clark, 2011). Quantitative data can be analysed with descriptive statistics and other statistical tools. Qualitative data can be analysed, for example, using thematic analysis or grounded theory. The third step involves in merging quantitative and qualitative results obtained independently (Creswell & Plano Clark, 2011). In this study the merging is conducted through providing a side-by-side comparison of the quantitative results and qualitative findings together in a summary table so that it merges the quantitative and qualitative findings (Creswell & Plano Clark, 2011). The final step in the convergent parallel mixed-methods methodology is interpreting the
merged results. It involves in examining the ways in which the two sets of results are related to each other for better understanding of the research problem.

### 4.4 The Research Methodology Implementation

This research aims to investigate the public value of e-government in Sri Lanka. It is both confirmatory and exploratory in nature. The research is confirmatory in the sense that it aims to investigate the public value of e-government in Sri Lanka by hypothesising a theoretical framework. Using a theoretical framework that drives the research is a prevalent feature of a confirmatory research (Christ, 2009). Testing the theoretical framework with the use of survey data is essential to identify the critical factors for evaluating the public value of e-government in Sri Lanka. Adopting a quantitative strand is, therefore, absolutely necessary in this research to fulfil the confirmatory objectives developed in the research.

This research is also exploratory as it aims to explore citizens’ perceptions about the public value of e-government initiatives in Sri Lanka (Creswell & Plano Clark, 2011). Furthermore, this research is designed to explore questions such as how e-government initiatives create public value for citizens, and how the existing practices in implementing e-government initiatives in Sri Lanka can be improved for delivering better public value which further reflects the exploratory nature of the research. Adopting a qualitative strand, therefore, is also necessary. The results obtained from implementing the quantitative strand and findings obtained from implementing the qualitative strand can then be merged for better investigating the public value of e-government in Sri Lanka. Figure 4.2 (Creswell & Plano Clark, 2011) summarises the
implementation of the convergent parallel mixed-method methodology in this research.

![Figure 4.2](image)

**Figure 4.2** An overview of the research methodology implementation
4.4.1 The Implementation of the Quantitative Strand

The implementation of the quantitative strand commences with the formulation of specific research questions as follows: What is the public value of e-government in Sri Lanka? What are the public values of e-government from the perspectives of citizens? What are the critical factors for evaluating the public value of e-government? To adequately answer these research questions, the theoretical framework hypothesised in Figure 3.2 needs to be tested and validated.

To test and validate the theoretical framework, the data has to be collected from a survey. For this purpose a close-ended survey questionnaire is developed. There are many advantages of using close-ended questions. For example, answers are much easier to code and analyse, and often can be coded directly from the questionnaire (Bailey, 1994). The respondents often have a better understanding of the questions. Respondents who are unsure about the questions can often understand the question by reading the answers provided. As a result, there are fewer frustrated respondents who answer ‘don’t know’ or fail to answer at all (Bailey, 1994). This helps the response rate since frustration over a single question can lead the respondent to discard the entire questionnaire (Bailey, 1994). The answers are relatively complete and a minimum of irrelevant responses are received (Bailey, 1994). This study uses survey questionnaire for quantitative data collection.

The questionnaire as shown in Appendix A includes three sections. The first section contains an introduction of the aims of the research, a description of the terms used in the questionnaire and the contact information of the researcher. The second section is designed for collecting demographic information of the participants. The third section
is used to collect the information necessary for testing and validating the conceptual framework. 64-questionnaire items are developed for this purpose. For capturing citizens’ perceptions about the public value of e-government, three sub-sections are developed by considering the argument that public value can be created through the delivery of quality public services, effectiveness of public organisations, and achievement of socially desirable outcomes. Each sub-section is further divided into minor sections to capture citizens’ perceptions about the specific public value of e-government such as quality of information, online services, user-orientation, performance efficiency, openness, responsiveness, social equity, self-development, trust, participatory democracy, and environmental sustainability.

The questionnaire items contained in section two use a seven point likert-type scale. The Likert-type scale is well known as a summated scale with which a respondent can record his/her agreement or disagreement on each item in a question on an intensity scale (Miller, 1970). Likert-type scales are considered as reliable and are recommended for obtaining people’s attitudes, values and perceptions (Miller, 1970). In the seven point likert-type scale used in this study the value “1” represents ‘not valuable at all’ and the value “7” represents ‘highly valuable’.

The constructed questionnaire is pretested with the help of captive audiences (Bailey, 1994) such as academic experts, e-government practitioners, fellow research scholars, and actual e-government users in Sri Lanka. A group of ten participants is included in the pretesting team. Each participant is given a draft questionnaire typed with triple line space which allowed them to write comments on each questionnaire item. Participants are encouraged to check all the aspect of the questionnaire such as
question wording, question order, redundant questions, missing questions, inappropriate, inadequate, or confusing response categories and so forth (Bailey, 1994). Participants are asked to restate questions which are difficult to understand or to answer (Miller, 1970).

A positive feedback is received from the pretesting of the questionnaire with suggestions for minor changes. This results in the revision of a few questionnaire items. The revised questionnaire is presented again for further feedback. During the pretesting the time of questionnaire completion is confirmed as twenty minutes.

Participants for this survey are e-government users in Sri Lanka. In Sri Lanka English is only the second language (Weerakkody et al., 2009). A certain number of survey questionnaires, there, are translated into Sinhala. Translation is done using the double (two-way) translation method (Marin & Marin, 1991; Bailey 1994). Double translation occurs when one person translates a document from English to Sinhala and then different person translates it back from Sinhala to English (Marin & Marin, 1991; Bailey, 1994). If the result is not the same as the original questionnaire, errors have then been made (Bailey, 1994). To make sure that the Sinhala version of the questionnaire conveys the same meaning as the English one, four professional translators are hired to undertake the double translation independently. The Sinhala version of the questionnaire is attached in Appendix B.

Once the questionnaire is developed, ethics clearance is sought from the RMIT University’s Human Research Ethics Committee in order to start the data collection for this research. A formal letter of invitation is prepared where respondents are
invited to participate in the research. It also contains instructions to the participants with the inclusion of other information such as the title of the research, the aims of the research, expectations from the participants, benefits of participating, any risks of participating, participants’ rights, and the name and contact information of the researcher. The letter of invitation is important because it justifies the research to the respondent and often determines whether he or she cooperates or not (Bailey, 1994). The letter is printed in paper containing the letterhead of the RMIT University in order to indicate the legitimacy of the research to the respondents (Bailey, 1994). The letter of invitation to participate in the research is attached in Appendix E.

To obtain participants’ responses to the developed questionnaire, it is essential to select a suitable sample population for the research. Sampling procedures in social science research are often classified into two clusters namely probability and non-probability sampling (Bailey, 1994; Neuman, 2006). In probability sampling the probability of selecting each respondent is unknown whereas in non-probability sampling the probability of selecting each respondent is known (Neuman, 2006). A probability sample is planned to capture a large number of cases that are collectively representative of the population of interest to obtain a breadth of information (T Teddlie & Yu, 2007). Stratified random sampling is a variety of probability sampling which facilitates the researcher to derive the sample on the basis of some specific characteristics in the sample (T Teddlie & Yu, 2007) such as urban, semi-urban and rural population. The stratified random sampling technique allows the researcher to divide the population into subpopulations (strata) and to take a sample of each subpopulation (Neuman 2006). Stratified random sampling techniques are primarily used in quantitative studies (Bailey, 1994; Neuman, 2006; Teddlie & Yu, 2007).
purposive sample is a variety of non-probability sampling which is employed to select a small number of cases for obtaining a greater depth of information from a smaller number of participants (Teddlie & Yu, 2007). Purposive sampling is commonly used in qualitative studies (Teddlie & Yu, 2007).

Teddlie and Yu (2007) conceptualise a useful way of classifying various sampling strategies used in mixed-methods research. As shown in purposive-mixed-probability continuum in Figure 4.3 (Teddlie & Yu, 2007), the area labelled as ‘A’ consists of pure qualitative (QUAL) research with purposive sampling and the area labelled as ‘E’ consists of pure quantitative (QUAN) research with probability sampling. Area labelled as ‘C’ represents pure mixed-methods (MIXED) research and sampling for pure mixed-methods research. It has been suggested that both purposive and probability sampling should be used in mixed-methods design (Teddlie & Yu, 2007).

![Figure 4.3](image)

**Figure 4.3** Purposive-mixed-probability sampling continuum

This study follows a convergent parallel mixed-methods methodology to answer both explanatory and exploratory types of research questions. In the convergent parallel methodology both quantitative and qualitative data are collected concurrently and independently. As a result, both probability and purposive sampling are used
simultaneously while using convergent a parallel mixed-methods methodology (Teddlie & Yu, 2007). Creswell and Plano Clark (2011) recommend including the same individuals in both quantitative and qualitative samples. This is because selecting the same individuals for two samples is extremely useful for corroborating, directly comparing or relating two sets of findings about the research topic (Creswell & Plano Clark, 2011). It has been further suggested to have the two samples in different sizes with the qualitative sample being smaller than the quantitative sample (Creswell & Plano Clark, 2011). This helps the researcher to perform an in-depth qualitative exploration and a rigorous quantitative examination of the topic.

This research aims to investigate the public value of e-government in Sri Lanka. It is therefore necessary to approach those participants who have used e-government. To data there is a lack of published statistics about the actual percentage of e-government usage in Sri Lanka. A Government visitors’ survey (ICTA & MGC, 2008a), however, indicates that only 22.3% government visitors are familiar with the e-services. The sample size of this survey is 529 government visitors. Moreover, in Sri Lanka only 13.1% householders have internet (DCS-SL, 2009). All these statistics reveal that the number of e-government users in Sri Lanka is relatively low. This shows the challenge in finding an adequate sample for this research. The need to obtain a sample that adequately represents e-government users in all three demographic areas, namely, rural, semi-urban and urban areas, further increases the challenge.

The Department of Census and Statistics of Sri Lanka classifies the total population of Sri Lanka into three main sectors namely, urban, estate and rural sectors (DCS-SL, 2011). Urban sector generally refers to the population in areas governed by either
municipal councils or urban councils (DCS-SL, 2011). Estate sector refers to the population of labourers who work in plantations which are more than 20 acres in extent and have not less than 10 residential labourers (DCS-SL, 2011). Rural sector refers to the population in residential areas which do not belong to the urban sector or the estate sector (DCS-SL, 2011). Ideally the population for the sample used in this research, therefore, should include e-government users from all these sectors. With the use of the stratified random sampling strategy 1200 e-government users are selected for this research and are stratified into three main strata (urban, rural, estate) with each strata comprising of 400 e-government users. Table 4.1 summarises the research sample.

<table>
<thead>
<tr>
<th>Table 4.1</th>
<th>The subpopulation stratified from the population</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urban</strong></td>
<td><strong>Rural</strong></td>
</tr>
<tr>
<td>400</td>
<td>400</td>
</tr>
</tbody>
</table>

There is much research on how to determine an adequate sample size in a survey. Yamane (1973) for example proposes a formula (4.1) to calculate the appropriate sample size as follows. In this formula ‘N’ refers to the population size and ‘e’ refers to the level of precision which is 95% confident and with Probability 0.05. According to the formula, the appropriate sample size for this survey is 300. Therefore, at least 300 valid responses should be obtained in order to allow the research findings to be generalised into a larger population.

\[
\text{Appropriate Sample Size} = \frac{N}{1 + N(e)^2} \quad (4.1)
\]
Chapter 4
Research Methodology

Approaching 1200 participants and obtaining 300 valid responses is a challenging task. To mitigate the challenge, several strategies are followed. In Sri Lanka, about 600 tele-centres have been established to provide access to the internet and e-government resources to the rural and semi-urban communities. An informal consultation with the ICTA project manager to the tele-centre development project reveals that a significant number of rural and semi-urban citizens visit tele-centres to use e-government resources on a daily basis. A decision is, therefore, made to approach potential urban and semi-urban participants by visiting tele-centres. After consulting the project manager in charge of the tele-centres project, twenty tele-centres throughout the country except those in the war affected districts are randomly selected. Permission is obtained from the ICTA to visit these tele-centres and tele-centre operators are informed in advance about the purpose of the survey. Finally, during visits to the selected tele-centres, semi-urban and rural participants are selected for the quantitative strand using the random sampling method. In urban Sri Lanka internet and e-government initiatives are more popular than rural and semi-urban areas (DCS-SL, 2009). Urban participants for the quantitative strand are recruited randomly by visiting internet cafes, universities, private sector companies and government offices in the main cities.

While the quantitative sample is selected using the random sampling method the qualitative sample is selected using the purposive sampling method (Teddlie & Yu, 2007). Following Creswell and Plano Clark’s (2011) recommendation, the same individuals who have participated in the survey are selected for the purposive sampling. A detailed discussion of the purposive sampling is presented in the ‘Implementation of Qualitative Strand’ section of this chapter.
Based on the sample identified, the paper-based survey is conducted in Sri Lanka between November 2009 and May 2010. Approximately 1200 survey questionnaires are distributed among the selected sample. Based on the language preferences of the participants, Sinhala or English questionnaires are distributed. Participants are encouraged to fill the questionnaire on the spot. However, participants who are not willing to complete the questionnaire on spot are given a stamped and addressed envelope to return the questionnaire to the researcher once completed. The name and address of the participants who took the questionnaires home are noted down on postcards for the purpose of following up. This is done considering the fact that following up can increase the total return up to 40% (Miller, 1970). Moreover, the telephone numbers and email addresses are noted down for following up.

The received responses are recorded and analysed using SEM techniques for identifying the critical factors for evaluating the public value of e-government. SEM is a statistical methodology that takes a confirmatory approach to the analysis of a structural theory bearing on the relevant research phenomenon (Byrne, 2010, p 3). A detailed discussion of SEM and use of SEM in this research is provided in Chapter 5.

4.4.2 The Implementation of the Qualitative Strand

As shown in Figure 4.2, to fulfil the requirements of a convergent parallel mixed-methods methodology the qualitative strand is implemented simultaneously to the implementation of the quantitative strand. The implementation of the qualitative strand commences with the formulation of the research question as follows: What are the public values of e-government from the perspective of citizens? How do e-government initiatives in Sri Lanka create public value for its citizens? What are the
critical factors for evaluating the public value of e-government in Sri Lanka? How can the existing practices in implementing e-government initiatives in Sri Lanka be improved for delivering better public value to its citizens?

To adequately answer the above research questions a qualitative research methodology is used. Interview questions are therefore developed based on a comprehensive review of the related literature together with the secondary data published on e-government in Sri Lanka (ICTA & MGC 2008a; United Nations, 2010). The interview agenda which contains semi-structured interview questions has four sections. Section one focuses on the demographic information. Section two focuses on the public value of public service delivery through e-government. Section three is about the public value of effectiveness of public organisations through e-administration. Section four consists of questions on the achievement of socially desirable outcomes through e-government. English and Sinhala samples of the semi-structured interview questions are attached in Appendices C and D.

Interview questions are pretested with the help of academic experts, higher degree research scholars, e-government specialists, and e-government users in Sri Lanka. Using the feedback received from the pretesting team, several revisions are made for ensuring that the questions are comprehensible and unambiguous (Kirk & Miller, 1986). The interview questions are translated by following double translation method (Marin & Marin, 1991; Bailey, 1994).

After developing and pre-testing the interview questions, the purposive sampling method is used to select the suitable population samples for the interviews (Teddlie &
Yu, 2007). The idea behind purposive sampling is that it will help the researcher best to gain a deeper understanding of the problem and the research question (Neuman, 2006; Creswell, 2009; Howitt, 2010). This technique guided the researcher to recruit participants for the interviews based on their experience on the value of e-government in Sri Lanka. To fulfil the concurrent mixed methodology sampling strategy, the same individuals who participated in the survey are included in the qualitative sample (Creswell & Plano Clark, 2011). However, a rather small number of participants are selected in contrast to quantitative sample (Creswell & Plano Clark, 2011). Participants are approached at Nenasala tele-centres, public organisations, universities, and private companies.

In purposive sampling, screening questions are used verbally during the recruitment process to determine whether a particular participant should be invited to participate in the interview or not. The screening process ensures that the interview participants have used e-government, and the sample represents different geographical areas (urban, semi-urban, and rural areas) from a variety of employment categories. The screening questions are attached in Appendix C.

Semi-structured interviews are conducted with e-government users in Sri Lanka from November 2009 to May 2010. Interviews are conducted approximately for forty five minutes (Miller, 1970). Prior to conducting the interview, a copy of the letter of invitation, which includes the title of the research, aims of the study, expectations from the participants, benefits of participating, any risk of participating, participants’ rights, and name and contact information of the researcher, is given to the interviewee to get their consent for participating in the interview. Interviews are conducted either
in Sinhala or English based on the preference of the interviewee. All the interviews are recorded digitally with the permission of the participants. Interview notes are taken to supplement these recorded interviews. At the end of the interviews refreshments are provided to the participants as an expression of gratitude for their cooperation. The collected interview data is transcribed and analysed using theory-driven thematic analysis methodology. A detailed discussion of the findings of thematic analysis is presented in Chapter 6.

4.5 Research Validity

The validity of the research findings is always critical for demonstrating the trustworthiness, rigor and legitimacy of the research (Whittemore, Chase, & Mandle, 2001). Creswell and Plano Clark (2011) define the validity in a mixed-methods methodology as applying appropriate procedures to address the possible problems in data collection, data analysis, and in merging findings for deriving conclusions. Although the validity of the mixed-methods methodology has not been widely discussed in literature (Dellinger & Leech, 2007), Creswell and Plano Clark (2011) identify the potential threats to the validity of a mixed-methods methodology. Collecting data from individuals inappropriate for the purpose of the research, bias of one data collection on the other data collection, obtaining non-comparable results, lack of trustworthiness of data analysis, researcher’s bias towards the findings of one strand, and not using appropriate methods to compare the results obtained from individual strands create validity issues in mixed-methods methodologies (Creswell & Plano Clark, 2011). These validity threats arise at various stages of the
implementation of the mixed-methods methodology including data collection, data analysis and interpretation.

To address these validity threats, a number of measures are taken in this research (Creswell & Plano Clark, 2011). To overcome the validity issue of getting inappropriate individuals for the quantitative and qualitative data collection, participants for both quantitative and qualitative strands are selected from the same sample. To avoid potential bias of the quantitative data collection on the qualitative data collection and vice versa, both data collections are carried out independently and at the same time. Furthermore, the same research question is answered in both quantitative and qualitative strands to make sure data is comparable in order to obtain greater validity for the research.

To ensure validity at the data analysis stage, validity checks that are unique to quantitative and qualitative methodologies are applied. To ensure the validity of the quantitative study various tests including discriminant, convergent and factorial validity tests are conducted (Hair, Black, Babin, & Anderson, 2010). Descriptive, interpretative, theoretical, and external validity tests are conducted to ensure the validity of the qualitative study (Yin, 1994; Johnson, 1997). A discussion of the validity tests conducted in each strand is presented in Chapters 5 and 6.

At the data interpretation stage, validity issues occur when the researcher favours the finding of one strand, and pays less attention to comparing the results obtained from the individual strands (Creswell & Plano Clark, 2011). As remedies to these validity issues, this research gives equal weight to both quantitative results and qualitative
findings during the interpretation stage, and provides a comparison table which displays both the quantitative factors and the corresponding qualitative theme.

4.6 Conclusion

This chapter aims to select an appropriate research methodology to answer the research questions. Reviewing various research methodologies, the convergent parallel mixed-methods research methodology is adopted to answer the research questions. Adoption of this methodology is due to its capacity to provide different but complimentary data on the same research problem, thereby providing the researcher with a better understanding of the research problem, and its ability to overcome the weaknesses associated with qualitative and qualitative approaches. The facility to triangulate the results obtained from the independently analysed quantitative and qualitative data is another advantage of using this methodology in this research. With the use of convergent parallel mixed-methods research methodology, quantitative and qualitative data are collected respectively by using a survey questionnaire and interviews. Collected survey and interview data will be analysed using SEM and thematic analysis. Comprehensive discussions of the analysis of survey and interview data are presented in the subsequent chapters.
Chapter 5

Analysis of Quantitative Data

5.1 Introduction

SEM is a statistical approach for testing hypothesised theoretical models that contain certain relationships between and among observed variables (variables that can be directly measured) and latent variables (variables that cannot be directly measured) (Hoyle, 2000) in a confirmatory manner with the sample data collected through surveys (Byrne, 2010; Kline, 2010; Glaser, 2010). It examines the extent to which the hypothesised model is supported by the sample data (Byrne, 2010). A model can be rejected as inappropriate if the sample data does not conform to the hypothesised model (Sutton-Grier, Kenney, & Richardson, 2010).

Over the past 25 years, SEM has been becoming popular in the social science research (Mueller, 1997). The popularity of SEM is due to the flexibility that it has for interplaying between the theory to be tested and the sample data (Chin, 1998). In contrast to the traditional statistical approaches SEM provides the researcher with the capability of modelling the relationships between observed variables and latent variables, and the relationships among a large number of latent variables (Chin, 1998; Gau, 2010). Moreover, the capacity of SEM to directly incorporate measurement errors of observed variables into the data analysis, and to employ various goodness-of-fit (GOF) indices that facilitate the evaluation of the model in details makes it even more attractive in conducting various types of research (Mueller, 1997; Chin, 1998;
Due to the significant benefits that SEM can offer over the other statistical approaches, this research uses SEM to analyse the quantitative data.

This chapter aims to answer the confirmatory research questions formulated in this research, namely, ‘what are the public values of e-government from the perspective of citizens’ and ‘what are the critical factors for evaluating the public value of e-government in Sri Lanka’. With the use of SEM on the sample data collected through a survey, the hypothesised theoretical framework is tested and validated for examining how well the hypothesised framework fits into the sample data (Byrne, 2010). The SEM analysis results are then used to answer the research questions.

The remainder of this chapter is organised as follows. First, the data analysis techniques applied in this research are described followed by a discussion of how the data set is prepared for the analysis. An overview of the survey data is then presented. This is followed by a detailed discussion of the SEM analysis on the quantitative data collected and a summary of the research findings resulted from this analysis.

5.2 An Overview of the Data Analysis Techniques

SEM is widely accepted as one of the most powerful statistical approaches available in quantitative data analysis (Kaplan, 2009; Hair et al., 2010). It allows the researcher to conduct CFA which specifically deals with the measurement models (Brown, 2006). The measurement model defines the relationships between observed variables and latent variables (Brown, 2006; Hair et al., 2010). Here, an observed variable refers to a variable that can be measured directly through a value obtained from
respondents in response to a particular survey question (Byrne, 2010; Hair et al., 2010). A latent variable refers to a variable that cannot be directly measured and therefore, is measured through a set of observed variables associated with such a latent variable (Shumacker & Lomax, 2004; Hair et al., 2010). An important feature of CFA is its hypothesis driven nature (Brown, 2006). It is, therefore, necessary to have a pre-specified hypothesised theoretical model which contains a certain number of latent variables (constructs or factors) and a set of observed variables which are used to measure each latent variable (Shumacker & Lomax, 2004; Hair et al., 2010).

SEM allows the researcher to test how individual latent variables in a pre-specified hypothesised theoretical model are related to each other (Shumacker & Lomax, 2004; Kaplan, 2009; Hair et al., 2010). It uses a structural model which consists of dependent relationships (regressions types) linking the latent variables in the pre-specified hypothesised theoretical model. To perform a comprehensive data analysis, SEM uses both measurement model analysis with CFA and structural model analysis (Byrne, 2010; Hair et al., 2010).

This research uses a pre-specified hypothesised theoretical model shown as in Figure 3.2 developed based on the review of existing research (Brown, 2006). By conducting the SEM analysis on the survey data collected from Sri Lanka, the hypothesised theoretical model is tested and validated for showing to what extent that the hypothesised model is supported by the sample data (Shumacker & Lomax, 2004). Various GOF assessment indices are used for examining to what extent the pre-specified hypothesised model fits into the sample data (Byrne, 2010). Based on the results of the SEM analysis, the research questions are answered.
Software applications are important tools for conducting the SEM analysis (Kline, 2005). To analyse the data using SEM, this research uses the PASW (Predictive Analytic Software) version 18 and the AMOS (Analysis of Moment Structures) Graphics version 18 (Arbuckle, 2009). The PASW is previously referred to as SPSS (Statistical Package for Social Sciences) commonly used for generating descriptive statistics, tabulated reports, charts, and plots of distribution and trends (SPSS, 2007; George & Mallery, 2011). In this research the role of the PASW is to store the survey data, generate descriptive statistics, handle missing data, detect outliers, kurtosis and skews, and testing the normality of the data set (George & Mallery, 2011). The AMOS is employed for performing complex SEM analysis (Arbuckle, 2009). Particularly AMOS graphics integrate an easy-to-use graphical user interface with a complex computing engine that makes its use attractive (Arbuckle, 2009).

There are many reasons for using SEM in this research. First, SEM offers a very useful way to test theories (Hair et al., 2010). It enables a researcher to express a theory with a set of latent and observed variables, and to express the relationships among these variables. SEM is capable of examining how well the theory fits to the sample data (Hair et al., 2010). Due to this capacity of SEM, the theoretical framework hypothesised in this research can be tested by examining how well the framework fits to the data in order to answer the confirmatory research questions.

Secondly, the ability to use many observed and latent variables to express a theory motivates the adoption of SEM for data analysis in this research (Shumacker & Lomax, 2004). It is well known that most basic statistical analysis packages can only accommodate a few variables and therefore, are not suitable for complex theory
testing (Shumacker & Lomax, 2004). Using SEM in this research allows the researcher to test the hypothesised theoretical framework which consists of fifteen (15) latent variables (constructs) and sixty-three (63) observed variables.

Thirdly, using SEM in this research to analyse the data ensures the validity and reliability of the observed data obtained from the measurement instruments (Shumacker & Lomax, 2004). Measurement errors play a major role in SEM (Shumacker & Lomax, 2004). A measurement error generally refers to the degree to which the variable that is measured does not perfectly describe the latent variable of interest (Hair et al., 2010). Failing to capture the measurement errors creates threats to the validity and reliability of the observed data obtained from the measurement instruments for the latent variables (Shumacker & Lomax, 2004; Hair et al., 2010). Traditional data analysis methods do not account for measurement errors (Brown, 2006). SEM, however, does provide a strong analytical framework for handling measurement errors associated with latent and observed variables (Shumacker & Lomax, 2004; Kaplan, 2009; Byrne, 2010; Hair et al., 2010).

Finally, the availability of user friendly software packages such as AMOS which simplifies the complexity of SEM is another motivation for using SEM in this research (Shumacker & Lomax, 2004). Early versions of SEM require users to input the program syntax for their models using Greek and matrix notations (Shumacker & Lomax, 2004). The latest development of software applications allows the researcher to run complex SEM algorithms by clicking pull down menus or drawing diagrams graphically on graphical editors to invoke program syntaxes internally (Shumacker & Lomax, 2004; Byrne, 2010).
To conduct the SEM analysis, a set of steps needs to be followed (Kaplan, 2006; Hair et al., 2010). Figure 5.1 summarises the steps for SEM analysis (Kaplan, 2009; Hair et al., 2010). The first step is the presentation of the theory (Kaplan, 2009). The second step involves in developing and specifying the measurement model in a way that CFA can be performed (Kaplan, 2009; Hair et al., 2010). Developing and specifying the measurement model is done based on the theory (Harrington, 2009). In this stage, observed variables (hereinafter observed variable is referred to as indicator variable) are assigned to each latent variable (hereinafter latent variable is referred as latent factor) to develop the measurement model (Hair et al., 2010). The number of indicator variables assigned to a latent factor is a critical issue in SEM analysis (Gerbing & Anderson, 1985). As a general rule, it is recommended to have more than three indicator variables for a latent factor (Cook, 1981; Gorsuch, 1983; Gerbing & Anderson, 1985; Tabachnick & Fidell, 2001).

The third step involves in selecting a sample and obtaining measures for analysing the model (Kaplan, 2009). The minimum sample size is a very important consideration in SEM analysis (Kline, 2005; Kaplan, 2009; Byrne, 2010; Hair et al., 2010). SEM requires a large sample in order to maintain power, and to obtain stable parameter estimates and standard errors (Shumacker & Lomax, 2004). In general, sample sizes that exceed 200 cases could be considered ‘large’ in SEM analysis (Kline, 2005).

The model estimation technique is another consideration important for obtaining appropriate measures (Byrne, 2010; Hair et al., 2010). There are various model estimation methods associated with AMOS such as maximum likelihood (ML), weighted least square (WLS), un-weighted least square (ULS), generalised least
square (GLS), scale free least square (SLS), and asymptotically distribution free (ADF) (Kline, 2005; Arbuckle 2009; Kaplan, 2009; Hair et al., 2010). Among these techniques, ML continues to be the most widely used method (Harrington, 2009; Hair et al., 2010). Modern versions of ML estimation have robust procedures for handling the violations of normality (Hair et al., 2010). ML estimation, therefore, can produce fairly reliable results with non-normal data (Hair et al., 2010).

The fourth step involves in assessing the validity of the measurement model. One of the primary aims of SEM analysis is to examine the extent to which a hypothesised model ‘fits’ the sample data (Byrne, 2010). The validity of the measurement model depends on establishing acceptable levels of GOF (Hair et al., 2010). An appropriate GOF value means that that the hypothesised model is proved (Kline, 2005).

Various GOF assessment indices are used in SEM (Kaplan, 2009). These indices can be classified into three categories, namely, (a) absolute fit indices, (b) incremental or comparative fit indices, and (c) parsimony fit indices (Brown, 2006). Absolute fit indices are direct measures of how well the model specified by the researcher reproduces the observed data (Hair et al., 2010). They provide the most basic assessments of how well a researcher’s theory fits the sample data (Hair et al., 2010). Chi-square ($X^2$), normed $X^2$ or the ratio of $X^2$ to degree of freedom ($X^2/df$), the root mean square error of approximation (RMSEA), standardised root mean residual (SRMR), and goodness of fit index (GFI) are some examples of absolute fit indices used in this research (Schumacker & Lomax, 2004; Brown, 2006; Byrne, 2010).
The incremental fit indices differ from the absolute fit indices in that they assess how well the estimated model fits relative to some alternative baseline models (Hair et al., 2010). They evaluate the fitness of a user specified solution in relation to a more restricted model, the nested baseline model (Brown, 2006). The comparative fit index (CFI), the Tucker-Lewis index (TLI), and the normed fit index (NFI) are examples of the incremental fit indices (Schumacker & Lomax, 2004; Brown, 2006; Byrne, 2010).

The parsimony fit indices provide information about which model among a set of competing model is the best, considering its fitness relative to its complexity (Hair et al., 2010). The adjusted goodness of fit index (AGFI) and the parsimony normed fitness index (PNFI) are examples of the parsimony fit indices (Schumacker & Lomax, 2004; Brown, 2006; Byrne, 2010; Hair et al., 2010). Table 5.1 summarises the recommended GOF values for each GOF index.

<table>
<thead>
<tr>
<th>Category</th>
<th>GOF index</th>
<th>Recommended value</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute fit indices</td>
<td>$\chi^2$ and probability value ($P$)</td>
<td>Relatively small $\chi^2$ value with a $P$-value higher than 0.05</td>
<td>Hair et al. (2010), Byrne (2010)</td>
</tr>
<tr>
<td></td>
<td>$\chi^2$/df</td>
<td>Less than 2.0</td>
<td>Hair et al. (2010)</td>
</tr>
<tr>
<td></td>
<td>RMSEA</td>
<td>Less than 0.05</td>
<td>Schumacker and Lomax (2004), Brown (2006)</td>
</tr>
<tr>
<td></td>
<td>SRMR</td>
<td>Close to 0.08 or below</td>
<td>Brown (2006), Hair et al. (2010)</td>
</tr>
<tr>
<td>Incremental fit indices</td>
<td>CFI</td>
<td>Higher than 0.90</td>
<td>Bentler (1992); Hair et al. (2006, 2010)</td>
</tr>
<tr>
<td></td>
<td>TLI</td>
<td>Close to 0.95</td>
<td>Byrne (2010), Kaplan (2009)</td>
</tr>
<tr>
<td></td>
<td>RFI</td>
<td>Close to 0.95</td>
<td>Byrne (2010)</td>
</tr>
<tr>
<td>Parsimony fit indices</td>
<td>AGFI</td>
<td>Close to 0.95</td>
<td>Schumacker and Lomax (2004), Byrne (2010)</td>
</tr>
</tbody>
</table>
The fifth step in SEM analysis involves in model modifications if necessary (Kaplan, 2009). Based on the GOF value, the model can be modified (Kaplan, 2009). This stage is iterative with the model continually being modified and evaluated until a decision is made that the model meets some standards of an appropriate fit (Kaplan, 2009). Model modifications are carried out using several diagnostic measures based on the guidelines on the examination of the significance of standardised factor loadings (SFL), standardised residuals (SR), modification indices (MI), appropriateness of the GOF values of the measurement model while considering the number of items in a latent factor (Kline, 2005; 2009; Brown, 2006; Byrne, 2010; Holmes-Smith, 2010; Hair et al., 2010).

After obtaining the appropriate GOF values for the measurement model, the sixth step involves in specifying the structural model by drawing the structural relationships among the latent factors based on the hypothesised theoretical framework shown in Figure 3.2 (Hair et al., 2010). Each structural relationship is drawn using single headed directional arrows (Hair et al., 2010). These arrows represent the hypotheses (Hair et al., 2010).

The seventh step is about assessing the validity of the structural model. It involves testing the validity of the structural model and its corresponding hypothesised structural relationships (Hair et al., 2010). The significance of the structural relationship is examined using various statistics including the standardised regression weight (SRW), the critical ratio (CR) and the $P$ value (Byrne, 2010). Based on the significance of the structural relationships, hypotheses are accepted or rejected. If the model does not show sufficient validity, the model requires further modifications and
has to be tested with new data (Hair et al., 2010). The final step in the SEM analysis involves in summarising the findings based on the measurement and structural model analysis (Kaplan, 2009).

**Figure 5.1** The SEM analysis flowchart
5.3 Preparing the Data for the SEM Analysis

Before conducting the SEM analysis, the researcher has to ensure that the assumptions guiding the SEM analysis are met in the relevant research domain (Cruz, 2007). SEM assumes that the data set is complete without any missing values (Kaplan, 2009). It further requires that the data set is normally distributed (Shumacker & Lomax, 2004; Arbuckle, 2009; Byrne, 2010). This includes properly handling the appearance of outliers, kurtosis, and skews in the data set (Cruz, 2007). To draw accurate conclusions using SEM it is necessary to prepare the data set by applying appropriate data screening procedures (Cruz, 2010). This research, therefore, conducts several tests to detect missing values, outliers, kurtosis, and skews in assessing the normality of the data set.

5.3.1 Dealing with Missing Data

Missing data reduces the sample size for SEM analysis that can ruin the research (Holmes-Smith, 2010; Hair et al., 2010). It affects the parameter estimation and the GOF statistics in SEM models (Kaplan, 2009). It is, therefore, necessary to adequately handle the missing data in the data set for obtaining accurate research findings.

In this research, 7 questionnaires out of the achieved sample of 293 respondents have a few missing responses. This is due to the respondents not having supplied answers to some questions. No regular pattern can be identified in the missing data in the survey questionnaires. If the missing data in relation to an individual observation is less than 10% and appears at random, then such missing data can generally be ignored (Kaplan, 2009; Hair et al., 2010). Such missing data do not affect the overall...
observations of the research findings (Kaplan, 2009; Hair et al., 2010). These types of missing data can be replaced with appropriate values (Kaplan, 2009).

The PASW facilitates replacing missing data (Shumacker & Lomax, 2004; George & Mallery, 2011). Replacing the missing data with the use of the ML approach is widely accepted for handling the missing data (Allision, 2003; Brown, 2006). Such an approach is suitable when the missing data appears at random (Shumacker & Lomax, 2004). This approach finds the expected value based on the ML parameter estimation and imputes that value to the missing data (Shumacker & Lomax, 2004; Brown, 2006). The production of least bias is the reason for the popularity of the ML approach for handling the missing data (Allision, 2003). In this research missing values are replaced by applying the ML approach in the PASW.

5.3.2 Dealing with Outliers, Skews and Kurtosis

Outliers are values which are extreme when compared with the rest of the data set (Shumacker & Lomax, 2004; Kline, 2010). Outliers are present due to various reasons including observation errors, data entry errors, and instrument errors based on layout or instructions (Shumacker & Lomax, 2004). Outliers affect the normality of the data set. As a result, outliers must be deleted, explained or accommodated by using robust statistics procedures (Shumacker & Lomax, 2004; Kline, 2010). Outliers are of two types namely univariate outliers and multivariate outliers (Byrne, 2010; Kline, 2010). If the extreme values are on a single variable it produces a univariate outlier (Tabachnick & Fidell, 2001; Cruz, 2007; 2001; Kline, 2010). If the extreme values are on two or more variables, or the pattern of score of two or more variables is atypical it results in multivariate outliers (Tabachnick & Fidell, 2001; Cruz, 2007; Kline, 2010).
There are several methods for identifying the outliers in the PASW (George & Mallery, 2011). Boxplot is a popular method for detecting outliers (Hair et al., 2010). It shows those mild and extreme outliers (Hair et al., 2010). With the use of the Boxplot analysis, the survey data is examined for detecting those outliers which seriously affect the SEM analysis (Hair et al., 2010). In this research, only a very few cases are detected as serious outliers. These outliers are deleted from the analysis (Shumacker & Lomax, 2004).

The presence of outliers influences the skewness and the kurtosis of the distribution of the data set (Cruz, 2007). A skewed distribution refers to a distribution that is pulled in one direction away from the centre, typically the result of extreme observations (Witte & Witte, 2008). Kurtosis generally refers to the peakedness or flatness of a distribution when compared with a normal distribution (Hair et al., 2010). The appearance of skewness and kurtosis threatens the SEM analysis (Byrne, 2010; Hair et al., 2010). The skewness of data set seriously affects the algorithms that are used to test the mean (Byrne, 2010). The appearance of kurtosis affects the techniques that are used to calculate the variance and covariance (Byrne, 2010). It is, therefore, necessary to conduct the tests for detecting the skewness and kurtosis of the data set before the SEM analysis can be conducted.

In this research, several statistics are generated for assessing the skewness and kurtosis by using the PASW. According to the skew index, variables with absolute values which are greater than 3.0 are extremely skewed (Kline, 2005). A study by West, Finch, and Curran, (1995) suggests that the standardised kurtosis index value equalling to or greater than 7.0 is an indication of departure from normality (Byrne,
2010). An examination of the skewness and kurtosis values in this research indicates that skewness and kurtosis values sit within the recommend range.

5.3.3 Normality Test

Factors such as the presence of extreme outliers, skewness and kurtosis create negative impacts on the normal distribution of the data set (Kline, 2010). As noted before, SEM requires the data to be normally distributed for deriving accurate conclusions (Cruz, 2007; Byrne, 2010; Kline, 2010). Parameter estimation techniques used in SEM, for example, ML (early versions) do not provide accurate results when the non-normality of the data set is more pronounced (Brown, 2006). Special attention is, therefore, paid in this research for examining the normality of the data set.

The normality of a data set is often examined through the Kolmogorov-Smirnov (K-S) test (Hair et al., 2006, 2010; SPSS, 2007; George & Mallery, 2011). This test examines whether the distribution of survey questionnaire items differ significantly from a normal distribution (George & Mallery, 2011). The significance value of the K-S test for each questionnaire item indicates the degree to which the data deviates from normality. A significance value approaching 0.000 indicates that the data is non-normally distributed (George & Mallery, 2011).

In this research the K-S test is conducted on the questionnaire items using the PASW (SPSS, 2007). The K-S test results for the survey data reveal that the data set deviates from normality. As a result, appropriate procedures are followed in this research to handle the issue of the non-normality. Appendix F presents the K-S test results.
5.3.4 Remedies for Non-normality

Bootstrapping is one of the commonly accepted methodologies for handling non-normal data (West et al., 1995; Brown, 2006; Byrne, 2010; Kline, 2005, 2010), specially when skewness and kurtosis are lower than 2 and 7 respectively (Finney & DiStefano, 2006). It is a sub-sampling procedure within the original sample (Brown, 2006; Byrne, 2010). It “enables the researcher to create multiple subsamples from original database” (Byrne, 2010, p 331). This allows the researcher to test the SEM models in a condition of multivariate normal distribution for enabling accurate results to be obtained (Byrne, 2001). One of the major limitations of bootstrapping is that it requires a relatively large sample (larger than 40) (Thompson, 1994). In this research the sample is relatively large and therefore it is appropriate to use bootstrapping procedures to handle the issue of non-normality of the data set. As another remedy for non-normality, the bootstrap ML estimation technique is used for estimating the parameters (Arbuckle, 2009). The bootstrap ML estimation is adopted because it is robust against violations of normality (Hair et al., 2010).

5.3.5 Reliability of the Questionnaire

Before conducting the SEM analysis, it is necessary to ensure the reliability of the survey questionnaire. The Cronbach’s alpha (α) is a popular method for examining whether all the items within the instrument measure the same thing (Nunnally, 1978; George & Mallery, 2011). The closer the Cronbach’s α value is to 1.00 the greater the reliability of the items in the instrument (George & Mallery, 2011). As a rule of thumb, the Cronbach’s α value greater than 0.80 indicates that the questionnaire items in the instrument are reliable (Nunnally, 1978).
Using the PASW, the Cronbach’s $\alpha$ value is generated for the latent factors in the hypothesised theoretical framework. Appendix G presents the Cronbach’s $\alpha$ value for the survey questionnaire items associated with each latent factor. An analysis of the Cronbach’s $\alpha$ values reveals that those $\alpha$ values of the latent factors are greater than 0.80 except for the latent factors openness (0.722) and participatory democracy (0.731). The Cronbach’s $\alpha$ values for these latent factors however do not significantly deviate from the recommended value. Hence, the openness and participatory democracy variables are retained in the survey instrument for further analysis.

5.4 An Overview of the Survey Data

For the purpose of this research, 1200 survey questionnaires are distributed. From this 572 people have responded to the survey. Among them, 214 have not used e-government at all. From the balance, 65 responses are incomplete (more than 50% of the questions are unanswered) and hence unusable. The number of completed responses is 293. The response rate of the survey is, therefore, at 29.71% (Neuman, 2003; Saunders et al., 2003). The response rate of the survey is in line with the suggestion of Dwivedi, Papazafeiropoulou, Gharavi, and Khoubati (2006) that the response rate for e-government research is normally less than 50%. In this research, the reasons for non-response could be respondents’ lack of interest in the research topic, low uptake of e-government, respondents’ level of education (low education level), or some other social and economic factors.

The demographic statistics of the survey is analysed across the participants’ geographical distribution, age group, educational level and employment type. The
respondents’ geographical distribution is analysed first using the PASW. As shown in Figure 5.2 respondents are dispersed across 18 districts throughout the country, namely, Anuradhapura (3.8%), Badulla (5.1%), Colombo (16.5%), Digamadulla (2.2%), Galle (6.2%), Gampaha (17.9%), Hambantota (3.9%), Kaluthara (4.3%), Kandy (7.6%), Kegalle (2.9%), Kurunegala (6.9%), Matale (5.4%), Matara (2.8%), Moneragala (3.8%), Nuwara-Eliya (3.4%), Polonnaruwa (4.7%), Puttalam (2.2%), and Ratnapura (3.6%). Survey questionnaires are not distributed in war affected districts, namely, Batticaloa, Jaffna, Kilinochchi, Mannar, Mullaitivu, Trincomalee, and Vavuniya. Hence, there are not respondents from those areas.

![Figure 5.2](image)

**Figure 5.2** The geographical distribution of the respondents

Figure 5.3 presents the age profile of the respondents. 6.9% of respondents are within the range of 16-20 years, 54.3% in the 21-30 years range, 34.1% are in 31-45 range,
3.6% are in 46-60 years range, and 1.1% are over 60 years old at the time the survey is conducted. A majority (54.3%) of the respondents represent the age range of 21-30.

![Figure 5.3](image1.jpg)  The age profile of the respondents

The respondents’ highest level of education is also examined. As presented in Figure 5.4 22.8% of the respondents have school education. 31.9% of the respondents have undergraduate degrees, 21.4% of the respondents have postgraduate qualifications, and 23.9% of the respondents have vocational training qualifications.

![Figure 5.4](image2.jpg)  The educational profile of the respondents
The employment profile of the respondents is examined. A majority of the respondents that is at 31%, comes from the IT and computer sector. The remaining 69% work in the education (14.1%), finance (10.2%), travel and tourism (2.2%), agriculture (1.4%), medical and health (6.5%), trading sectors (4.3%), students (4.3%), and other (11.6%). 12.9% of the respondents are unemployed who are not students. Figure 5.5 presents the employment profile of the respondents. As shown in Figures 5.3, 5.4 and 5.5, the respondents are from different geographical backgrounds, multiple age groups, and a variety of educational background. The sample for this research is, therefore, adequately representative of the whole population.

![Employment Profile Graph]

**Figure 5.5** The employment profile of the respondents
5.5 The SEM Analysis

The SEM analysis starts with developing and specifying the full measurement model using AMOS. Based on the theoretical framework hypothesised in Figure 3.2, the full measurement model is developed in the following.

5.5.1 The Full Measurement Model

The full measurement model constructed in Figure 5.6 is a third-order CFA measurement model which contains three layers of latent factors as depicted by ovals (Hair et al., 2010). The latent factors including the quality of information (QUALI), functionalities of e-services (SERVI), user-orientation (USERO), organisational efficiency (ORGEF), organisational openness (OPENN), organisational responsiveness (RESPO), equity (EQUIT), self-development (SELFD), trust (TRUST), participation democracy (PARTI), and environmental sustainability (ENVIR) are depicted in the first layer of the full measurement model. The second layer represents three latent factors, namely, the delivery of public services (DPS), effectiveness of public organisations (EPO), and achievement of socially desirable outcomes (ASO). The latent factor public value of e-government (PUBVAL) represents the third layer of the full measurement model.

A third-order CFA model can be formed when the first-order and second-order latent factor are explained by a third-order latent factor structure (Schumacker & Lomax, 2004). In the full measurement model, the third-order latent factor causes multiple first and second-order latent factors which in turn cause the indicator variables (Hair et al., 2010). Here the indicator variables are shown in rectangles. In CFA it is
possible to represent hypotheses about hierarchical relations between latent factors through specification of higher-order factors with presumed direct causal effects on lower-order factors (Kline, 2005). In the measurement model depicted in Figure 5.6, the third-order latent factor PUBVAL and second-order latent factors including the DPS, EPO, and ASO have no indicator variables. This is because those higher-order factors (PUBVAL, DPS, EPO and ASO) are measured indirectly through the indicator variables of the first-order factors (Kline, 2005; Byrne, 2010). The goal of the higher-order factor analysis is, therefore, to provide a more parsimonious account for the correlations among those lower-order factors (Brown, 2006).

The full measurement model is constructed based on the reflective measurement theory (Hair et al., 2010). The reflective measurement theory states that latent factors ‘cause’ or ‘reflect’ the indicator variables (Hair et al., 2010). If a latent factor is thought to ‘cause’ or ‘reflect’ an indicator variable, the indicator variable is a reflective indicator of the latent factor and can then be used as a partial measure of the latent factor (Hair et al., 2010). The direction of the arrows in the full measurement model is therefore from latent factors to indicator variables (Hair et al., 2010). Furthermore, the full measurement model also uses a set of first and second-order reflective latent factors. For example, the higher-order factor, public value of the DPS is reflected, rather than influenced, by citizens’ perceptions about the value of the QUALI, SERVI and USERO. Similarly, the public value of EPO is reflected by citizens’ perceptions about the value of the ORGEF, OPENN, and RESPO.

The full measurement model comprises of three main dimensions namely, DPS, EPO and ASO. In the DPS dimension, five indicator variables shown in rectangles
(QUA_8a to QUA_8e) are postulated to load on the first-order factor QUALI. Another six indicator variables (SER_9a to SER_9f) are loaded on the factor SERVI, and the remaining seven indicator variables (USO_10a to USO_10g) are loaded on USERO. In the EPO dimension, five indicator variables (EFF_11a to EFF_11e) are loaded on the factor ORGEF, eight indicator variables (OPE_12a to OPE_12h) on the factor OPENN, and five indicator variables (RES_13a to RES_13e) on the factor RESPO. Similarly, in ASO dimension, six indicator variables (EQU_14a to EQU_14f) are loaded on the first-order factor EQUIT, five indicator variables (SEL_15a to SEL_12e) on the factor SELFED, another five indicator variables (TRU_16a to TRU_16e) on the factor TRUST, four (DEM_17a to DEM_17d) on the factor PARTI, and six (ENV_18a to EFF_18f) on the factor ENVIR. All together sixty-two items are loaded as latent factors and none of the indicator variables in full measurement model are cross-loaded on multiple latent factors. Table 5.2 provides a short description of the indicator variable used in the measurement instrument.

In the full measurement model, each indicator variable is associated with its measurement errors (Holmes-Smith, 2010). When an indicator variable is usually measured there is an error associated with its measurement. This measurement error shows the degree to which the variable that measures does not perfectly describe the latent factors of interest (Hair et al., 2010; Holmes-Smith, 2010). A measurement error is drawn as a small oval with an arrow and shown as ‘e01’, ‘e02’ etc. Residuals associated with latent factors are labelled as ‘Res1’, ‘Res2’ etc. It is unlikely that latent factors are explained perfectly by independent and dependent variables. Hence the residuals are hypothesised to ‘soak up’ any unexplained variances (Holmes-Smith, 2010). Their notations are similar to (those of) measurement errors.
Figure 5.6  The full measurement model
### Table 5.2
A summary of the indicator variables in the full measurement model

<table>
<thead>
<tr>
<th><strong>Q8- Quality of information</strong></th>
<th><strong>Q13- Improving responsiveness</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>QUA_8a - Accurate information</td>
<td>RES_13a - Display citizen charter online</td>
</tr>
<tr>
<td>QUA_8b - Up-to-date information</td>
<td>RES_13b - Ability to make inquiries online</td>
</tr>
<tr>
<td>QUA_8c - Relevant information</td>
<td>RES_13c - Follow-up emails for inquiries</td>
</tr>
<tr>
<td>QUA_8d - Information with right level of detail</td>
<td>RES_13d - Online case tracking</td>
</tr>
<tr>
<td>QUA_8e – Simple and understandable info.</td>
<td>RES_13e - Automatic responses to submissions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Q9- Functionalities of e-services</strong></th>
<th><strong>Q14-Equity</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>SER_9a - Pay online</td>
<td>EQU_14a - Website content in local languages</td>
</tr>
<tr>
<td>SER_9b - Compete two way transactions online</td>
<td>EQU_14b - Kiosks in rural/semi-urban areas</td>
</tr>
<tr>
<td>SER_9c - One way transactions</td>
<td>EQU_14c - Accessibility standards of websites</td>
</tr>
<tr>
<td>SER_9d - Search information in databases</td>
<td>EQU_14d - Content for disadvantaged citizens</td>
</tr>
<tr>
<td>SER_9e - Download application forms</td>
<td>EQU_14e - Content for ethnic minorities</td>
</tr>
<tr>
<td>SER_9f - Download archives</td>
<td>EQU_14f - Provision of cultural/religious info</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Q10 - User-orientation</strong></th>
<th><strong>Q15-Self-development</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>USO_10a - User friendliness of website layout</td>
<td>SEL_15a - ICT resources for public to access</td>
</tr>
<tr>
<td>USO_10b - Simple website addresses</td>
<td>SEL_15b - Low cost training for citizens</td>
</tr>
<tr>
<td>USO_10c - A single website with links</td>
<td>SEL_15c - Content for students’ education</td>
</tr>
<tr>
<td>USO_10d - A single website for all services</td>
<td>SEL_15d - Software for improving social skills</td>
</tr>
<tr>
<td>USO_10e - Common look and feel of websites</td>
<td>SEL_15e - Resources for distance learning</td>
</tr>
<tr>
<td>USO_10f - Design websites for novice users</td>
<td>SEL_15f - Resources for distance learning</td>
</tr>
<tr>
<td>USO_10g - Frequently asked questions (FAQs)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Q11- Improving efficiency</strong></th>
<th><strong>Q16-Trust</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>EFF_11a - IT enabled public service counters</td>
<td>TRU_16a - Privacy statement on websites</td>
</tr>
<tr>
<td>EFF_11b - Re-design processors</td>
<td>TRU_16b - Citizens’ trust online interaction</td>
</tr>
<tr>
<td>EFF_11c – Improve ICT infrastructure</td>
<td>TRU_16c - Citizens trust in government</td>
</tr>
<tr>
<td>EFF_11d - Share info among organisations</td>
<td>TRU_16d - Citizens trust in government</td>
</tr>
<tr>
<td>EFF_11e - Empower public sector staff</td>
<td>TRU_16e - Credible information dissemination</td>
</tr>
<tr>
<td>EFF_11f – Remove excess staff</td>
<td>TRU_16f – Protection by laws</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Q12- Improving openness</strong></th>
<th><strong>Q17-Participatory democracy</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>OPE_12a - Public policy drafts, laws online</td>
<td>DEM_17a - Inform citizens about polices</td>
</tr>
<tr>
<td>OPE_12b - Disclosure of the budget online</td>
<td>DEM_17b - Participate in online discussions</td>
</tr>
<tr>
<td>OPE_12c - Disclosure of plans and progress</td>
<td>DEM_17c - Government takes citizens opinion</td>
</tr>
<tr>
<td>OPE_12d - Citizens make complaints online</td>
<td>DEM_17d - Ability to post topic for discussion</td>
</tr>
<tr>
<td>OPE_12e - Publish tenders online</td>
<td>DEM_17e - Government takes citizens opinion</td>
</tr>
<tr>
<td>OPE_12f – Staff contact information online</td>
<td>DEM_17f - Ability to post topic for discussion</td>
</tr>
<tr>
<td>OPE_12g - Organisations’ contact info online</td>
<td>DEM_17g - Government takes citizens opinion</td>
</tr>
<tr>
<td>OPE_12h - Organisational charts/duties online</td>
<td>DEM_17h - Ability to post topic for discussion</td>
</tr>
</tbody>
</table>

| **Q18- Environmental sustainability** | |
|-------------------------------------| |
| OPE_12g - Organisations’ contact info online | ENV_18a - Limit duplication of resources |
| OPE_12h - Organisational charts/duties online | ENV_18b - Switch off electrical equipment |
| OPE_12i - Staff contact information online | ENV_18c - Reduction of paper printing |
| OPE_12j - Organisations’ contact info online | ENV_18d - Recycling consumable equipment |
| OPE_12k - Organisations’ contact info online | ENV_18e – Citizens inputs for policies |
| OPE_12l - Organisations’ contact info online | ENV_18f – Retire energy inefficient systems |
The unidirectional arrow in the measurement model pointing from the latent factor to the indicator variable and arrows leading from a higher-order latent factor to a lower-order latent factor represents a regression path (Byrne, 2010). AMOS requires one of the factor loadings on each latent factor to be constrained to some nonzero value (mainly 1.0) meaning that the latent factors will have the same scale as their measured variables (Byrne, 2010; Holmes-Smith, 2010). Hence in the full measurement model some factor loadings are constrained to 1.0.

### 5.5.2 Modifications of the Full Measurement Model

The full measurement model is estimated using the bootstrap ML estimation techniques. Based on the GOF statistics generated by AMOS, the validity of the full measurement model is assessed. Those GOF measures of the full measurement model are compared with the recommended GOF values as presented in Table 5.1.

An analysis of the GOF statistics reveals that the full measurement model does not have sufficient validity exemplified by insufficient absolute, incremental and parsimony fit indices. The absolute GOF indices values, a $X^2$ value of 3139.71 with a Bollen-Stine probability ($P$) value of 0.002 indicate that the full measurement model does not fit the data. A smaller $X^2$ value with a $P$ value higher than 0.05 is recommended for an adequate fit (Hair et al., 2010; Byrne, 2010). Other absolute GOF indices such as RMSEA and SRMR indicate that the model does not fit the data. The RMSEA value of the model is at 0.060 with a PCLOSE value of 0.000 which are not in the recommended range (RMSEA less than 0.05 with a PCLOSE value greater than 0.05) (Hair et al., 2010; Byrne, 2010).
The incremental GOF indices indicate that the model does not fit the data adequately. The CFI, TLI, and RFI values for the measurement model are at 0.815, 0.807, and 0.675 respectively. All the incremental GOF values are well below the recommended value range between 0.90 and 0.95 (Kaplan, 2009; Hair et al., 2010; Byrne, 2010). An analysis of the parsimony fit indices confirms that the model has not reached an appropriate fit with its AGFI value being at 0.703 which is well below the recommend value of 0.95 (Byrne, 2010). This shows that the full measurement model does not have sufficient validity. As a result, modifications of the full measurement model are necessary (Kaplan, 2009).

The model modification process is carried out in several stages. In the first stage, the full measurement model is decomposed into several one-factor congeneric models. The GOF measures of each one-factor congeneric measurement model are assessed for their validity. Various other tests, namely, the convergent, discriminant and factorial validity tests are conducted (Hair et al., 2010). The factors that can pass the convergent and discriminant tests are reassembled into the higher-order factor models (Hair et al., 2010). Finally a factorial test is conducted to detect and drop any cross loading indicator variables on multiple factors (Molla et al., 2009).

5.5.3 Analysis of One-factor Congeneric Measurement Models

An one-factor congeneric measurement model is the simplest form of measurement models for representing the factor loadings of the set of indicator variables on the single latent factor (Holmes-Smith, 2010). The model revision process is initiated with the development of eleven one-factor congeneric measurement models for the
first-order factors depicted in the full measurement model, namely, QUALI, SERVI, USERO, ORGEF, OPENN, RESPO, EQUIT, SELFD, TRUST, PARTI and ENVIR.

First, a one-factor congeneric model is developed for the QUALI factor as shown in Figure 5.7. In this model, the latent factor QUALI is loaded with five indicator variables, namely, QUA_8a (accurate information), QUA_8b (up-to-date information), QUA_8c (relevant information), QUA_8d (information with right level of detail), and QUA_8e (simple and understandable information). Each indicator variable is associated with a measurement error labelled from e01 to e05. Figure 5.7 shows the estimated initial one-factor congeneric measurement model for the QUALI.

![Diagram of the estimated initial congeneric measurement model for QUALI](image)

The developed one-factor congeneric measurement model is then estimated. The GOF statistics are obtained for assessing its validity. An analysis of the GOF statistics shows that the model does not have sufficient validity exemplified by the poor $X^2/df$ value of 3.953 which is higher than the recommended value (2.0), and by a Bollen-Stine $P$ value of 0.001 which is also lower than the recommended value (0.05) (Hair et al., 2010). The RMSEA value is at 0.104 which is well above the recommended
value (0.05) (Byrne, 2010). The CFI, TLI, and AGFI fit statistics of the model are at 0.974, 0.948, and 0.909 respectively. Although the CFI, TLI, and AGFI (incremental and parsimony fit indices) values are within the acceptable range, the absolute fit statistics ($X^2/df$, $P$ value, RMSEA) reveal that the model does not approach an adequate fit. This creates the necessity for modifying the one-factor congeneric measurement model shown as in Figure 5.7.

The model is re-examined with the use of several diagnostic measures including standardised factor loading (SFL), standardised residuals (SR), modification indices (MI), the cut-off values for the GOF measures and the minimum number of items for a factor (Schumacker & Lomax, 2004; Kline 2005; Hair et al., 2010; Holmes-Smith, 2010; Byrne, 2010). These diagnostic measures are summarised as follows:

(a) SFL – The SFL values indicate that how accurately individual items can explain a factor. If an item has a SFL value which is less than 0.5, this signifies that the item does not explain the factors well. As a result, such an item can be deleted (Chau, 1997; Hair et al., 2010). This is to get rid of those irrelevant items from the analysis;

(b) SR values – Residuals are the difference between the observed and the estimated covariance terms (Kline, 2005). SR residuals are obtained by dividing residuals by the standard error of residual (Hair et al., 2010). SR values that are greater than $|±2.58|$ indicates that a particular relationship is not well accounted for by the model (Schumacker & Lomax, 2004). In this research, the SR value $|±2.58|$ is used as the cut-off point in the model re-specification (Schumacker & Lomax, 2004; Hair et al., 2010). Standardised
residuals greater than $|\pm 4.0|$ suggest a potentially unacceptable degree of error that leads to the deletion of the offending items (Hair et al., 2010);

(c) MI values – MI can be conceptualised as an $X^2$ statistic with one degree of freedom (df) (Joreskog & Sorbom, 1993; Byrne, 2010). MI values in AMOS shows the amount the overall model’s $X^2$ value drops when a single parameter is freely estimated (Byrne, 2010; Hair et al., 2010). Larger MI values (greater than 4.0) suggest that the overall model’s fit can be improved significantly by freeing the corresponding path (Hair et al., 2010, p. 689). Along with other diagnosing measures described as above, MI values are useful in diagnosing problems with specific items in the model (Byrne, 2010; Hair et al., 2010);

(d) GOF cut-off values — GOF cut-off values used in the research are presented in Table 5.1; and

(e) Number of items per factor— for a latent factor, the minimum number of indicator variables should be at least three (Gerbing & Anderson, 1985). Dropping an item in any of the circumstances mentioned above will decrease this number.

The diagnostic statistics for one-factor congeneric model for QUALI are obtained through AMOS text outputs. The model diagnosing starts with examining the SFLs. As shown in Figure 5.9 and Table 5.3, SFLs for indicator variables QUA_8a, QUA_8b, QUA_8c, QUA_8d, and QUA_8e are 0.501 ($\approx$0.50), 0.661 ($\approx$0.66), 0.798 ($\approx$0.80), 0.870 and 0.481 ($\approx$0.48) respectively. QUA_8e has the lowest SFL value of 0.48 which is below the recommend cut-off value (0.5) which indicates a problem in the indicator variable QUA_8e loading on latent factor QUALI.
### Table 5.3
The standardised factor loadings for the QUALI

<table>
<thead>
<tr>
<th>Indicator variable</th>
<th>Latent factor</th>
<th>SFL estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>QUA_8a</td>
<td>← QUALI</td>
<td>.501</td>
</tr>
<tr>
<td>QUA_8b</td>
<td>← QUALI</td>
<td>.661</td>
</tr>
<tr>
<td>QUA_8c</td>
<td>← QUALI</td>
<td>.798</td>
</tr>
<tr>
<td>QUA_8d</td>
<td>← QUALI</td>
<td>.870</td>
</tr>
<tr>
<td>QUA_8e</td>
<td>← QUALI</td>
<td>.481</td>
</tr>
</tbody>
</table>

By identifying QUA_8e as a suspect item, MI values are obtained to confirm the deletion of QUA_8e. MI values suggest a correlation between the errors e01 and e05. It is, however, advised that the researcher should not always re-specify the model by drawing the correlation between errors (Hair et al., 2010, p. 704). Hence, an examination of SR is carried out as another diagnostic measure. As shown in Table 5.4, SR among indicator variables QUA_8a and QUA_8e is (-3.526) which is higher than the recommended SR value (Schumacker & Lomax, 2004; Hair et al., 2010; Byrne 2010). Given that a higher SR is associated with QUA_8e and its SFL is below 0.5, QUA_8e becomes a candidate for deletion. Hence, QUA_8e is trimmed (deleted) from the model. Table 5.4 shows SR covariance among observed variables of the construct QUALI.

### Table 5.4
The standardised residuals among indicator variables

<table>
<thead>
<tr>
<th></th>
<th>QUA_8e</th>
<th>QUA_8a</th>
<th>QUA_8b</th>
<th>QUA_8c</th>
<th>QUA_8d</th>
</tr>
</thead>
<tbody>
<tr>
<td>QUA_8e</td>
<td>.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>QUA_8a</td>
<td>-3.526</td>
<td>.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>QUA_8b</td>
<td>-1.983</td>
<td>.971</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QUA_8c</td>
<td>-2.66</td>
<td>.761</td>
<td>.726</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>QUA_8d</td>
<td>.548</td>
<td>-.517</td>
<td>-.135</td>
<td>-.221</td>
<td>.000</td>
</tr>
</tbody>
</table>
After trimming QUA_8e from the one-factor congeneric model, the model is re-estimated for examining the validity. The GOF statistics reveal that the modified one-factor congeneric measurement model adequately fits the data exemplified by an $X^2/df$ of 0.635 with $P$ value of 0.530, RMSEA value of 0.000, SRMR value of 0.011, CFI, TLI and AGFI values that are very close to 1. As shown in Figure 5.8, The SFL of indicator variables (0.53, 0.79, 0.84, 0.80) in the modified measurement model are above the recommended value of 0.5 (Chau, 1997). Figure 5.8 shows the re-specified measurement model of the construct QUALI.

Following the same diagnostic measures used to re-examine the first-order factor QUALI, other first-order factors, SERVI, USERO, ORGEF, OPENN, RESPO, EQUIT, SELFD, TRUST, PARTI, and ENVIR are re-examined by developing one-factor congeneric measurement models. Appendix H presents the re-specified congeneric measurement models.

Table 5.5 summarises the GOF results of all the initial congeneric measurement models (denoted by Initial) and re-specified congeneric measurement models (denoted by Re-sp). All the re-specified one-factor congeneric measurement models and the
two-factor measurement model (SERVI is a two factor model) have met the acceptable absolute fitness measures (the $X^2/df < 2.0$ with a $P$ value of $> 0.05$) except for the re-specified models, RESPO and PARTI. The re-specified measurement model for RESPO has a higher $X^2/df$ value of 2.789 which is greater than the recommended value (Byrne, 2010; Hair et al., 2010). Furthermore, as shown in Table 5.5, the RMSEA (0.081), CFI (0.897), TLI (0.891) and AGFI (0.902) values of RESPO are not within the acceptable range. As noted in Table 5.1, the recommended RMSEA, CFI, TLI and AGFI values are at 0.05, 0.90, 0.95, and 0.95 respectively. It is, therefore, concluded that the one-factor model RESPO does not fit the data.

The same can be observed in relation to the re-specified model PARTI where the GOF indicators do not meet the acceptable level. In this model, a higher $X^2/df$ value of 7.914 with a $P$ value of 0.005, RMSEA value of 0.159, SRMR value of 0.095, and unacceptable CFI (0.885), TLI (0.871) and AGFI (0.890) values demonstrate that the model does not fit the data very well.

Except for the RESPO and PARTI, other re-specified measurement models met the accepted GOF values as presented in Table 5.1. Some of these models, for example, USERO, OPENN, EQUIT and SELFD have reached the best values for RMSEA (0.000), CFI (1), and TLI (1) fit indices (Byrne, 2010; Hair et al., 2010). It is worthwhile to note that re-specification of the one-factor congeneric model for ENVIR is not required as the initial measurement model demonstrates appropriate GOF results.
### Table 5.5
The GOF results of initial and re-specified congeneric measurement models

<table>
<thead>
<tr>
<th>GOF index and accepted value</th>
<th>$X^2/df &lt;$</th>
<th>$P &gt;$</th>
<th>RMSEA</th>
<th>SRMR</th>
<th>CFI</th>
<th>TLI</th>
<th>AGFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>QUALI Initial</td>
<td>3.953</td>
<td>0.001</td>
<td>0.104</td>
<td>.0343</td>
<td>0.974</td>
<td>0.948</td>
<td>0.909</td>
</tr>
<tr>
<td>Re-sp</td>
<td>0.635</td>
<td>0.530</td>
<td>0.000</td>
<td>0.011</td>
<td>0.989</td>
<td>0.909</td>
<td>1</td>
</tr>
<tr>
<td>SERVI Initial</td>
<td>6.685</td>
<td>0.000</td>
<td>0.144</td>
<td>0.066</td>
<td>0.910</td>
<td>0.849</td>
<td>0.816</td>
</tr>
<tr>
<td>SERVI Re-sp</td>
<td>1.540</td>
<td>0.160</td>
<td>0.044</td>
<td>0.025</td>
<td>0.993</td>
<td>0.988</td>
<td>0.968</td>
</tr>
<tr>
<td>SERVI1 Re-sp</td>
<td>2.433</td>
<td>0.119</td>
<td>0.072</td>
<td>0.001</td>
<td>0.979</td>
<td>0.979</td>
<td>0.974</td>
</tr>
<tr>
<td>SERVI2 Re-sp</td>
<td>0.382</td>
<td>0.536</td>
<td>0.000</td>
<td>0.006</td>
<td>1</td>
<td>1</td>
<td>0.994</td>
</tr>
<tr>
<td>USERO Initial</td>
<td>5.459</td>
<td>0.000</td>
<td>0.127</td>
<td>0.064</td>
<td>0.891</td>
<td>0.837</td>
<td>0.842</td>
</tr>
<tr>
<td>Re-sp</td>
<td>0.116</td>
<td>0.890</td>
<td>0.000</td>
<td>0.051</td>
<td>1</td>
<td>1</td>
<td>0.998</td>
</tr>
<tr>
<td>ORGEF Initial</td>
<td>3.751</td>
<td>0.000</td>
<td>1.000</td>
<td>0.045</td>
<td>0.940</td>
<td>0.90</td>
<td>0.914</td>
</tr>
<tr>
<td>Re-sp</td>
<td>0.511</td>
<td>0.600</td>
<td>0.000</td>
<td>0.009</td>
<td>1</td>
<td>1</td>
<td>0.991</td>
</tr>
<tr>
<td>OPENN Initial</td>
<td>5.471</td>
<td>0.000</td>
<td>0.128</td>
<td>.0688</td>
<td>0.866</td>
<td>0.812</td>
<td>0.825</td>
</tr>
<tr>
<td>Re-sp</td>
<td>0.143</td>
<td>0.706</td>
<td>0.000</td>
<td>0.006</td>
<td>1</td>
<td>1</td>
<td>0.998</td>
</tr>
<tr>
<td>RESPO Initial</td>
<td>7.557</td>
<td>0.005</td>
<td>0.127</td>
<td>0.089</td>
<td>0.883</td>
<td>0.867</td>
<td>0.842</td>
</tr>
<tr>
<td>Re-sp</td>
<td>2.789</td>
<td>0.067</td>
<td>0.081</td>
<td>0.0712</td>
<td>0.897</td>
<td>0.891</td>
<td>0.902</td>
</tr>
<tr>
<td>EQUIT Initial</td>
<td>1.707</td>
<td>0.081</td>
<td>0.051</td>
<td>0.031</td>
<td>0.991</td>
<td>0.985</td>
<td>0.956</td>
</tr>
<tr>
<td>Re-sp</td>
<td>0.487</td>
<td>0.786</td>
<td>0.000</td>
<td>0.0113</td>
<td>1</td>
<td>1</td>
<td>0.989</td>
</tr>
<tr>
<td>SELFED Initial</td>
<td>2.627</td>
<td>0.022</td>
<td>0.077</td>
<td>0.028</td>
<td>0.985</td>
<td>0.970</td>
<td>0.945</td>
</tr>
<tr>
<td>Re-sp</td>
<td>0.978</td>
<td>0.376</td>
<td>0.000</td>
<td>0.012</td>
<td>1</td>
<td>1</td>
<td>0.982</td>
</tr>
<tr>
<td>TRUST Initial</td>
<td>5.339</td>
<td>0.000</td>
<td>0.126</td>
<td>0.040</td>
<td>0.960</td>
<td>0.921</td>
<td>0.895</td>
</tr>
<tr>
<td>Re-sp</td>
<td>1.674</td>
<td>0.187</td>
<td>.0197</td>
<td>0.050</td>
<td>0.996</td>
<td>0.988</td>
<td>0.970</td>
</tr>
<tr>
<td>PARTI Initial</td>
<td>11.804</td>
<td>0.000</td>
<td>0.198</td>
<td>.0394</td>
<td>0.954</td>
<td>0.862</td>
<td>0.791</td>
</tr>
<tr>
<td>Re-sp</td>
<td>7.941</td>
<td>0.005</td>
<td>0.159</td>
<td>.0951</td>
<td>0.885</td>
<td>0.871</td>
<td>0.890</td>
</tr>
<tr>
<td>ENVIR Initial</td>
<td>1.198</td>
<td>0.291</td>
<td>0.027</td>
<td>.0208</td>
<td>0.997</td>
<td>0.996</td>
<td>0.970</td>
</tr>
</tbody>
</table>
| Re-sp                       | Model re-specification is not required
Chapter 5

Analysis of Quantitative Data

5.5.4 The Convergent Validity of the One-factor Models

All the re-specified one-factor congeneric models are tested for the convergent validity. Convergent validity examines the extent to which “indicators of a specific construct converge or share a high proportion of variance in common” (Hair et al., 2010, p 670). By performing convergent validity test the validity of the hypothesised construct can be examined (Brown, 2006; Hair et al., 2010). Convergent validity can be assessed by (a) the significance of the factor loadings of all items, (b) the average variance extracted (AVE), and (c) the reliability of constructs (Fornell & Larcker, 1981; Bhattacherjee & Premkumar, 2004; Hair et al., 2010).

The significance of the factor loading of items can be assessed through SFL (Fornell & Larcker, 1981; Bhattacherjee & Premkumar, 2004; Hair et al., 2010). As a good rule of thumb, SFL for each observed item should be at least 0.5 or higher, and 0.7 is ideal (Chau, 1997; Hair et al., 2010). An AVE measures the amount of variance that is captured by a latent factor in relation to the amount of variance due to the measurement error (Chau, 1997, p 324). An AVE is computed as the total of all squared SFLs divided by the number of items (Fornell & Larcker, 1981; Hair et al., 2010). For each latent factor, an AVE at 0.5 or higher is adequate for the convergent validity (Hair et al., 2010).

The reliability of the construct (latent factor) can be estimated with the coefficient $H$ (Hancock & Mueller, 2001). The coefficient $H$ is defined as the “proportion of variability in the construct explainable by its own indicator variables” (Hancock & Mueller, 2001, p. 202–203). It is recommended over other construct reliability measures such as Cronbach’s alpha (Hancock & Mueller, 2001; Molla et al., 2009;
Silvia, 2011) for many reasons including (a) items with a negative factor loadings do not detract from the reliability composite, (b) all variables contribute something to the definition of the construct and hence every item adds to the reliability of the composite and, (c) reliability of the composite will always be larger than the item reliability of the single best indicator variable (Holmes-Smith, 2010, p. 7.25). In applied research the $H$ value at 0.70 or higher is acceptable for the construct reliability (Hancock & Mueller, 2001). Appendix I shows the formulas used to calculate the coefficient $H$ and the AVE.

Table 5.6 summarises the convergent validity test results of the re-specified one-factor congeneric models. All the factors demonstrate an appropriate convergent validity by reaching the appropriate threshold AVE value of 0.5 (or approaching 0.5) and the coefficient $H$ value of 0.7, except for the factors RESPO and PARTI. The AVE values for the factors RESPO (0.29) and PARTI (0.27) are well below the recommended value (0.5). Moreover, the coefficient $H$ values for RESPO (0.63) and PARTI (0.59) are also below the recommended value (0.7). This is a clear indication that factors RESPO and PARTI do not demonstrate a sufficient convergent validity. Moreover, as shown in Table 5.5, factors RESPO and PARTI fail to demonstrate appropriate GOF. Given their poor GOF and the insufficient convergent validity test results, the latent factors RESPO and PARTI are dropped from the initial full measurement model for further analysis (Hair et al., 2010). The remaining factors are tested for the discriminant validity.
Table 5.6 The convergent validity test results of re-specified one factor models

<table>
<thead>
<tr>
<th>Latent factor</th>
<th>AVE</th>
<th>H</th>
<th>Indicator variable and description</th>
<th>SFL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality Information (QUALI)</td>
<td>0.56</td>
<td>0.85</td>
<td>QUA_8a Accurate information</td>
<td>0.525</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>QUA_8b Up-to-date information</td>
<td>0.698</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>QUA_8c Relevant information</td>
<td>0.839</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>QUA_8d Information with details</td>
<td>0.803</td>
</tr>
<tr>
<td>Functionalities of Services (SERVI 1)</td>
<td>0.48</td>
<td>0.64</td>
<td>SER_9b Complete two way transactions</td>
<td>0.690</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SER_9c One way transactions</td>
<td>0.690</td>
</tr>
<tr>
<td>Functionalities of Services (SERVI 2)</td>
<td>0.59</td>
<td>0.82</td>
<td>SER_9d Search information in databases</td>
<td>0.742</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SER_9e Download application forms</td>
<td>0.814</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SER_9f Download archives</td>
<td>0.756</td>
</tr>
<tr>
<td>User-orientation (USERO)</td>
<td>0.49</td>
<td>0.82</td>
<td>USO_10b Simple website addresses</td>
<td>0.713</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>USO_10c A single website with links</td>
<td>0.822</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>USO_10d A single website for all services</td>
<td>0.679</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>USO_10g FAQs</td>
<td>0.569</td>
</tr>
<tr>
<td>Efficiency (ORGEF)</td>
<td>0.48</td>
<td>0.80</td>
<td>EFF_11b Re-designed processors</td>
<td>0.620</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>EFF_11c Improved ICT infrastructure</td>
<td>0.744</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>EFF_11d Sharing info among organisations</td>
<td>0.641</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>EFF_11e Empower public staff with ICT</td>
<td>0.774</td>
</tr>
<tr>
<td>Openness (OPENN)</td>
<td>0.48</td>
<td>0.85</td>
<td>OPE_12a Policy drafts/ laws for consultation</td>
<td>0.592</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OPE_12d Citizens make complaints online</td>
<td>0.889</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OPE_12e Publish tenders online</td>
<td>0.501</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OPE_12f Display staff contact information</td>
<td>0.733</td>
</tr>
<tr>
<td>Responsiveness (RESPO)</td>
<td>0.29</td>
<td>0.63</td>
<td>RES_13a Display citizen charter online</td>
<td>0.504</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RES_13b Ability to make inquiries online</td>
<td>0.631</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RES_13c Follow-up emails for inquiries</td>
<td>0.508</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RES_13d Online case tracking</td>
<td>0.518</td>
</tr>
<tr>
<td>Equity (EQUIT)</td>
<td>0.49</td>
<td>0.82</td>
<td>EQU_14a Website content in local languages</td>
<td>0.705</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>EQU_14b Kiosks in rural and semi-urban areas</td>
<td>0.591</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>EQU_14c Accessibility standards of websites</td>
<td>0.823</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>EQU_14e Content for ethnic minorities</td>
<td>0.670</td>
</tr>
<tr>
<td>Self-development (SELF)</td>
<td>0.58</td>
<td>0.86</td>
<td>SEL_15a ICT resources for public access</td>
<td>0.710</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SEL_15b Low cost training for citizens</td>
<td>0.755</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SEL_15c Content for students’ education</td>
<td>0.867</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SEL_15d Software to develop skills</td>
<td>0.690</td>
</tr>
<tr>
<td>Trust (TRUST)</td>
<td>0.51</td>
<td>0.84</td>
<td>TRU_16a Security and privacy statements</td>
<td>0.557</td>
</tr>
</tbody>
</table>
5.5.5 The Discriminant Validity of the One-factor Models

Discriminant validity refers “to the extent to which a latent factor (construct) is truly distinct from other latent factors both in terms of how much it correlates with other latent factors and how distinctly measured variables represent only this single factor” (Hair et al., 2010, p. 669). It is examined by performing the chi-square difference ($\Delta \chi^2$) test recommended by Anderson and Gerbing (1988). These tests are performed by constraining the estimated correlation parameter between each pair of latent factors to 1.0, and by obtaining $\chi^2$ difference values for the constrained and unconstrained models (Anderson & Gerbing, 1988). A significantly lower $\chi^2$ value for the model in which the correlations are not constrained would indicate that the latent factors are not perfectly correlated (two different latent factors), and therefore, the discriminant validity of those latent factors is achieved (Bagozzi & Phillips, 1982, p. 476; Anderson & Gerbing, 1988).
The discriminant validity between QUALI and SERVI, for example, is examined by developing two measurement models. Figure 5.9 shows the unconstrained model (UNM) where the correlation parameter is freely estimated. The Figure 5.10 shows the constrained model (CM) where the correlation parameter between constructs is fixed to 1 by assuming that latent factors QUALI and SERVI are the same (Anderson & Gerbing, 1988).

The two models are estimated using the ML estimation technique. The \(X^2\) values are obtained for the unconstrained model and the constrained model. As shown in Table
5.7, the $X^2$ value of the unconstrained model is at 5.332. The $X^2$ value of the constrained model is at 62.70. This indicates that the unconstrained model’s $X^2$ value is significantly lower than that of the constrained model. Moreover, the chi-square difference ($\Delta X^2$) between the constrained and unconstrained model is also significant ($\Delta X^2 = 57.37$). It is, therefore, concluded that the discriminant validity between QUALI and SERVI1 is achieved at $P < 0.001$ (Bagozzi & Phillips, 1982; Anderson & Gerbing, 1988; Kline, 2005, 2010). This suggests that QUALI and SERVI1 are two factors. The $\Delta X^2$ is calculated as follows:

$$\Delta X^2 = X^2_{CM} - X^2_{UCM} = 62.70 - 5.332 = 57.37, P < 0.001$$

Similarly, the discriminant validity between other constructs is examined by developing and testing those two-factor models. The $X^2$ values are compared and presented in the Table in Appendix J. As shown in Appendix J, all the constructs have achieved sufficient discriminant validity. During the discriminant validity testing stage several items are dropped from the original model with help from the model re-specification diagnostic tools.

### 5.5.6 Factorial Validity and Higher-order Models

The factorial validity test is conducted to assess whether the factors that pass the convergent validity and the discriminant validity tests represent the same higher level construct and to detect and drop any cross-loading variables (Molla et al., 2009). Following the hypothesised theoretical framework in Figure 3.2, three higher-order measurement models are developed, namely, the delivery of public services model
(DPS), effectiveness of public organisations model (EPO) and the achievement of socially desirable outcomes model (ASO) by using the one factor models that pass the convergent and discriminant validity tests. In the DPS model, QUALI, SERVI, and USERO represent the higher-order factor DPS as shown in Figure 5.11.

![Figure 5.11](image)

**Figure 5.11** The higher-order factor measurement model for DPS

The DPS model is estimated using the ML estimation techniques. The GOF values indicate that the DPS model is within the acceptable range. The $\chi^2/df$ value of 1.06 with a $P$ value of 0.355, the RMSEA value of 0.015 with the PCLOSE value of 0.989, and the SRMR value of 0.029 are clear indications that the model is approaching an adequate fit. Moreover, both the CFI and the TLI values are at 0.997 which is very close to 1.0 and the AGFI value is at 0.954. This indicates that the model has a very
good fit (Schumacker & Lomax, 2004; Byrne, 2010; Hair et al., 2010). This shows that the DPS model has sufficient validity. Figure 5.12 shows the estimated measurement model of DPS.

![Figure 5.12](image-url)

**Figure 5.12**  The estimated higher-order factor measurement model for DPS

Following the theoretical framework, a higher-order factor measurement model is developed for the dimension of EPO. In the EPO measurement model, two factors, namely, ORGEF and OPENN represent the higher-order factor of the EPO. As noted before, during the convergent validity test, the factor RESPO is dropped due to the insufficient convergent validity. Hence, the higher-order measurement model of EPO consists of only two first-order factors as shown in Appendix K.1.
The EPO model is estimated using ML estimation techniques. The results show that the EPO model has sufficient validity exemplified by the $\chi^2/df$ value of 1.416 with a $P$ value of 0.142, the RMSEA value of 0.039 with the PCLOSE value of 0.640, the SRMR value of 0.029, the CFI value of 0.990, the TLI value of 0.984 and an AGFI value of 0.960 (Schumacker & Lomax, 2004; Hair et al., 2010; Byrne, 2010). The factorial validity test does not reveal any cross-loading items nor did it result in dropping further items. The estimated measurement model of EPO is shown in Appendix K.2.

Finally, the measurement model for the dimension of the ASO is developed. The ASO model consists of four first-order factors EQUIT, SELFD, TRUST, and ENVIR and one higher-order factor, namely, the ASO. The estimated ASO measurement model reveals that the model has sufficient validity. GOF statistics reveal a $\chi^2/df$ value of 1.86, a RMSEA value of 0.56 (which is slightly higher than 0.5) a SRMR value of 0.045, a CFI value of 0.962, and TLI and AGFI values which are greater than 0.9. These GOF statistics indicate the validity of the ASO model. Moreover, it is worthwhile to note that the estimated ASO model does not demonstrate any cross loading variables and therefore, does not results in the dropping of further items. Appendix K.3, 4 shows the higher-order factor measurement models for ASO.

It is worth to mention that at the factorial validity assessment stage several items associated with first-order factors are dropped for improving the GOF values of the higher-order factor models. This could affect the reliability and validity of the individual factors. The reliability and validity of the factors will be re-examined during the final measurement model assessment stage.
### 5.5.7 Discriminant Validity among Higher-order Factors

To examine the discriminant validity among the higher-order factors DPS, EPO and ASO, a full measurement has to be developed. As shown in Figure 5.13, the full measurement model is reconstructed by assembling the three higher-order measurement models for DPS, EPO, and ASO into a single model and by drawing the correlations among the higher-order factors. To test the discriminant validity among the higher-order factors, the $\Delta X^2$ test is used (Anderson & Gerbing, 1988).

Five measurement models are developed by (a) freeing the correlation among higher-order factors DPS, EPO and ASO (unconstrained model), (b) constraining the correlation between DPS and EPO to 1.0 (assuming DPS and EPO are a single factor) and freeing the correlation between DPS and ASO, and EPO and ASO (c) constraining the correlation between DPS and ASO to 1.0 (assuming that DPS and ASO are a single factor) and freeing the correlation between EPO and ASO, and DPS and ASO (d) constraining EPO and ASO to 1.0 (assuming that EPO are ASO are a single factor) and freeing the correlation between DPS and ASO, and DPS and EPO and (e) constraining all correlations among the factors DPS, ASO and EPO to 1.0 by assuming all the higher-order factors DPS, EPO, and ASO are identical (Kline, 2005, 2010). Figure 5.13 shows the unconstrained measurement model. Other models are shown in Appendix K.5, K.6, and K.7.
Figure 5.13  The unconstrained higher-order model
The five measurement models are estimated and the $\Delta X^2$ statistics are obtained. As shown in Table 5.7, the unconstrained model has the lowest $X^2$ value which is at 803.864. The $\Delta X^2$ among the unconstrained model and the constrained models are ($\Delta X^2$ of DPS and EPO constrained model: 115.378, DPS and ASO constrained model: 159.712, EPO and ASO constrained model: 97.165, and DPS, EPO and ASO constrained model: 160.155) are significant with a $P$ value of $< 0.001$. This suggests that the discriminant validity among DPS, EPO and ASO constructs has been achieved. This further suggests that DPS, EPO and ASO are not identical.

Table 5.7 The chi-square ($\Delta X^2$) difference test results among higher-order factors

<table>
<thead>
<tr>
<th>Measurement model</th>
<th>$X^2$</th>
<th>$Df$</th>
<th>$X^2/df$</th>
<th>$\Delta X^2$ versus unconstrained model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unconstrained model</td>
<td>803.864</td>
<td>521</td>
<td>1.554</td>
<td>-</td>
</tr>
<tr>
<td>DPS and EPO constrained model</td>
<td>919.242</td>
<td>522</td>
<td>1.761</td>
<td>115.378</td>
</tr>
<tr>
<td>DPS and ASO constrained model</td>
<td>963.576</td>
<td>522</td>
<td>1.846</td>
<td>159.712</td>
</tr>
<tr>
<td>EPO and ASO constrained model</td>
<td>901.029</td>
<td>522</td>
<td>1.726</td>
<td>97.165</td>
</tr>
<tr>
<td>DPS, EPO and ASO constrained model</td>
<td>964.019</td>
<td>524</td>
<td>1.840</td>
<td>160.155</td>
</tr>
</tbody>
</table>

Table 5.8 presents a comparison of the GOF results among the unconstrained models and the constrained models. As shown in the Table 5.8, the unconstrained model demonstrates better GOF statistics in contrast to the constrained models. The Bollen-Stine $P$ value of 0.699, the $X^2/df$ value of 1.554, the RMSEA value of 0.045 with the PCLOSE value of 0.921, the SRMR value of 0.049, the CFI value of 0.933, and the TLI value of 0.928 suggest that the unconstrained model has achieved sufficient validity although the AGFI value (0.842) is below the recommended value. This
confirms that the public value of e-government can be better explained by the three main higher-order factors, namely, DPS, EPO and ASO.

### Table 5.8 The GOF of higher-order correlated measurement models

<table>
<thead>
<tr>
<th>Measurement model</th>
<th>RMSEA</th>
<th>PCLOSE</th>
<th>SRMR</th>
<th>CFI</th>
<th>TLI</th>
<th>AGFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommend value</td>
<td>&lt; 0.05</td>
<td>&gt; 0.05</td>
<td>&lt; 0.08</td>
<td>&gt; 0.90</td>
<td>Close</td>
<td>Close</td>
</tr>
<tr>
<td>Unconstrained model</td>
<td>0.045</td>
<td>0.921</td>
<td>0.049</td>
<td>0.933</td>
<td>0.928</td>
<td>0.842</td>
</tr>
<tr>
<td>DPS and EPO constrained model</td>
<td>0.053</td>
<td>0.218</td>
<td>1.897</td>
<td>0.908</td>
<td>0.901</td>
<td>0.829</td>
</tr>
<tr>
<td>DPS and ASO constrained model</td>
<td>0.055</td>
<td>0.051</td>
<td>0.2472</td>
<td>0.897</td>
<td>0.890</td>
<td>0.826</td>
</tr>
<tr>
<td>EPO and ASO constrained model</td>
<td>0.051</td>
<td>0.338</td>
<td>0.1786</td>
<td>0.912</td>
<td>0.905</td>
<td>0.832</td>
</tr>
<tr>
<td>All constrained model</td>
<td>0.055</td>
<td>0.058</td>
<td>0.2526</td>
<td>0.898</td>
<td>0.890</td>
<td>0.827</td>
</tr>
</tbody>
</table>

#### 5.5.8 The Validity of the Final Measurement Model

The higher-order factors that can pass the discriminant validity (DPS, EPO and ASO) are tested for the factorial validity in assessing whether these higher-order factors represent the same higher level factor. As noted above, the discriminant validity test reveals that DPS, EPO and ASO are not identical. As a result, it suggests that the covariance among higher-order factors can be explained by their regression on a fourth-order factor (Byrne, 2010), public value of e-government (PUBVAL). Figure 5.14 shows the estimated final measurement model.

The final measurement model is estimated. It has a $\chi^2/df$ value of 1.537 with a Bollen-Stine P value of 0.727, a RMSEA value of 0.044 with a PCLOSE value of 0.946, and a SRMR value of 0.049. A $\chi^2/df$ value which is less than 2.0 with a P value greater than 0.05, a RMSEA value less than 0.05, and a SRMR value less than 0.08 indicate
that model fits the data very well (Schumacker & Lomax, 2004; Brown, 2006; Byrne, 2010; Hair et al., 2010). Furthermore, the CFI value (0.935) and the TLI value (0.930) are close to 0.95 indicating a good fit (Byrne, 2010; Hair et al., 2010). It is, therefore, concluded that the final measurement model has sufficient validity.

Table 5.9 shows a comparison of the GOF statistics of the initial measurement model presented in Figure 5.6 and the final measurement model presented in Figure 5.14. It is clear from the GOF statistics that the final measurement model’s validity is far better than that of the initial measurement model. It is, therefore, concluded that the final measurement model (the public value model) fits data very well in contrast to the initial measurement model.

<table>
<thead>
<tr>
<th>Table 5.9</th>
<th>A comparison of GOF statistics of initial and final measurement models</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$P$</td>
</tr>
<tr>
<td><strong>Recommended value</strong></td>
<td>&gt; 0.05</td>
</tr>
<tr>
<td><strong>Initial Measurement Model</strong></td>
<td>0.002</td>
</tr>
<tr>
<td><strong>Final Measurement Model</strong></td>
<td>0.699</td>
</tr>
</tbody>
</table>
Figure 5.14  The final measurement model (public value model)
5.6 Research Findings of the Quantitative Data Analysis

The Figure 5.15 depicts the structural model which shows a strong support for all paths in the structural model with regression coefficient values ranging from 0.58 to 0.98 at $P < 0.001$ (***). The model accounts for 76% variances in the delivery of public service (DPS), 97% in effectiveness of public organisations (EPO), and 78% in the achievement of socially desirable outcomes (ASO). Moreover, it accounts for 34% of the variance in quality of information (QUALI), 73% in functionalities of e-services (SERVI), 68% in user-orientation (USERO), 77% in organisational efficiency (ORGEF), 86% in openness (OPENN), 92% in equity (EQUIT), 85% in self-development (SELD), 68% in trust (TRUST), and 63% in environmental sustainability (ENVIR).

Table 5.10 summarises the hypothesis test results. In Table 5.10, the important test statistic is the critical ratio (CR). It is calculated by dividing the un-standardised regression weight (URW) by its standard error (SE). CR values higher than $\pm 1.96$ and probability ($P$) values less than 0.05 indicate statistical significance at the level of 0.05 (Byrne, 2010). For example, the CR of 6.699 (6.699 > $\pm 1.96$) for the regression coefficient DPS $\rightarrow$ QUALI with a $P$ value very close to zero ($P$ value close to zero is shown in ***)) indicates that this regression coefficient is significantly different from zero and therefore, the path should remain in the model (Byrne, 2010). Hence, it is concluded that hypothesis H1 (formulated in Chapter 3) is supported. As shown in Table 5.10, all CR values are within the acceptable range and $P$ values are close to zero (***)) suggesting that hypotheses are supported. However, as noted in this chapter due to insufficient convergent validity, the constructs ‘OPENN’ and ‘PARTI’ are dropped from the model. Hypotheses H6 and H10, therefore, are not proved. It is
also worth noting that the regression coefficient paths, PUBVAL → DPS (H12), PUBVAL → EPO (H13), and PUBVAL → ASO (H14), also demonstrate sufficient validity.

![Diagram of the estimated structural equation model]

**Figure 5.15** The estimated structural equation model
Table 5.1  The hypotheses test results

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>The structural relationship</th>
<th>SRW</th>
<th>URW</th>
<th>SE</th>
<th>CR</th>
<th>P</th>
<th>Hypothesis test result</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>QUALI ← DPS</td>
<td>0.583</td>
<td>.579</td>
<td>0.083</td>
<td>6.699</td>
<td>***</td>
<td>Supported</td>
</tr>
<tr>
<td>H2</td>
<td>SERVI ← DPS</td>
<td>0.856</td>
<td>1.883</td>
<td>0.267</td>
<td>7.053</td>
<td>***</td>
<td>Supported</td>
</tr>
<tr>
<td>H3</td>
<td>USERO ← DPS</td>
<td>0.826</td>
<td>1.727</td>
<td>0.247</td>
<td>6.999</td>
<td>***</td>
<td>Supported</td>
</tr>
<tr>
<td>H4</td>
<td>ORGEF ← EPO</td>
<td>0.896</td>
<td>0.872</td>
<td>0.099</td>
<td>8.806</td>
<td>***</td>
<td>Supported</td>
</tr>
<tr>
<td>H5</td>
<td>OPENN ← EPO</td>
<td>0.917</td>
<td>1.132</td>
<td>0.128</td>
<td>8.858</td>
<td>***</td>
<td>Supported</td>
</tr>
<tr>
<td>H6</td>
<td>RESPO ← EPO</td>
<td>The construct RESPO is dropped from the model due to insufficient convergent validity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H7</td>
<td>EQUIT ← ASO</td>
<td>0.853</td>
<td>1.178</td>
<td>0.112</td>
<td>10.508</td>
<td>***</td>
<td>Supported</td>
</tr>
<tr>
<td>H8</td>
<td>SELFD ← ASO</td>
<td>0.922</td>
<td>0.992</td>
<td>0.098</td>
<td>10.096</td>
<td>***</td>
<td>Supported</td>
</tr>
<tr>
<td>H9</td>
<td>TRUST ← ASO</td>
<td>0.826</td>
<td>1.089</td>
<td>0.096</td>
<td>11.391</td>
<td>***</td>
<td>Supported</td>
</tr>
<tr>
<td>H10</td>
<td>PARTI ← ASO</td>
<td>The construct PARTI is dropped from the model due to insufficient convergent validity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H11</td>
<td>ENVIR ← ASO</td>
<td>0.791</td>
<td>1.124</td>
<td>0.114</td>
<td>9.865</td>
<td>***</td>
<td>Supported</td>
</tr>
<tr>
<td>H12</td>
<td>DPS ← PUBVAL</td>
<td>0.874</td>
<td>0.881</td>
<td>0.093</td>
<td>6.240</td>
<td>***</td>
<td>Supported</td>
</tr>
<tr>
<td>H13</td>
<td>EPO ← PUBVAL</td>
<td>0.984</td>
<td>1.716</td>
<td>0.275</td>
<td>6.240</td>
<td>***</td>
<td>Supported</td>
</tr>
<tr>
<td>H14</td>
<td>ASO ← PUBVAL</td>
<td>0.900</td>
<td>0.813</td>
<td>0.287</td>
<td>6.636</td>
<td>***</td>
<td>Supported</td>
</tr>
</tbody>
</table>

Accurate and relevant information with an appropriate level of detail disseminated in a timely manner is critical for creating public value of e-government. The structural model analysis reveals that the quality of information is the least contributing factor, explaining only 34% (0.34) of the variance. E-government services are an important public value in Sri Lanka which explains 73% variance of the model. Citizens value both complex functionalities of e-services (SERVI1) and simple functionalities of e-services (SERVI2) such as searching interactive information, downloading government applications, and downloading archives. On the user-orientation of e-government services delivery, the analysis suggests that the citizen-centric feature of e-government service delivery channels such as simple and easy to remember website
addresses, web index concept, and web portals where information is disseminated through a single window is valued.

The organisational efficiency is crucial for the public value evaluation of e-government. The analysis reveals that citizens value improving ICT infrastructure for better performance in public organisations, re-designing government processes in a citizen-centric manner, sharing information among public organisations, and empowering public staff with appropriate ICT skills. All these activities have the potential to improve the organisational efficiency, leading to a reduction of administration cost in public organisations and saving tax payers’ money. Although implementing e-government is a way of saving money for both government and tax payers, the analysis reveals that citizens do not value saving money by cutting staff from e-government implementation. Improving openness of the public organisations through e-government is another important factor for evaluating the public value. The study shows that public policy drafts, laws and regulations for consultation, displaying government officials’ contact information online and ability to make complaints online to show public organisations’ transparency are valuable to improve the openness of the public organisations.

Citizens value equity, trust, self-development, and government’s efforts to contribute to environmental sustainability. In terms of equity, citizens value information dissemination through local languages, development of websites that complies with the accessibility standards, establishment kiosk in rural and semi-urban areas to provide access to e-government and content for ethnic minorities. This research shows that citizens value government efforts to build citizens’ skills through e-government
initiatives. For example, citizens’ value e-content that supports children’s education, initiatives that support distance education and availability of resources to develop the ICT skills of citizens.

Trust is another critical factor for evaluating the public value of e-government in Sri Lanka. Citizens expect that e-government will ensure the secrecy of their sensitive information held in computer systems, dissemination of credible information through e-government channels, and protection of citizens by e-law. The perceptions of citizens’ about e-government’s contributions to environmental sustainability are positive. Reduction of paper usage by introducing electronic copies, recycling ICT equipment and papers, switching off computer systems when not using, and retiring energy inefficient computer systems are seen as valuable for contributing to environmental sustainability.

5.7 Conclusion

This chapter aims to answer the confirmatory research questions formulated in this research: What is the public value of e-government initiatives in Sri Lanka? What are the public values of e-government from the perspective of citizens? What are the critical factors for evaluating the public value of e-government in Sri Lanka? For this purpose, in this Chapter the theoretical framework hypothesised in Figure 3.2 is tested and validated using survey data collected in Sri Lanka by using SEM. The findings reveal that quality of information, e-services, user-orientation, organisational efficiency and openness, equity, trust, self-development, and environmental
sustainability are the critical factors for evaluating the public value. During the data analysis, participatory democracy and responsiveness are dropped due to having insufficient convergent validity. It is therefore conclude that responsiveness and participatory democracy are not critical factors for evaluating the public value of e-government in Sri Lanka.
Chapter 6

Analysis of Qualitative Data

6.1 Introduction

A qualitative approach to research aims to understand the research problem in the light of the meanings that individuals have given to such a problem based on their experiences (Denzin & Lincoln, 1998, 2005; Merriam, 2002). From the perspective of qualitative research, there is, therefore, no fixed, single or measurable answer for a research problem (Merriam, 2002). Instead there are multiple meanings and interpretations constructed by individuals that can change over time (Merriam, 2002). As a result, the qualitative approach enables the researcher to obtain a more detailed and meaningful understanding of the research problem from the perspective of many individuals at a particular point of time (Patton, 2002; Crane, 2010).

A qualitative approach uses different types of qualitative data. Individuals’ thoughts and beliefs obtained from individual interviews and focus group discussions are commonly used as qualitative data. Furthermore, notes from logbooks, quotes from published documents, and non-textual data from pictures, audio and video recordings may also be used as qualitative data in research (Patton, 2002; Srivastava & Thomson, 2009). With the use of a variety of qualitative data, a better understanding of the research problem can be obtained.
The qualitative data that collected for a research can be analysed using many different techniques. Grounded theory, for example, is a complex qualitative data analysis technique which is used to generate theories by identifying categories of information, positioning categories within a theoretical model, and then generating a theory by interconnecting these categories (Creswell, 2009; Howitt, 2010). Thematic analysis is another popular technique which involves identifying, analysing and reporting patterns (themes) within a qualitative data set (Braun & Clarke, 2006). Such techniques are extremely useful in analysing different types of qualitative data to answer research questions.

This research adopts a qualitative approach to investigate the public value of e-government in Sri Lanka from the perspective of citizens. Qualitative data is collected from interviews with e-government users and from reports published on e-government in Sri Lanka. Thematic analysis is used to analyse the qualitative data (Boyatzis, 1998; Braun & Clarke, 2006). The use of thematic analysis in this research is due to its simplicity, less demanding nature and imposition of only a few constraints at data collection and analysis, and provision of a systematic approach to summarise a large volume of data into meaningful and descriptive themes (Howitt, 2010).

This chapter aims to analyse the qualitative data for investigating the public value of e-government in Sri Lanka. The qualitative data is systematically analysed in this chapter by performing theory-driven thematic analysis. The chapter will discuss the thematic analysis findings in relation to three main dimensions, namely, the public values of delivery of quality public services, effectiveness of public organisations, and
achievement of socially desirable outcomes. Several thematic maps will be developed in this chapter for better presentation of the findings of thematic analysis.

The remainder of this chapter is organised as follows. First, an overview of the thematic analysis technique is presented. A comprehensive discussion of the findings of thematic analysis is then presented with the use of three thematic network maps. Finally, a summary of the qualitative research findings is presented.

6.2 An Overview of Thematic Analysis

Thematic analysis is a systematic way of grouping complex qualitative data into a number of themes for increasing the accuracy in understanding and interpreting people’s experience or observations about people, events, and situations (Boyatzis, 1998; Attride-Stirling, 2001). A theme is a “pattern found in the information that at minimum describes and organises the possible observations and at maximum interprets aspects of the phenomenon” (Boyatzis, 1998). The core of thematic analysis is the capacity to summarise complex qualitative data by identifying the underlying dominant themes which appear and re-appear within the data set (Howitt, 2010).

Two approaches to thematic analysis exist in the literature. They are theory-driven (deductive) thematic analysis and the data-driven (inductive) thematic analysis (Boyatzis, 1998; Attride-Stirling, 2001; Joffe & Yardley, 2004). In theory-driven thematic analysis themes are derived with the use of pre-existing theoretical concerns (Braun & Clarke, 2006; Howitt, 2010). The theory-driven approach is the most frequently used approach because it can lead to the development of codes and themes
based on theories familiar to researchers (Boyatzis, 1998). The wordings, meanings, expressions of the elements of the theory may be specific to the context of the researcher’s field (Boyatzis, 1998). The theory-driven thematic analysis is extremely useful for researchers to replicate, extend or refute previous research (Boyatis, 1998).

In the data-driven thematic analysis themes are derived purely from the collected data. These themes are, therefore, more explicitly analyst driven (Braun & Clarke, 2006). As a result, the themes identified from the data in the data-driven thematic analysis may demonstrate a little connection to the specific interview questions that have been asked from the interviewees (Braun & Clarke, 2006). Such an approach is helpful to explore new areas of research that emerge from the data (Boyatis, 1998). The data-driven thematic analysis, however, ignores the researcher’s theoretical interest in the area or topic (Braun & Clarke, 2006).

Three kinds of themes exist in thematic analysis, namely, the basic themes, the organising themes, and the global themes (Attride-Stirling, 2001). Basic themes are the lowest level themes derived from the initial code (code is a label given to identify a feature of data) attached to segments of data (Attride-Stirling, 2001). Organising themes are the middle-order themes that organise the basic themes into groups for representing similar matters (Attride-Stirling, 2001). Global themes are the highest level themes that encompass the principal metaphors in the data as a whole (Attride-Stirling, 2001). They group related organising themes together to present an argument for answering the research question. Based on the three kinds of themes, a thematic network map can be developed which shows the important themes (global, organising, and basic themes) at multiple levels and the relationships among these themes.
In the thematic map developed in this chapter, the global themes, organising themes and basic themes are shown respectively, in the shape of rectangles, ovals, and rounded-rectangles. Figure 6.1 (Attride-Stirling, 2001) shows a fragment of a sample thematic map.

![Thematic Map Diagram]

**Figure 6.1** A sample thematic map

Before conducting the thematic analysis it is necessary to transcribe the interview data. Data transcription is a key task in qualitative data analysis (Bird, 2005). It is the process of transforming verbal data into the written text for further analysis (Braun & Clarke, 2006; Howitt, 2010). There are several methods for transcribing qualitative data. Out of the many existing methods, secretarial transcription and Jefferson (2004) transcription are the most popular ones (Howitt, 2010). On one hand, secretarial transcription focuses purely on the words which are said and not on how they are said (Howitt, 2010). Jefferson’s (2004) transcription, on the other hand, takes into account additional information relating to the way in which the words are said including overlaps in the interviewee’s responses, pitch rises, pitch falls, squeaky or creaky voice, volume, speech speed etc. It is argued that there is no major advantage in using...
Jefferson’s (2004) transcription in thematic analysis given that thematic analysis mainly focuses on *what* is said rather than on *how* it is said (Braun & Clarke 2006; Howitt, 2010). It is further argued that most researchers using thematic analysis transcribe data using the secretarial transcription method (Howitt, 2010). This research, therefore, uses the secretarial transcription method for transcribing data. The accuracy of the transcription of data is maintained by verifying transcripts against the original voice record of the interview.

Transcribed data in a textual format are analysed using the thematic analysis method. Thematic analysis consists of several steps as shown in Figure 6.2 (Attride-Stirling, 2001; Braun & Clarke, 2006; Howitt, 2010). The first step, familiarising with data, allows the researcher to get a better understanding of the details of the collected data set. During this research, the researcher familiarises himself with the data at the data collection and data transcription stages. Conducting fifteen face-to-face interviews helps the researcher to become familiar with the raw data while the data is being collected. Steps followed in the data transcription process to ensure the accuracy of the transcription help the researcher to further familiarise himself with the data. Furthermore, making additional notes on initial ideas, meanings, and initial themes is extremely helpful to familiarise the researcher with the depth and breadth of the content (Braun & Clarke, 2006).

The second stage is the initial coding which involves in assigning specific codes for each line or more lines in the transcribed text (Attride-Stirling, 2001; Braun & Clarke, 2006; Howitt, 2010). A code is a label given to each line (or more) to “identify a feature of the data that appears interesting to the analyst, and refer to the most basic
segment or element of the raw data or information that can be assessed in a meaningful way regarding the phenomenon” (Boyatzis, 1998, p 63; Braun & Clarke, 2006, p 88). In this research codes are generated in a deductive manner by approaching the data set with specific questions in mind that the researcher wishes to code around (Braun & Clarke, 2006; Howitt, 2010). This step results a code book (Boyatzis, 1998). Figure 6.2 shows the steps in thematic analysis.

The third step involves in searching for themes based on the initial coding. Themes are identified by reviewing each code attached to the text segments, and sorting the different codes into meaningful groups which helps to extract the salient and common themes in the coded text segments (Attride-Stirling, 2001; Howitt, 2010). During this stage visual maps are used to arrange codes around themes for better understanding the meaning of themes, discovering the relationships between codes and themes, and between different levels of themes such as basic, organising and global themes (Attride-Stirling, 2001; Braun & Clarke, 2006).
The fourth step is the reviewing of themes which involves activities such as breaking down certain themes into two or more themes, converging overlapping themes for creating a new theme and discarding themes (Braun & Clarke, 2006). The fifth step is to define and label themes. During this stage themes are further refined to reflect the essences of what each theme is about (Braun & Clarke, 2006). The sixth step involves in developing thematic networks that show the important themes (global, organising, and basic themes) at multiple levels and their relationships (Attride-Stirling, 2001).

This research adopts the theory-driven thematic analysis for analysing the interview data with the use of the theoretical concepts developed in chapter 3. The use of thematic analysis in this research is due to its various features (Braun & Clarke, 2006). The capacity of thematic analysis to summarise key features of a complex and large volume of data is an advantage of using it. Thematic analysis can provide social interpretations of complex qualitative data by generating unanticipated insights, and underlining similarities and differences across the data set. The fact that thematic analysis is a relatively easy and quick method to analyse large and complex data is another reason for using thematic analysis in this research. The ability to generate findings in a way that is accessible to a wide range of stakeholders is another advantage of thematic analysis.

No matter what techniques are used to analyse qualitative data, the validity and reliability of the research findings are always critical in qualitative research (Yin, 1994; Whittemore et al., 2001; Sridharan, Deng, & Corbitt, 2010). Five types of validity are widely discussed in qualitative research, namely, (a) descriptive validity, (b) interpretative validity, (c) theoretical validity, (d) internal validity, and (e) external
validity (Johnson, 1997). Descriptive validity generally refers to the accuracy of the facts reported by the researcher (Johnson, 1997). Interpretive validity is about accurately describing the meaning given by the participants to the research phenomena which is being studied by the researcher (Johnson, 1997). Theoretical validity refers to the degree to which the theoretical rationalisations developed from a research fits the data (Johnson, 1997). External validity refers to establishing the domain to which a study’s findings can be generalised (Yin, 1994). Internal validity refers to “the degree to which a researcher is justified in concluding that an observed variable is causal” (Johnson, 1997, p 287).

Various procedures are applied in this research to ensure the descriptive, interpretive and theoretical validity of the research. To ensure the descriptive validity, the research notes taken during the interviews are cross-checked with the digitally recorded interviews. Furthermore, the recorded interviews are listened to many times before being transcribed (Braun & Clarke, 2006).

To ensure the interpretative validity, informal conversations are made with selected participants during the thematic analysis stage for clearing up the areas of miscommunication. Furthermore, feedbacks are obtained from the selected participants for the thematic analysis findings for making sure that participants’ viewpoints, experience, thoughts, and feelings are interpreted and portrayed accurately in the research (Johnson, 1997). In addition, participants’ exact words are provided as direct quotations in the thematic analysis findings (Johnson, 1997).
The theoretical validity is ensured in this research in several ways. Spending a significant time on collecting data by studying the interview participants and their backgrounds helps the researcher to build more detailed theoretical explanations for the thematic analysis findings (Johnson, 1997). Moreover, time spent on discussing and explaining the research findings with expert researchers is extremely useful in this research for identifying specific problems that may occur in the thematic analysis process (Johnson, 1997). Furthermore, simultaneous triangulation followed in this research further facilitates the validation of the thematic analysis findings.

To maintain the internal validity during the thematic analysis process, pattern matching and explanation building are performed. To ensure the external validity, the finalised themes are tested against each and every interview transcript during the data analysis stage to ensure generalization of the themes across multiple interview transcripts (Yin, 1994).

### 6.3 Thematic Analysis Findings

This research adopts the theory-driven thematic analysis for exploring the citizens’ perceptions of the public value of e-government in Sri Lanka. The specific goals of thematic analysis in this research are to investigate the public value citizens expect from e-government in Sri Lanka, identify the critical factors for evaluating the public value of e-government, and seek explanations as to how e-government initiatives in Sri Lanka create public value for its citizens. The research findings of such a thematic analysis help the Sri Lanka government better understand how it can improve the
existing practices in implementing e-government projects for delivering better public value to its citizens.

This research recruits 15 participants for interviews from the quantitative sample to obtain the citizens perceptions of the public value of e-government in Sri Lanka. These participants have diverse demographic characteristics. Among the participants, 6 are within the age group of 31-45 years, 5 in the 21-30 age group, 2 are in 16-20 group, and 1 participant each from 46-60, and over 60 age group. These participants represent urban (4 participants), semi-urban (5) and rural (6) areas of Sri Lanka. They represent a variety of employment sectors. 4 interviewees are from the IT and computer sector, 3 interviewees from the public administration, 2 each interviewees from the education and agriculture sectors, 1 interviewee each from law, travel and tourism, and two interviewees are unemployed.

Figure 6.3 shows the research findings organised around the three global themes, namely, the delivery of quality public services, effectiveness of public organisations, and achievement of socially desirable outcomes (Karunasena & Deng, 2011a). Each global theme consists of the critical factors for evaluating the public value of e-government in Sri Lanka. Figures 6.4, 6.5 and 6.6, show the three thematic networks developed for better representing each global theme and its associated lower level themes.
6.3.1 Global Theme One: Delivery of Quality Public Services

The delivery of quality public services (DPS) through e-government consists of four organising themes including (a) quality of information, (b) functionalities of e-services, (c) user-orientation of the delivery of public service, and (d) information and services through e-enabled counters. As presented in the DPS thematic network in Figure 6.4, each organising theme summarises the critical factors for creating public value through the delivery of quality public services.
The value of quality information online is an important organising theme discovered in this study. It is abstracted from the basic themes of (a) accurate information, (b) up-to-date information, (c) simple and understandable information, (d) relevant information, and (e) convenience for citizens. Having access to the latest and accurate information provided in an understandable manner increases citizens’ convenience in obtaining public information. The study reveals that accessing quality information online helps citizens to make their visits to public organisations more effective by enabling them to be prepared. Being prepared in advance helps citizens to obtain answers to the specific questions that they have in regards to the relevant public service. An interviewee states as follows:

“For me the ability to access correct and up-to-date information online is very important because before I make a personal visit to a government organisation, I can get prepared by reading the latest information on government websites. If the information on the government websites is correct, current and easy to understand, I can make my visit to the government organisation more effective. Quality information helps me to ask the right and specific questions from government officials. Being prepared also helps me to understand what government officials explain to me. I will not get misguided by the incorrect information given by some government staff members”.

Citizens can save time and obtain monetary benefits by accessing quality information online. They can reduce the number of physical visits to public organisations by accessing quality public information online. Citizens, therefore, value accessing quality public information online and believe that these facilities save their valuable time and money, and make their lives easier. Another interviewee explains as follows:
“If you go to a public office you can see that their setup is very inefficient. We need to spend a lot of time to get information. Sometimes we have to spend 2-3 days. This is a real waste of time and money. But if the information provided through government websites is correct, clear, and easy to understand, I really don’t need to waste my time in public offices. Or at least I can reduce the number of visits that I have to make to government offices”.

There is much unwanted information on government websites. Out-of-date and incorrect information, for example, destroy the quality of the information. Moreover, those speeches of politicians and messages by heads of government organisations, historical details of the organisation, and establishment details are considered as unwanted information by many interviewees. Interviewees stress the importance of having only the relevant information on the websites that can be used to fulfil their needs in obtaining public services.

The functionality of available e-services is another organising theme discovered in this research. It is abstracted from the four basic themes of (a) the value of complex e-services, (b) the value of simple e-services, (c) convenience of using e-services, and (d) value of reducing corruption.

The functionalities of e-services are valued by the citizens. Complex e-services that facilitate citizens to pay for revenue licenses for vehicles, for utilities bills such as water and electricity bills are valued by citizens. There is, however, a lack of such facilities in Sri Lanka. The need for prioritising e-services development with a focus on the most frequently used public services such as bill payments, license renewals, and services related to life events is highlighted in the research. Simple e-services that
provide facilities to track the status of an application submitted, to download forms, and to search databases are regarded as valuable. Both simple and complex functionalities of e-services help citizens to save money and time due to the convenience that they provide to citizens. A majority of the interviewees, however, stress that the government should have a proper plan to make citizens’ aware of the available e-services and their value for citizens. In addition, e-services reduce corruption associated with the face-to-face service delivery mode.

The value of user-orientation of public information and services delivery is another organising theme identified in this study. User-orientation refers to the citizen-centricity of the delivery of public service through e-government. It is abstracted from several basic themes, namely, (a) the citizen-centric feature of government websites, (b) a direct channel for accessing government information, and (c) the availability of multiple channels to deliver e-government information and services.

Accessing public information and services through e-government channels is a direct way of accessing government information and an alternative to relying on third party channels such as newspapers, radio and private television channels. The study shows that government websites are considered as a more reliable source of public information than alternative sources. An interview participant, for example, states as follows:

“In my opinion dissemination of government information through websites is extremely important because some newspapers, TV and, Radio channels have their own political agendas. These media cannot be considered as independent and impartial sources of information. Some are owned by large private companies. Some channels directly and indirectly support various political
parties. In that way they are not independent. Sometimes they even distort information to suit their political agendas. So, originality of the information gets lost. We don’t know the real story. They are not reliable. If the information is available on government websites, we can be confident that this information comes directly from the government and not through an intermediate media. So, the ability to obtain information directly from the government through government websites is valuable”.

The citizen-centric features of government websites with respect to their value to citizens are widely mentioned. Citizens value various features of government websites including the attractiveness of the homepage, colourfulness of the website, availability of sitemaps and menus, use of simple URLs, display of information in a printable format, use of Unicode fonts, and the use of local languages. An interviewee, for example, expresses the value of having simple and meaningful URLs as follows:

“I think every government institute must have a URL which is easy to remember. There are hundreds of government websites! They should have short and meaningful names. People should be able to guess these URLs. For example, we have only one government owned zoological garden in Sri Lanka. Therefore, I think ideally they should have www.zoo.gov.lk. But the department has registered www.colombozoo.gov.lk as their URL. This is not right. I don’t think that anyone can guess this. It does not make sense”.

Alternative channels to access public services and information are considered to be valuable. Web portals, call centre services, and mobile phone applications are mentioned as valuable alternatives of accessing public services. Web portals such as the government information centre portal (www.gic.gov.lk), country portal
(www.srilanka.lk) and the government’s official web portal (www.gov.lk) are valued. In addition, call centre services such as 1919 (government information centre), 119 (police emergency services), and 1920 (toll free agriculture advisory service) are seen as valuable. The interest of citizens in accessing government information through mobile phones is also revealed from this study. The delivery of government information through mobile phones is considered valuable due to the convenience, mobility and personalised nature of this mode of delivering public information. This study reveals that there are many valuable mobile applications such as security and news updates, traffic information, exam results, train seat reservation, and water bill payment facility. An interviewee states the value of accessing public information through mobile as follows:

“If I can access government information through my mobile phone at any time, even while I’m travelling, it is very useful. I always take my mobile phone with me everywhere. It is so convenient for me to access information through my mobile.”

The value of obtaining public services through e-enabled front office counters is another important organising theme discovered in this study. It is described by three basic themes, namely, (a) time savings and monetary benefits that citizens receive by obtaining services from computerized counters, (b) convenience for citizens, and (c) reduction of corruption in the provision of public services.

 Delivering information and services through e-enabled counters in front offices is very much valued. The development of e-enabled counters can lead to a dramatic improvement in the performance of front offices in delivering public service. There are no long queues at public organisations which have e-enabled counters. This shows that getting services from these counters is more convenient with actual time savings.
E-enabled public service counters have reduced corruption in public organisations as well. As clearly mentioned in the following interview transcript, due to the slowness of the manual public services system, some people bribe corrupt government front office staff to expedite the services.

“Government offices without computers installed in service counters are very slow. You can see there are long queues. If we want to get some work done soon, we sometimes have to bribe front office staff. This happens in many government offices. Department of Motor Traffic is a one good example”.

![Diagram of Delivery of Quality Public Services]

**Figure 6.4** A thematic network of the delivery of quality public services
6.3.2 Global Theme Two: Effectiveness of Public Organisations

E-administration focuses on reducing administrative expenses, managing performance, making strategic connections between government agencies, creating empowerment, and improving transparency and accountability in government (Heeks, 2008a). The value of effectiveness of public organisations (EPO) through e-government is explored in this study. This global theme is explained by three organising themes, namely, (a) the efficiency of public organisations, (b) the openness of public organisations, and (c) the responsiveness of public organisations (Karunasena & Deng, 2011a).

As shown in Figure 6.5, the value of improving organisational efficiency through e-government is abstracted from (a) improving organisational performance by improving ICT infrastructure, (b) reducing administrative expenditure of the government through e-government, (c) saving tax payers’ money, (d) connecting the information systems of different government organisations, (e) empowering the public staff by recognizing staff as a key driving factor for the successful implementation of e-government, and (f) removing uncommitted staff.

Interviewees express their view that public organisations can enhance their performance by improving ICT infrastructure. The capacity of computer systems to undertake multiple tasks at the same time, their speed in searching and processing information, the ability to reuse information stored in databases are some reasons which make citizens believe that e-government applications can help in improving organisational efficiency. E-government systems are also seen as a way of saving money and time by reducing the number of overtime hours required to be put in by government employees. With e-government systems in place, the government is able to handle the increasing demand for public
services without having to hire additional staff. As a result, implementing e-government systems to produce more work with fewer resources and to increase organisational efficiency is very much valued.

Improving the performance and reducing the expenditure of public organisations create many indirect benefits to citizens as well. An interviewee argues as follows:

“How does the government get money? They collect money from us by enforcing heavy taxes on everything! If the public sector can save money by implementing computer systems it will reduce the wastes in public organisations. As a consequence, the government will not need to enforce heavy taxes on citizens. This means that citizens will get the benefits of implementing computer systems in public organisations”.

It is also noted that interconnecting e-government systems across multiple agencies creates further benefits to citizens and thereby, maximise the public value. The fact that the computer systems of different government organisations are not connected to share public information makes it necessary for people to make several visits to multiple organisations for obtaining public services.

Public staffs are the driving force for making e-government projects successful (Hanna, 2007). Without adequate leadership, support and blessing of the public staff it is impossible to realise the vision of e-government. As a result, taking necessary steps to build the skills of public staff is critical for the development of e-government projects. There is, however, a division of views among the interviewees with respect to the reduction of staff through e-government. One view is that e-government should not result in the reduction of staff. This is because the contribution of staff to the successful
implementation of e-government is immense and the government would not be able to obtain the continuous staff support for future e-government developments if staff reduction is an outcome of implementing e-government initiatives. According to the other view, however, the government may reduce staff, especially the inefficient and uncommitted employees for maximising the benefit of e-government. It is argued that the government should take immediate actions to remove uncommitted and inefficient staff for providing citizens with better services. In the opinion of one interviewee:

“... the government sector should be efficient. By implementing computer systems in government organisations, they can get rid of the people who are not doing a good job. In the first instance, you may think that this is a shocking and harsh thing, but it is not. If the government wants to make the system efficient and to provide better services to us it has to get rid of some of the lazy people who are not doing their job properly. The government should take some drastic steps. The government can keep the staff that is willing to work hard. If others don’t want to work they can go home”.

Improving the openness of public organisations through e-government is another organising theme identified in this research. The study identifies three basic themes which reflect the value of improving the openness of public organisations, namely (a) informing citizens about public organisation’s activities, (b) disclosing public organisation’s decision making protocol, and (c) providing facilities to make enquiries online.

Informing citizens through the internet about public organisations’ activities such as how a public organisation’s budget is managed and how public money is spent is valuable. Disclosing information relating to the issues such as on which projects the government is investing, on what basis tenders are awarded, to whom tenders are awarded, the progress of the projects already undertaken is valuable. Such disclosure helps to reduce fraud,
cheating and corruption in public organisations, thereby increasing the transparency and accountability of the government. It is, however, worth noting that a majority of interviewees are not interested in such information.

There is a strong demand for public organisations to disclose their decision making protocols online. Facilities for citizens to make online inquiries about various public services, for example, making online inquiries about the status of an application submitted or inquiring the reasons as to why an application is rejected, are also valued.

The following segment from the interview transcript clearly reflects this:

“If a government website describes, for example, on what basis the government issues visas, on what grounds your visa application can be rejected, what applications are given processing priority etc, this would be extremely valuable and useful to visa applicants. This gives you an understanding about the public sector decision making process. You know on what basis the relevant government organisation makes decisions. Then, the public sector decision-making becomes more transparent. If the decision making process is transparent then you tend to accept their decisions more willingly. It is also really important to have a mechanism in the government website to trace the status of the visa application, and the decisions made on the application”.

Improving the responsiveness of public organisations through e-government is another important organising theme identified in this study. It consists of two basic themes, namely, (a) the demand for speedy responses to citizens’ inquires, and (b) the issue of non-responsive public staff.

The responsiveness of public organisations can be improved by implementing e-government systems. Interviewees believe in the ability of computer systems to perform
tasks quickly and thereby, help public officials to attend to citizens’ inquiries quickly. Public organisations can exhibit their responsiveness by replying to the citizens’ emails quickly. The study reveals that responsiveness of public staff is crucial for realising the true public value of e-government. The study, however, also shows that the responsiveness of public staff currently working in e-government environments is not positive. The following interview transcript clearly reveals an interviewee’s dissatisfaction over the non-responsiveness of public staff:

“Most of our public officials don’t send replies to our emails or to the inquiries that we make online. They don’t even answer our calls. So, I think they are not responsive enough. Due to this reason we can’t get the real advantage of e-government”.

**Figure 6.5** A thematic network of effectiveness of public organisations
6.3.3 Global Theme Three: Achieving Socially Desirable Outcomes

Achieving socially desirable outcomes through e-government is the third global theme identified in this study shown as in Figure 6.6. It is described by six organising themes, namely, (a) improving the mutual trust between the government and citizens, (b) ensuring confidentiality of citizens’ information, (c) achieving social equity, (d) facilitating self-development, (e) environmental sustainability, and (f) promotion of participatory democracy (Karunasena & Deng, 2011a).

Improving mutual trust between government and citizens through e-government is an organising theme abstracted from the basic themes of (a) citizens’ trust in government, (b) government’s trust in citizens, and (c) citizens’ trust in e-government. Citizens’ trust in government is crucial for e-government. Trust in the government refers to one’s perceptions regarding a public agency’s ability to provide a particular service and its integrity in the provision of such services (Be´langer & Carter, 2008). The study reveals that citizens’ trust in government is relatively low and this is reflected through citizens’ lack of trust in public staff and in government procedures. It shows that many citizens fear that their sensitive information held in public organisations may be accessed by unauthorised personnel. The study also reveals that there are abusive practices in some public organisations. The failure to fulfil promises and dishonesty on the part of government staff decreases the trust between the government and citizens, and increase their opposition to e-government initiatives (Be´langer & Carter, 2008). The following excerpt from the interview transcript clearly reflects an interviewee’s lack of trust in public staff working in e-government environments:
“I think trust is the most important thing in public service. Honestly speaking we cannot fully trust government organisations. I’m not sure what happens to our information in their computer systems. Corrupt staff can access our personal information and misuse such information. So, at this point I can’t trust the government staff”.

Government’s trust in citizens is crucial. According to a government official the government’s trust in citizens is relatively low. The following interview transcript clearly explains the government’s lack of trust in citizens:

“Our government system is based on the old English administrative and financial rules and regulations. This system does not recognize the need to develop trust. Government officers never trust citizens and citizens never trust government employees! Actually we can’t trust citizens 100%. There are people who cheat and do fraudulent acts in their dealings with the government. Therefore, we have to be very careful in our transactions with citizens. I know this will have to be changed in order to adopt e-government”.

The trust of citizens in e-government is another important factor for creating public value through e-government. Honest, non-fraudulent interactions with e-government service providers enhance citizen trust and their acceptance of e-government services (Be´langer & Carter, 2008). The study reveals that dissemination of credible information through e-government channels and non-fraudulent electronic transactions with the government positively influences citizens’ trust in e-government. Conversely, failing to do so has the potential of destroying citizens’ trust in e-government. Security and privacy are crucial for developing citizens’ trust in e-government.
E-government is a channel for enhancing citizens’ trust in government (Kearns, 2004). Many citizens, however, are reluctant to adopt e-government services due to a lack of trust in the security of online transactions and concerns regarding the misuse of information submitted electronically (Be´langer & Carter, 2008). As technological advancements spread through the society, the fears of identity theft and privacy loss rise (Be´langer & Carter, 2008). As a result, ensuring citizens’ secrecy through e-government is becoming a growing concern nowadays.

Ensuring the confidentiality of citizen’s information is an organising theme abstracted from the following basic themes: (a) the need of ensuring the secrecy of citizens’ sensitive information, (b) the need of ensuring the secrecy citizens’ identity, and (c) the necessity of improving the security infrastructure of e-government systems. Many interviewees claim that they are afraid to disclose their sensitive information such as bank and credit card details to public organisations. Taking necessary measures to prevent unauthorised access to citizens’ sensitive information in e-government systems is important. Moreover, this study reveals that disclosure of the identity information of citizens such as their names, telephone numbers, email and postal addresses is an issue for many. Interviewees expect that people authorised to access their information will not misuse their sensitive information and will not disclose their identity. One interviewee states that,

“….the government must make sure that unauthorised people will not get my bank details, credit card numbers etc. My bank information and credit card details are very important. Also I really don’t want them to reveal my name, address and telephone numbers to anyone without my consent. They must make sure that even authorised people will not misuse my personal information. That is the sort of the danger you face when it comes to e-government”.

“
Another interviewee expresses the same view in the following words:

“I’m really worried about my bank information being disclosed to unauthorized individuals when I use e-government. Actually for this reason, so far I have abstained from using the e-revenue license system. I heard this system is very useful. But I’m not sure what will happen to my information”.

Improving the security of the infrastructure in e-government systems is highly valued. For e-government initiatives to succeed, the government should have the capacity to secure citizens’ information. Some interviewees question the Sri Lankan government’s capacity to protect citizens’ information in e-government systems by recalling past incidents of hacking government websites and incidents relating to the altering of the records in the department of motor traffic’s information systems. All these findings indicate a causal relationship between citizens’ trust in e-government and ensuring the confidentiality of citizens’ information held in government information systems. Maintaining the confidentiality of citizens’ information is extremely important for ensuring public trust in e-government and failing to do so may lead to a decrease in citizens’ trust in e-government.

Achieving social equity through e-government is another organising theme discovered in this study. It is abstracted from several basic themes, namely, (a) ensuring the rights of people with special needs to access e-government resources, (b) providing appropriate e-government content for ethnic minorities, (c) disseminating information and services in local languages, (d) contribution of e-government to achieve peace, harmony and social cohesion in societies, (e) increasing rural citizens’ access to e-government, (f) developing affordable ICT infrastructure throughout the country.
Interviewees express the view that ensuring the right of the citizens with special needs to access e-government resources is valuable. In this regard, the need for developing appropriate e-content to develop the skills and improve the wellbeing of people with low income is important. The interviewees are also of the opinion that there should be an appropriate methodology for disseminating information to people with physical disabilities such as hearing and visual problems. Ensuring the availability of appropriate content for ethnic minorities is also seen as critical. Sri Lanka is a country with multiple ethnic groups such as Sinhalese, Tamils, Muslims, and others. These ethnic communities represent diverse cultural backgrounds. In this regard, a majority of the interviewees recognised that e-government should fulfil the needs of these communities by providing appropriate content with respect to their social and cultural needs. It is a right of minority communities to have equal access to e-government information, services and other resources. Ensuring this right of ethnic minorities may contribute to the achievement of peace, harmony and social cohesion among the multiple ethnic communities in Sri Lanka. One interviewee expressed this view in the following words:

“Government information and services delivered through e-government must be made available in all three languages. If this happens, it may solve a lot of ethnic problems. It will develop peace, harmony and social cohesion among the multiple ethnic communities in Sri Lanka”.

English is only a second language in Sri Lanka. Dissemination of government information and provision of e-services in local languages is therefore highly valued. Interviewees who represent rural areas stress that they are more comfortable and confident in reading government information in local languages. They strongly value
the government’s efforts to disseminate information and services in local languages through e-government.

“Information dissemination in all three languages is very important. In Sri Lanka not everyone can read more than one language. Actually, I don’t feel confident if I have to read government information in English. If information is available in our mother language I feel confident. I read information with more interest and understand it better”.

There is an increasing demand for the government to provide rural communities with adequate resources for accessing e-government. The establishment of tele-centres in rural and semi-urban areas of Sri Lanka for providing access to e-government resources is highly valued. The interviewees stress the value of improving the ICT infrastructure such as telecommunication and internet, and tele-centres in rural areas.

The self-development of citizens through e-government is another organising theme revealed in this study. It is a reflection of several basic themes, namely (a) developing citizens’ skills and knowledge through e-content and e-educational software, (b) educating children through e-government, (c) disseminating information for self-development, and (d) providing affordable access to the ICT infrastructure.

Developing an e-society is an integral part of e-government (Ndou, 2004; Heeks, 2008a). This study shows that developing citizen’s knowledge and skills through e-society initiatives is valued by Sri Lankan citizens. It reveals that e-government initiatives are seen as having the potential to significantly contribute to the development of citizens by providing access to knowledge online, e-content, e-educational software and training programs. In this regard, public organisations such
as the department of education, government universities, and vocational training institutes can play a significant role. Another way of developing citizens through e-government is by disseminating information. An interviewee employed in the public sector believes that information dissemination is extremely helpful for improving citizens’ livelihoods. For example, disseminating agricultural information by the Department of Agriculture is seen as being useful. Similarly, individuals who are interested in developing their knowledge in floriculture and plant diversity would benefit by accessing the information available in the website of the Department of Botanical Gardens. It is therefore clear that some of the information available through e-government is helpful for the self-employment of citizens.

Promoting participatory democracy is another organising theme identified from this study. It is abstracted from the following two basic themes: (a) adequate representation of citizens in participatory democracy initiatives and (b) trustworthiness of participatory democracy initiatives. There is doubt about the value of participatory democracy initiatives in Sri Lanka due to the inadequate representation of the interests of a majority of the population. The existence of poor ICT readiness among a majority of Sri Lankan citizens prevents the interests of the majority being represented through participatory democracy initiatives. This indicates that the environment in Sri Lanka is not sufficiently mature for implementing participatory democracy initiatives. This study further reveals interviewees’ lack of trust in participatory democracy initiatives. The following interview transcript clearly shows an interviewee’s aversion to participatory democracy initiatives.

“If the government introduces electronic participatory democracy initiatives, I don’t think it would sufficiently represent the majority’s will. Look, in Sri Lanka
only a few people have internet. Many rural people don’t have access to computers and the internet. Only a very few people use e-government. So, if the government implements electronic participatory democratic initiatives and ask for citizens’ input, the majority’s ideas will not surely be represented. May be only the people in Colombo will participate. So, there is an opportunity for some people to cheat and manipulate the democratic process to advance their political agendas.”

Another interviewee expresses his lack of trust in participatory democracy initiatives as follows:

“I’m not sure how e-democracy can benefit us. Actually I don’t think we can implement e-democracy in Sri Lanka. For example, let’s take e-voting systems that we had to forecast election results during the pre-election period. As I read in newspapers, a lot of cheatings happened in this system. Some people were hired by political parties to cast votes for the candidate that they were supporting. So, the forecasted results of these systems were not true. The same thing will happen if government implements real e-democracy initiatives”.

The value of environmental sustainability is another important organising theme identified in this study. It is abstracted from two basic themes: (a) using e-government for protecting the environment, and (b) emerging environmental threats from e-government. Two controversial observations are emerged from the thematic analysis relating to environmental sustainability. One the one hand, e-government initiatives are believed to have contributed to environment protection and sustainability. For example, e-government initiatives have the potential of saving tons of paper used each year in public organisations. The introduction of electronic data storage can help solve
the hardcopy storage problems which require massive storage facilities. Furthermore, the government can develop special purpose information systems including biodiversity databases, forest fires early warning systems, and pollution monitoring systems for protecting the environment. The continuous development of e-government, therefore, creates public value for citizens by fulfilling their desires in protecting the environment for future generations.

On the other hand, e-government initiatives are considered to have brought more environmental threats than ever before. The government uses thousands of computers and related devices to implement e-government initiatives. These equipment poses severe threats to the environment in many ways. The growing number of computers and air conditioned rooms, for example, increases the demand for energy which results in burning massive amounts of petroleum thereby increasing the emission of CO2. Computer parts which are made up of plastic and other e-waste such as CDs, diskettes, and used ink cartridges will certainly pose many environmental threats in the future. E-government, therefore, could bring more environmental threats than traditional government operations. The use of computers in the public sector is, however, unavoidable and the government should implement a green IT action plan to mitigate these problems. Figure 6.6 shows the thematic network of ASO.
Figure 6.6 A thematic network of the achievement of socially desirable outcomes

6.4 Conclusion

This chapter aims to explore the public value of e-government in Sri Lanka by analysing qualitative data. The study reveals that the quality of public information online, functionalities of e-services, delivery of information and service through e-
enabled counters, and delivery of information and services in a user-oriented manner are critical for evaluating the public value through the delivery of quality public service. Improving organisational efficiency, openness and responsiveness through e-government are critical for evaluating the public value of effectiveness of public organisations. Improving mutual trust between citizens and the government, ensuring confidentiality of citizens’ information, achieving equity, self-development of citizens, and environmental sustainability are the critical factors for achieving socially desirable outcomes through e-government. The study concludes that developing participatory democracy is not a critical factor for evaluating the public value of e-government in Sri Lanka.
Chapter 7
A New Framework

7.1 Introduction

Triangulating the findings from multiple research methods in a single study can improve the validity and reliability of the research findings (Mathison, 1988; Johnson, Onwuegbuzie & Turner, 2007). On the one hand, obtaining mutually agreeable findings for the same research problem from different methods increases the validity and internal consistency of the research, leading to a greater confidence in the conclusions being made in the research (O’Cathain et al., 2007; Johnson et al., 2007). On the other hand, obtaining divergent findings from two different methods enables the researcher to build explanations for the differences which may offer opportunities for further investigations (Jick, 1979; Tashakkori & Teddlie, 2008).

This research adopts a simultaneous triangulation strategy for improving the validity of the research findings (Morse, 1991). This strategy allows the researcher to independently analyse the quantitative and qualitative data, and at the interpretation stage to use the findings from the two strands to complement one another (Morse, 1991). As a result of using triangulation, “the bias inherent in any particular data source, investigators, and particularly methods will be cancelled out” by other data sources, investigators, and methods and “the result will be a convergence upon the truth about some social phenomenon” (Johnson et al., 2007, p. 115).
This chapter aims to develop a new framework for evaluating the public value of e-government in Sri Lanka. It merges and triangulates the quantitative findings and the qualitative findings for identifying the critical factors in evaluating the public value of e-government in Sri Lanka. A revised framework is, then, developed for effectively evaluating the public value of e-government in Sri Lanka with the use of the identified critical factors. With the use of the revised framework, some recommendations are proposed for the Sri Lankan government to maximise the public value creation through its e-government projects.

The remainder of the chapter is organised as follows. First, a discussion of the critical factors for evaluating the public value of e-government in Sri Lanka is presented followed by a description of the revised framework for evaluating the public value of e-government. Some specific policy recommendations are then proposed for maximising the public value creation through the e-government initiatives. Finally, a brief summary of the chapter is presented.

### 7.2 Critical Factors

This section presents the critical factors for evaluating the public value of e-government in Sri Lanka identified by triangulating the quantitative and qualitative findings. A side-by-side comparison of the critical factors identified from the quantitative and qualitative studies is presented using a summary table (Creswell & Plano Clark, 2011). As shown in Figure 7.1 the quality of information, functionalities of e-services, availability of information and services from e-enabled front office counters, user-orientation of information and services, improved organisational
efficiency, openness and responsiveness, social equity, facilitating self-development of citizens, improved trust, confidentiality and environmental sustainability are identified to be critical for evaluating the public value of e-government in Sri Lanka.

**Figure 7.1** Critical factors for evaluating the public value of e-government in Sri Lanka

The provision of quality information is critical for evaluating the public value of e-government. Providing quality information, which is up-to-date, accurate and relevant with the right level of details, increases citizens’ satisfaction, and reduces the waste of citizens’ time and effort in accessing public information. This can result in saving a significant amount of money for citizens in contrast to obtaining information by
physically visiting public organisations. It is, therefore, not a surprise to observe that citizens value quality information through online public service delivery.

The availability of specific functionalities of e-services is critical. In Sri Lanka citizens value complex and simple online services. The complex services are the two-way and one-way transactions. Two-way transactions involve making online payments and obtaining government services (Silcock, 2001; Irani et al., 2006). Providing two-way services for frequently used public services such as bill payments, licence renewals and life events is very much valued. One-way transactions facilitate the interaction between citizens and government in a single direction, for example, enabling citizens to lodge applications online. In contrast, simple services enable citizens to have interactions with government (Chandler & Emanuels, 2002) by downloading forms, searching databases and checking the status of submitted applications. Overall, complex and simple e-services allow citizens to access public services at their own convenience at anytime and anywhere without any need for face-to-face contact (West, 2004).

The manual handling of documents and face-to-face interactions with staff provide ample opportunities for corruption. E-services have the potential to take away the option that the corrupted officials have in the decision-making process, therefore reducing the opportunity for arbitrary actions (Kovacic, 2005). Reducing corruption in public service delivery through e-services is highly valued. It is, therefore, concluded that functionalities of e-services is critical for the evaluation of the public value of e-government in Sri Lanka.
User-orientation is critical for evaluating the public value of e-government. It is about supplying public information and services in a timely and friendly manner to satisfy the needs of citizens (Jorgensen & Bozeman, 2007). The thematic analysis presented in Chapter 6 suggests that the citizen-centric features of government websites such as attractiveness and colourfulness, easy navigation among pages, information in printable manner, content in local languages, and simple web addresses that are easy to remember are valuable. This research reveals that the availability of multiple channels to access information and services such as websites, web portals, call centre services and mobile is highly valued.

Using ICTs for improving organisational efficiency with a focus on increasing customer satisfaction is no longer merely applicable to the private sector (Kohlborn, Weiss, Poeppelbuss, & Fielt, 2010). Public sector customers worldwide are increasingly becoming aware of the potential of ICTs and expect public organisations to use ICTs for improving the efficiency of such organisations (Pe’rez, Boli’var, & Herna’ndez, 2008; Luarn & Huang, 2009). Similarly, in Sri Lanka many citizens expect public organisations to use e-government for increasing organisational efficiency.

Citizens value the development of e-government systems by re-designing public sector processes in a citizen-centric manner (Karunasena & Deng, 2012a). Connecting e-government systems across government organisations for providing citizens with integrated services is critical. From such e-government systems, citizens not only anticipate an overall increase in the efficiency of public organisations but also substantial administrative savings of government expenditure leading to the reduction
of the tax burden on citizens. The development of e-government can lead to a reduction in public organisations’ employment as a result of substituting labour with e-government systems (Borins, 2002). It is clear that e-government can bring about significant savings of public money in public organisations by substituting expensive labour. This study, however, shows that citizens value the security of jobs of public staff and oppose staff reduction as an outcome of e-government. Continuously training and educating public staff is critical.

The disclosure of a public organisation’s financial information can lead to the civic society being informed about public sector activities and their contributions to the social and economic development in the country (Pe´rez et al., 2008). The availability of more information about the activities of public organisations makes citizens appreciate the public sector decision-making. This contributes to public organisations’ openness. E-government can positively improve the openness of a public organisation (Wong & Welsh, 2004), by providing citizens with a tremendous opportunity to monitor online the performance of public organisations (Torres et al., 2005).

The study shows that only a few citizens value the display of online of information relating to how a public organisation’s budget is managed, how public money is spent, and what the progress of government projects is. Many citizens are not interested in such initiatives. There is, however, a strong demand for public organisations to disclose their decision making protocols online. Disclosure of such information enables citizens to assess whether a decision made by a public organisation on a public service is really acceptable. Moreover, displaying public policy drafts for citizens’ review, displaying contact information of top public
officials, and providing facilities to comment and make complaints about a public organisation’s activities are very much valued. This information not only helps to increase the openness of public organisations, but also makes it convenient for citizens to access public organisations. This shows that openness is critical for evaluating the public value of e-government in Sri Lanka.

The findings from this study reveal that equity is important for evaluating the public value of e-government in Sri Lanka. Many citizens value the availability of website content in local languages, the development of websites that comply with accessibility standards to guarantee the rights of people with disabilities to access information and services, and the availability of e-government content for ethnic minorities including Tamils and Muslims (for example, information related to cultural and social needs). Furthermore, the establishment of kiosks to provide access to e-government services to rural semi-urban communities without computer ownership, and the development of affordable ICT infrastructure throughout the country to improve the access to e-government are also valued.

The self-development of citizens through e-government is crucial for evaluating the public value of e-government in Sri Lanka. It is clear from the analyse that the availability of ICT resources in public places (community centres, temples) for public access, low cost ICT training for citizens, e-content for children’s education, and specific applications that help citizens to develop skills are valued. Dissemination of government information also educates citizens (Eschenfelder, 2004). Citizens value online government information for self-development particularly using agricultural, health, education and so forth.
Trust is a critical element of any successful online initiative (Dempsey, Anderson, & Schwartz, 2003). E-government is widely seen as a positive channel for enhancing trust in government (La Porte et al., 2002). For enhancing public trust through e-government, protecting citizens’ sensitive information in e-government systems, dissemination of credible information through e-government channels, and protecting citizens through laws relating to e-government are important.

The thematic analysis provides three broader views relating to the public value of trust. They are, citizens’ trust in government, citizens’ trust in e-government, and government’s trust in citizens. Citizens’ trust in public staff and government procedure is critical for developing citizens’ trust in government. In respect to citizens’ trust in e-government, non-fraudulent electronic transactions with government and credible information through e-government channels are crucial. Government’s trust in citizens is also valued by the citizens. In this regard, government official’s trust in citizens when interacting via e-government is appreciated.

Environmental sustainability is another critical factor identified in this study. This study reveals that environment friendly activities such as switching off computer systems when not being used, using electronic records, thereby, reducing paper printing, recycling ICT equipment and papers, retiring energy inefficient computer systems, and developing specific information systems for monitoring and controlling environmental threats are valued by citizens. Citizens are concerned about the environmental threats posed by the equipment used in e-government systems. It is, however, worthwhile to point out that the use of computers in the public sector is
unavoidable. To improve the environmental sustainability of public organisations, some specific green IT strategies and policies should be implemented.

Providing information and services through e-enabled counters is critical for evaluating the public value of e-government in Sri Lanka. This study reveals that the time spent by citizens in waiting in queues is dramatically reduced due to the increased performance in delivering public services through e-enabled counters. Increased performance in front office service delivery has also reduced the corruption at the organisational level. Many citizens, therefore value obtaining public information and services through e-enabled counters.

The thematic analysis findings reveal that the responsiveness of public organisations’ is crucial for evaluating the public value of e-government. In order to capitalise on the potential of e-government systems to increase the responsiveness, the performance of employees working on e-government systems is critical (Luarn & Huang, 2009). In Sri Lanka, many citizens are unsatisfied with public official’s contributions to make public organisations more responsive. The poor responsiveness exhibited by public officials to citizens’ emails and online inquiries negatively affects the responsiveness of public organisations. The SEM analysis findings reveal that the responsiveness (RESPO) is not a critical factor for evaluating the public value of e-government in Sri Lanka. Citizens’ negative experiences on public officials responsiveness to citizens inquiries, lack of interest on displaying citizens’ charter online, failing to follow up emails by government officials make citizens think responsiveness of public organisations is not reflected through e-government in Sri Lanka.
Confidentiality is another critical factor for evaluating the public value of e-government discovered from the thematic analysis. It is about preventing the disclosure of citizens’ information by public authorities without citizens’ consent (Jørgensen & Bozeman, 2007). It is clear from the thematic analysis that citizens very much value ensuring confidentiality of their sensitive information such as bank and credit card details in e-government systems. Moreover, for many citizens the disclosure of their identities is also an issue. Hence, taking appropriate measures to secure citizens’ sensitive information and identity by strengthening the security of e-government systems in public organisations is critical. Citizens will not entrust personal information to e-government systems unless government can ensure that the information will be responsibly handled and secured against abuse (Dempsey et al., 2003; Lebech, 2003).

It is worth mentioning that the participatory democracy is originally hypothesised in the quantitative study as a critical factor for evaluating the public value of e-government in Sri Lanka. The findings from the SEM analysis, however, reveal that the participatory democracy is not critical for evaluating the public value of e-government exemplified by citizens’ lack of interest in reading documents available online about upcoming policy changes, participating in online discussions, and the ability to post topic for public discussions. Thematic analysis reveals citizens’ lack of trust in participatory democracy initiatives. The study further reveals citizens’ concerns about the possibility of under-representations of majority’s ideas through participatory democracy initiatives as a result of social exclusion. It is therefore concluded that participatory democracy is not a critical factor for evaluating the public value of e-government in Sri Lanka.
Table 7.1 presents a side-by-side comparison of the quantitative and qualitative findings. In Table 7.1, each critical factor is described by several attributes identified from the quantitative and qualitative studies. The degree to which each attribute is valued by the citizens is represented by the number of stars associated with each attribute. A single star (*) represents inadequately valued, two stars (**) represent valued, three stars indicate highly valued (***) and four stars represent very highly valued (****). The degree to which each attribute is valued by the citizens is obtained by counting the themes in the qualitative findings and examining the significance of the standardised factor loading in the final measurement model in quantitative study.

Table 7.1  The critical factors identified from qualitative and quantitative studies

<table>
<thead>
<tr>
<th>Critical factors</th>
<th>Description of critical factor from qualitative study</th>
<th>Description of critical factor from quantitative study</th>
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<tbody>
<tr>
<td>Quality of information</td>
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<tr>
<td>o Up-to-date ****</td>
<td>o Accurate ***</td>
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<tr>
<td>o Accurate ****</td>
<td>o Relevant ****</td>
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<tr>
<td>o Detailed ***</td>
<td>o Right level of detail ****</td>
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<tr>
<td>o Relevant information ***</td>
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<tr>
<td>o Simple information **</td>
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<tr>
<td>Functionalities of e-services</td>
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<tr>
<td>o Simple services online {download forms, track status of applications, search databases} **</td>
<td>o Complete two-way transactions ***</td>
<td></td>
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<tr>
<td>o Complex services online {complete two way transactions, one way transactions} **</td>
<td>o Download government forms ****</td>
<td></td>
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<tr>
<td>o Satisfaction ****</td>
<td>o Fill and submit applications online ***</td>
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<tr>
<td>User-orientation</td>
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<tr>
<td>o Citizen-centric features of websites {attractive and colorful **, easy navigation ***, information in printable manner *, Unicode fonts *, local language ***, search</td>
<td>o Simple website address ****</td>
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<tr>
<td>o Simple website address ****</td>
<td>o Web index ****</td>
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<td>o Web portals ***</td>
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<tr>
<td>Organisational efficiency</td>
<td>Openness of organisations</td>
<td>Responsiveness of organisations</td>
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<tr>
<td>Improved ICT infrastructure</td>
<td>Disclose decision making protocol online</td>
<td>Speedy response to email (or online forms) inquiries</td>
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<tr>
<td>Save tax payers money by reducing administrative expenditure</td>
<td>Information online on how budget is managed, how public money is spent, and progress of projects helps to reduce corruption in public organisations</td>
<td>Responsiveness is dropped from quantitative study due to insufficient convergent validity</td>
</tr>
<tr>
<td>Connected e-government systems across government organisations</td>
<td>Empower public staff</td>
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<td>Empower public staff</td>
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<tr>
<td>Staff reduction</td>
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<tr>
<td>Staff reduction is not an option</td>
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<tr>
<td>Remove uncommitted staff</td>
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</table>

- Facility **, simple website address ***
- Multiple channels {websites, web portals, call center, mobile} ***
- Information on mobile **

- Re-design processes in citizen centric manner ***
- Improve ICT infrastructure ****
- Share information among organisations ***
- Empower public staff ****

- Disclose decision making protocol online ***
- Information online on how budget is managed, how public money is spent, and progress of projects helps to reduce corruption in public organisations *
- Contact information of public staff online ****
- Make complaints online about organisation’s activities ***
- Policy drafts for consultation ***

- Ensure rights of people with special needs ***
- Content for ethnic minorities ***
- Information and services in local languages ****
- Rural citizens’ access to e-
<table>
<thead>
<tr>
<th>Category</th>
<th>Examples</th>
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<tbody>
<tr>
<td>Self-development of citizens</td>
<td>1. Access to affordable ICT infrastructure ***</td>
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<td></td>
<td>2. Development of skills and knowledge ****</td>
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<td>3. Educate children ***</td>
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<td>4. Government information for self-development ***</td>
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<tr>
<td>Development of trust</td>
<td>1. ICT resources for public access ***</td>
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<td></td>
<td>2. Low cost training for citizens ****</td>
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<td></td>
<td>3. Content for students’ education ****</td>
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<td></td>
<td>4. Specific applications designed to develop skills ***</td>
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<tr>
<td>Development of trust</td>
<td>1. Citizens’ trust in government {trust in public staff and government procedures} ****</td>
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<tr>
<td></td>
<td>2. Government’s trust in citizens ***</td>
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<td></td>
<td>3. Citizens’ trust in e-government {credible information dissemination, non-fraudulent electronic transactions with government} ****</td>
</tr>
<tr>
<td>Environmental sustainability</td>
<td>1. e-Government protect environment {electronic records, reduce paper printing, reduce duplication of effort} ****</td>
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<td></td>
<td>2. Special information systems to monitor and control environmental threats **</td>
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<td></td>
<td>3. Environmental threats from e-government *</td>
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<td></td>
<td>4. Plans for controlling environmental threats from e-government ****</td>
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<tr>
<td>Information and services from e-</td>
<td>1. Power off computers when not using ****</td>
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<tr>
<td>offices</td>
<td>2. Reduction of paper printing ****</td>
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<td></td>
<td>3. Recycle reusable equipment ****</td>
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<td></td>
<td>4. Retire energy inefficient systems ****</td>
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<td></td>
<td>5. Reduce corruption in front offices ****</td>
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<td>6. No data</td>
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212

Chapter 7

A New Framework

7.3 A Revised Framework

This section presents a revised framework for evaluating the public value of e-government in Sri Lanka. The revised framework consists of three main dimensions, namely, (a) delivery of quality public services, (b) effectiveness of public organisations, and (c) achievement of socially desirable outcomes. Each dimension is further divided into sub-dimensions with the critical factors identified within each dimension. Figure 7.2 shows the revised framework.

The public value of delivery of quality public services can be evaluated through the value of (a) quality of information online, (b) functionalities of e-services, (c) information and services provided through e-enabled service counters, and (d) user-orientation of information and service delivery. Public value of quality information can be gauged by citizens’ perceptions about the quality characteristics of information such as accuracy, up-to-date nature, simplicity, and relevance and the level of detail. Public value of functionalities of e-services can be gauged by the citizens’ perceptions about the usefulness of simple and complex e-services to obtain public services, and increased satisfaction of being able to access e-services.
The public value of information and service delivery through e-enabled counter services can be examined through citizens perceptions about the usefulness of e-enabled counters installed in the front office for providing better services to citizens, convenience for citizens by obtaining services from these counters, and citizens’ experiences on the decrease of corruption associated with front office public service delivery as result of e-enabled front office counters.
User-orientation of public information and service delivery can be gauged through citizens’ perceptions about the (i) citizen-centric features of government websites such as aesthetic attractiveness, choice of multiple languages, easy navigability among pages, search facility, printability of content, and meaningfulness and the simplicity of URL assigned to the website, and (ii) the alternative channels that provide access to public services such as individual websites, one stop portals, call centre services, and mobile.

The public value of effectiveness of public organisations through e-government is gauged through (a) organisational efficiency, (b) openness of public organisations, and (c) responsiveness of public organisations. The organisational efficiency is measured by examining the extent to which the ICT infrastructure within public organisations has been improved, whether the government processes have been re-designed in a citizen-centric manner, the degree to which administrative expenditure is reduced in public organisations as a result of e-government systems, the extent to which public staff is empowered with necessary skills and knowledge to perform efficiently in an e-government environment, the ability of citizens to obtain public services through integrated e-government systems which connect multiple public organisations vertically and horizontally, and citizens’ overall judgement about the efficiency of the public organisation where e-government systems are implemented.

The public value of improving the openness of public organisations is examined through citizens’ perceptions about the extent to which top public officials’ contact information is disclosed online, the provision of information on how public organisation make decisions, the provision of policy drafts online for citizens’
consultation, the ability to submit complaints or comment online about the activities of public organisations, and the degree to which information on how public money is managed is disclosed. The public value of improving the responsiveness through e-government can be gauged through the citizens’ perceptions about public organisations’ timely responses to their inquiries made through e-government.

The public value of the achievement of socially desirable outcomes through e-government can be examined through (a) equity, (b) self-development, (c) trust, (d) confidentiality, and (e) environmental sustainability. The public value of equity can be measured through citizens’ perceptions about the availability of e-government information and services in local languages, compliance of government websites with accessibility standards, the availability of specific e-government content for ethnic minorities, establishment of kiosks in rural semi-urban areas to provide access to e-government, and affordable access to ICT infrastructure in rural and semi-urban areas.

Self-development of citizens through e-government is examined by the citizens’ perceptions about the availability of ICT resources for developing skills and knowledge, the availability of low cost ICT training for citizens, the availability of content and applications for children’s education, and the information provided through government websites to develop the knowledge of citizens.

The public value of development of trust in government can be examined through (i) citizens’ trust in government, (ii) citizens’ trust in e-government, and (iii) the government’s trust in citizens. Trust in government can be gauged through citizens’ perceptions about the trustworthiness of public officials and government procedures.
Trust in e-government is gauged through citizens’ perceptions on the trustworthiness of electronic transactions that citizens make with the government, protection through laws, and the credibility of the information provided through e-government. Government’s trust in citizens is measured through the citizens’ judgements of the degree to which public officials trust citizens in e-government interaction.

The public value of confidentiality can be examined through citizens’ perceptions about the confidentiality of citizens’ sensitive information in government systems, protection of citizens’ identity afforded by e-government systems, and the security infrastructure in e-government systems.

Finally, the public value of environmental sustainability can be gauged through the contribution of e-government systems to protect environment by reducing duplication of effort and using electronic records to reduce paper printing, development of special purpose IT systems which can be used to monitor and control environmental threats, and implementation of green IT plan that control threats from government ICT initiatives. Table 7.2 presents a summary of the indicators used in the framework.

**Table 7.2** A summary of the indicators in the framework

<table>
<thead>
<tr>
<th>Main-dimension</th>
<th>Sub-dimension</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Delivery of quality public services</td>
<td>1.1 Quality of information</td>
<td>○ Accuracy</td>
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<tr>
<td></td>
<td></td>
<td>○ Up-to-date</td>
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<td></td>
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<td>○ Relevant</td>
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<td></td>
<td></td>
<td>○ Simple and understandable</td>
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<td></td>
<td></td>
<td>○ Increased convenience for citizens</td>
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<td></td>
<td>1.2 Functionalities of e-services</td>
<td>○ Usefulness of simple and complex e-services</td>
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<tr>
<td></td>
<td></td>
<td>○ Increased convenience for citizens</td>
</tr>
<tr>
<td>Section</td>
<td>Title</td>
<td>Subsections</td>
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</tr>
<tr>
<td>1</td>
<td>Information and service through e-enabled counters</td>
<td>1.3 Information and service through e-enabled counters</td>
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<td></td>
<td></td>
<td>o Usefulness of e-enabled counters installed at front office</td>
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<tr>
<td></td>
<td></td>
<td>o Increased convenience for citizens</td>
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<td></td>
<td></td>
<td>o Reduction of corruption in front office public service delivery</td>
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<td>1.4 User-orientation</td>
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<td></td>
<td></td>
<td>o Citizen-centric features of websites</td>
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<td></td>
<td></td>
<td>o Alternative channels to deliver information and services</td>
</tr>
<tr>
<td>2</td>
<td>Effectiveness of public organisations</td>
<td>2.1 Organisational efficiency</td>
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<tr>
<td></td>
<td></td>
<td>o Improved organisational ICT infrastructure</td>
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<td></td>
<td></td>
<td>o Government processes re-designed in a citizen-centric manner</td>
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<td>o Integration of e-government systems across public organisations</td>
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<td>o Public staff empowerment</td>
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<td>o Degree to which administrative expenditure is reduced in public organisations</td>
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<td>2.2 Openness of public organisation</td>
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<tr>
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<td>o Top public officials’ contact information online</td>
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<td></td>
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<td>o Public policy drafts for consultation</td>
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<td>o Disclosing public organisations’ decision making protocol online</td>
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<td></td>
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<td>o Ability to make complaints and comments online</td>
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<td>o Disclosing how budget is managed</td>
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<td>2.3 Responsiveness of public organisation</td>
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<td></td>
<td></td>
<td>o Public organisation’s timely response to citizens’ inquiries make through online, email or phone</td>
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<tr>
<td>3</td>
<td>Socially desirable outcomes</td>
<td>3.1 Equity</td>
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<tr>
<td></td>
<td></td>
<td>o Information and services in local language</td>
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<td></td>
<td></td>
<td>o Compliance of websites with accessibility standards</td>
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<td></td>
<td></td>
<td>o Content for ethnic minorities</td>
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<tr>
<td></td>
<td></td>
<td>o Establishment of kiosks in rural semi-urban areas,</td>
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<td></td>
<td></td>
<td>o Affordable ICT infrastructure in rural and semi-urban areas</td>
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</tbody>
</table>
3.2 Self-development
- ICT resources for public access
- Low cost ICT training
- Content and applications for children’s education
- Affordable access to ICT infrastructure
- Government information for self-development

3.3 Trust
- Citizens’ trust in government
- Citizens’ trust in e-government
- Government’s trust in citizens

3.4 Confidentiality
- Confidentiality of citizens sensitive information
- Protect citizens’ identity
- Security infrastructure in government

3.5 Environmental sustainability
- Specific information systems to monitor and control environmental threats
- Degree to which e-government systems contribute to protecting environment
- Green IT plan for controlling threats from e-government

The developed framework in Figure 7.2 has several advantages over the existing frameworks for evaluating the public value of e-government. Some of these advantages are the inclusion of a large number of society’s public values in the framework and the ability to use this framework as an instrument for evaluating the public value in other developing countries. In contrast to other frameworks (Kearns, 2004; European Commission, 2006; Golubeva, 2007), this framework encompasses a wide range of public values in society. Quality, user-orientation, efficiency, openness, responsiveness, equity, self-development, trust, confidentiality, and environmental sustainability are important public values considered in this framework. A
comprehensive set of indicators are proposed along with each public value for better evaluating the public value of e-government. As a result, with the use of this framework a more complete understanding about the public value of e-government can be obtained. Moreover, given that the framework is explicitly developed by studying the specific nature of e-government in Sri Lanka, and the critical factors and their indicators proposed in the framework are true representations of Sri Lankan citizens’ public values, it is possible to conduct a comprehensive investigation of the public value of e-government in Sri Lanka with the use of this framework. Furthermore, this framework can also be useful for measuring the public value of e-government in other developing countries by testing and validating with an appropriate sample data.

7.4 Recommendations

This research reveals that the quality of information, functionalities of e-services, user-orientation, public information and services from e-enabled counters, organisational efficiency, responsiveness and openness, self-development of citizens, equity, trust, confidentiality, and environmental sustainability are critical for improving the performance of e-government in Sri Lanka. Based on the research findings and with the use of much secondary data (DCS-SL, 2009; ICTA & MGC, 2008a, 2008b; ICTA & GreenTech, 2011a, 2011b), some specific recommendations are made in this section for maximising the creation of public value through e-government.
The quality of the information provided through e-government is critical for maximising the public value creation through e-government. This research, however, reveals that some of the public organisations do not appropriately maintain the quality of public information online. As a result, there is inaccurate and outdated information on government websites. A recent study further confirms this research finding. In Sri Lanka nearly 17.1% of ministries and 34.2% of departments have not updated their website since the date the website was created (ICTA & GreenTech, 2011a). It is, therefore, recommended that the Sri Lankan government strictly maintains the quality of the information provided through e-government. Failing to maintain the quality of the information provided threatens the accuracy and the credibility of the information, and thereby destroys the public value of e-government.

The provision of e-services with appropriate functionalities is critical for creating public value through e-government. Although there is a strong demand from citizens for e-services, particularly for online facilities for paying bills and renewing licences, the supply of such services is inadequate in Sri Lanka. In Sri Lanka, for example, only 27% of district secretariat offices provide e-services for paying bills (ICTA & GreenTech, 2011a). To enhance the public value creation through e-services, the government should take immediate actions to increase the supply of e-services with such functionalities. While increasing the supply of e-services, citizens’ awareness of the value of information and services provided through e-government channels also has to be increased. Unless citizens know what is available from e-services and the value of such services, it is unlikely that citizens will use the e-services (Jaeger & Thompson, 2003). The low up-take of e-government is problematic for the
government itself as significant returns on investment is only possible if there is a high uptake of e-government services (Norris & Moon, 2005).

The delivery of government information and services in a user-oriented (citizen-centric) manner is essential for creating public value through e-government. In Sri Lanka there is, however, unwanted information on government websites such as speeches of politicians and messages by heads of departments, and historical and establishment details of the organisation. Moreover, there is a lack of local language content and printable content on websites. Furthermore, the layout and the organisation of the content of some government websites are poor. To increase the public value through e-government, it is therefore recommended to revamp the existing government websites in a citizen-centric manner by removing unwanted content, increasing attractiveness, navigability among pages, local language content, printable information, and by incorporating a search facility. Assigning meaningful URLs to websites is also essential.

The delivery of government information and services through alternative e-government channels is also vital for creating public value through e-government. The significant demand for e-government services through mobile telephones in Sri Lanka indicates that the government should make considerable effort to develop e-government applications that can deliver public services through mobile telephones. The explosive growth in mobile phone subscribers in Sri Lanka indicates that there are possibilities of creating public value by introducing more personalised e-government services accessible via mobile phones (Karunasena & Deng, 2012b).
Many citizens value accessing government information and services over e-enabled counters. Since Sri Lanka is a country with poor e-readiness, providing information and services through e-enabled counters is extremely important for providing more convenient and cost effective services to citizens. In Sri Lanka, however, only 59% central government departments provide e-enabled counter services (ICTA & GreenTech, 2011a). To ensure the effective creation of public value through e-government, the government should increase the number of e-enabled counters at public organisations with appropriate e-government applications.

Increasing the organisational efficiency through e-government is critical for creating public value through e-government. In Sri Lanka, re-engineering the government program is being implemented with the aim of improving the efficiency and effectiveness of public organisations. Millions of public money is spent on developing e-government projects including the e-divisional secretariat project, e-human resources management project, the e-population registry project, the e-foreign employment project, and the e-motoring project. These projects, however, are still at various stages of development. As a consequence, neither these government organisations have had an opportunity to gain real efficiency through these systems nor the citizens have had an opportunity to enjoy the full benefits of e-services (Karunasena et al., 2011). The government, therefore, should take immediate actions to expedite the development of delayed projects for delivering better public value.

Citizens value the empowering of public officials with appropriate skills and knowledge. In Sri Lanka, under the human resources capacity building program nearly 10,000 public officials have been properly trained on the use of ICT. In
addition about 450 CIOs have been trained and appointed across public organisations for driving the e-government and the ICT based transformation process within those organisations (ICTA, 2011d). Continues empowering of public officials with appropriate skills and knowledge is vital to make public organisations more efficient thereby, creating public value for citizens. Staff with inadequate skills and knowledge impairs the reforming of the public sector with e-government (Samaratunge & Wijewardena, 2009). Although, staff reduction as a result e-government is not recommended in Sri Lanka, re-allocation of redundant staff to other suitable public organisations with inadequate human resources is recommended.

Improving organisation’s responsiveness is essential for creating public value through e-government in Sri Lanka. To improve the responsiveness of public organisations, urgent attention should be paid by government officials for providing timely responses to citizens’ inquiries made through e-government channels. Responses to citizens’ inquiries become meaningless or fail to create value for citizens if they are not delivered within the desired time (Anderson et al., 2011). Moreover, failing to do so not only leads to a low up-take of e-government, but also affects citizens’ trust in e-government, thereby, destroying the public value of e-government.

Citizens value improving the openness of public organisations through e-government. Improving the openness of public organisation can lead to better governance, better policy formulation, increased credibility for government and increased trust in public organisations (Hanna, 2008). To improve the openness of public organisations, the government should revamp their websites by incorporating detailed information about organisation’s decision making procedures and top officials’ duties and
responsibilities along with their contact information. This will enable citizens to
directly contact the relevant officials regarding their matters, and facilities them to
make complaints or comment on the public organisation’s activities. Nevertheless,
many citizens do not regard as valuable the disclosure of public organisation’s budget
management details online, progress of government projects that use public money,
and outcome of government tenders, such information is extremely useful for
improving the openness and accountability of public organisations. Providing such
information also helps to reduce the corruption in public organisations.

Citizens value improving trust and confidentiality through e-government. Honest,
trustworthy and law abiding public staff, trustworthy public administration
procedures, credible information dissemination and services through e-government,
and maintaining non-fraudulent electronic transactions are essential to ensure public
trust through e-government. Much secondary data, however, reveals that citizens’
information held at some public organisations is at the risk of being accessed and
misused by unauthorised personnel. In Sri Lanka, nearly 32% of ministries and 10%
of departments reported to have had unauthorized access to information (ICTA &
MGC, 2008a). 32% of ministries and 29% of departments have problems of loss of
data (ICTA & MGC, 2008a). These security loopholes can affect the confidentiality
of public information and thereby, destroy public trust in e-government. Citizens will
not use e-government services provided by public organisations that do not handle
their information responsibly (Dempsey et al., 2003). Addressing such issues is
extremely important for developing public trust and ensuring the confidentiality of
citizens’ information.
Providing equal opportunities to every citizen to access e-government is essential for creating public value for the society at large. Sri Lanka is home to multiple ethnic groups including Sinhalese (82%), Tamils (9.4%), Muslims (7.9%), and others (0.7%) (DCS-SL, 2001). A majority of them communicate in their local languages including Sinhala and Tamil. To ensure that every ethnic group has an equal opportunity to access government information in their local languages, public organisations attempt to disseminate information in local languages through e-government channels (Karunasena et al., 2011). In Sri Lanka, however, the multilingual content of a majority of websites is limited to the home pages. Moreover, 70% of departments and statutory boards do not provide public information in local languages (ICTA & GreenTech, 2011a). Inadequate local language content in government websites is a significant barrier for creating public value through e-government in Sri Lanka. It is, therefore, essential to add local language content to government websites.

It is further recommended that all public organisation use Unicode font, which is freely available, in preparing local language content. Moreover, to ensure equity, e-government information and services should be designed in such a way that they are accessible to every citizen including disabled citizens. It is recommended to conduct accessibility tests on government websites to ensure that these websites comply with the accessibility standards (Jaeger, 2008).

Access to the internet and computers, and citizens’ ICT literacy are necessary conditions for equity in e-government access (Sipior, Ward, & Connolly, 2010; Jaeger & Bertot, 2010). Statistics reveal that in Sri Lanka, only 11.1% of the rural household population have internet access (DCS-SL, 2009). This is a significant barrier to equal
provision of e-government information and services since 80% of the population in Sri Lanka lives in rural and estate areas. Moreover, only 20.3% of households are IT literate. 31.1% of urban households have computer literacy while the computer literacy of rural households is at 19.3%, and that of the estate sector (estate sector is defined as the plantation areas, which are more than 20 acres in extent and have not less than 10 residential labourers) is at 8.4% (DCS-SL, 2009). Furthermore, only 11.4% of households in Sri Lanka have computers. All these statistics show the low e-readiness among citizens. Inability to access the available e-government information and services due to the unavailability of connectivity, computers and poor literacy for a majority of citizens results in a digital divide, and thereby, can negatively affect the creation of public value through e-government (Karunasena & Deng, 2010a).

To lessen the digital divide that affect the creation of public value through e-government, establishing kiosks in rural and semi-urban areas is a viable solution. To date the government has established about 600 Nenasala centres (kiosks) in rural and semi-urban areas in Sri Lanka. The government, however, should pay more attention to increasing the number of these centres specially in the war affected areas. As personal wealth is a contributing factor to the digital divide (Chary, 2010), providing facilities to poor communities to access the resources at Nenasala centres for an affordable price is essential to encourage these disadvantaged communities to access e-government. Moreover, it is also recommended that the Sri Lankan government expedite the implementation of the RTN project, which promises affordable and anytime anywhere access to the internet to rural citizens.
Self-development of citizens through e-government is valued in Sri Lanka. An examination of e-government’s contribution to facilitate citizens’ self-development reveals that Nenasala centres are playing a significant role in Sri Lanka by developing skills and knowledge of citizens. To date, some Nenasala centres operate as e-libraries. Such centres are equipped with computer-based training media, a large volume of e-book and, periodicals for the use of citizens of all ages, and e-learning tools. Some of these centres also conduct ICT training to rural children for affordable rates (about $2 per month). Continuous provision of such facilities to citizens is essential for creating public value through e-government. To enhance public value creation, the government should increase the number of e-libraries, particularly in remote areas and offer ICT training facilities to citizens through these centres for an affordable price to develop their skills and knowledge.

Environmental sustainability is the final public value identified in this research. An examination of e-government’s contribution to environmental sustainability reveals that in Sri Lanka the government has not taken any significant efforts to ensure environmental sustainability through e-government. The increasing usage of computers in the public sector could lead to many environmental threats as a result of e-waste. It is, therefore, recommended that the Sri Lankan government develop a green IT plan and incorporate it in the national e-government policy.

7.5 Conclusion

This chapter triangulates the quantitative results and qualitative findings for identifying the critical factors for evaluating the public value of e-government in Sri
Lanka. Based on the critical factors identified by triangulating the quantitative results and qualitative findings, a new framework is developed for effectively evaluating the public value of e-government in Sri Lanka. Subsequently, based on the research findings and with the use of much secondary data, some specific recommendations are made for maximising the public value creation from its e-government projects.
8.1 Introduction

This research aims to investigate the public value of e-government in Sri Lanka. To fulfil the aim of the research, a main research question has been formulated as follows: *What is the public value of e-government in Sri Lanka?* To answer the primary research question, five secondary research questions are developed including (a) what are the public values of e-government?, (b) how do e-government initiatives in Sri Lanka create public value for citizens?, (c) what are the critical factors for evaluating the public value of e-government in Sri Lanka?, (d) what is the appropriate framework for evaluating the public value of e-government in Sri Lanka?, and (e) how can existing practices in implementing e-government initiatives in Sri Lanka be improved for delivering better public value?

To adequately answer the research questions, a convergent parallel mixed-methods research methodology is adopted. A theoretical framework is developed based on the review of related literature which hypothesizes the critical factors for evaluating the public value of e-government in Sri Lanka. Using the SEM analysis, the hypothesized theoretical framework is tested and validated with the use of survey data collected from Sri Lanka for a better understanding of the critical factors for evaluating the public value of e-government. In parallel to the collection of survey data, interview data is also collected and analysed by performing deductive thematic analysis. The
findings from the thematic analysis are used to obtain citizens’ perceptions of the public value of e-government in Sri Lanka. The results from the SEM analysis and findings from the thematic analysis are then triangulated to confirm and validate the overall research findings from this research.

This chapter aims to present a summary of the research. The chapter first discusses a summary of the research findings including (a) the development of a new framework for evaluating the public value of e-government in Sri Lanka, (b) the assessment of the perceived performance of e-government in Sri Lanka with the use of new framework, and (c) providing recommendations to Sri Lanka for maximising the public value creation through its e-government projects. This chapter then discusses the contribution of this research to the field of e-government research. Finally, a discussion of the limitations of the research and opportunities for future research is presented.

### 8.2 Research Findings

This research develops a new framework for investigating the public value of e-government in Sri Lanka by identifying the critical factors for evaluating the public value of e-government. The framework consists of three main dimensions for evaluating the public value of e-government, namely, delivery of quality public services, effectiveness of public organisations, and achievement of socially desirable outcomes (Karunasena & Deng, 2010a, 2011b, 2012b). In the framework, each dimension is represented by a set of critical factors for better evaluating the public value. With the use of the developed framework, the performance of e-government in
Sri Lanka is assessed with the intention of providing recommendations to Sri Lanka for maximising the public value creation through its e-government projects.

The first dimension of the framework is the public value of delivery of quality public services through e-government (Karunasena et al., 2011; Karunasena & Deng, 2010b, 2011b, 2012a, 2012b). It is reflected by the values of the quality of the information provided through e-government, functionalities of the e-services which enable citizens to interact with government organisations, public information and service delivery through e-enabled front office counters, and citizen-centric features of e-government service delivery channels (Karunasena & Deng, 2011a).

The second dimension of the framework, the public value of effectiveness of public organisations through e-government is reflected by the values of improving organisational efficiency, enhancing and demonstrating public organisations’ openness through e-government, and improving organisational responsiveness through e-government by providing timely responses to citizens’ inquiries (Karunasena & Deng, 2010b, 2011a, 2011b, 2012a, 2012b).

The third dimension of the framework, the public value of achieving socially desirable outcomes is reflected through the values of ensuring equal opportunities for every citizen, facilitating the development of citizens’ knowledge and skills through e-government, enhancing public trust and assuring citizens’ confidentiality when using e-government, and ensuring environmental sustainability through various e-government initiatives (Karunasena & Deng, 2010b, 2011a, 2011b, 2012b).
The public value of delivery of quality public services is assessed first using the proposed framework. In Sri Lanka the delivery of quality information through e-government creates public value to citizens (Karunasena et al., 2011; Karunasena & Deng, 2012a, 2012b). This study, however, reveals that some of the government organisations do not adhere to quality standards of public information online. There is much inaccurate and outdated information on websites. Moreover, there are usability issues relating to e-government information and service delivery channels. The content and the appearance of some websites are inappropriate. Moreover, there is a lack of functionalities of the e-services. Facilities for citizens to do electronic transactions are lacking in Sri Lanka (Karunasena et al., 2011, 2012; Karunasena & Deng, 2012b). Much effort, however, has been taken by the government to deliver public information and services through e-enabled public service counters to citizens. These counters also have contributed to the reduction of corruption in the front office public service delivery (Karunasena & Deng, 2011a).

Using the framework, the public value of effectiveness of public organisations is examined next. The study reveals that the government of Sri Lanka has initiated many e-government projects to increase the efficiency of public organisations. The delay in implementing these e-government projects however prevents both government and citizens from enjoying the full benefits of e-government (Karunasena & Deng, 2009a, 2009b; Karunasena et al., 2011). A significant number of public officials have been trained with the skills necessary to work efficiently in the e-government environment (Karunasena et al., 2012). The study further reveals that the implementation of e-government in Sri Lanka has not had a significant impact on improving the openness public organisations (Karunasena & Deng, 2012b). There is a lack of e-government
initiatives to demonstrate the openness of public organisations to citizens. In Sri Lanka, e-government has also not contributed much to increase the responsiveness of public organisations. Poor responsiveness of public officials’ to citizens inquiries made using e-government creates a negative impact on the public value creation through e-government in Sri Lanka.

Finally, the public value of achieving socially desirable outcomes through e-government is assessed with the use of the framework. This study reveals that the government has made a significant effort to ensure equity and self-development through e-government. Establishing kiosks for providing rural citizens with access to e-government, establishing e-libraries, providing e-learning content, and providing low cost ICT training to rural citizens and adults to facilitate their self-development are some of the government efforts taken to ensure equity and self-development of citizens (Karunasena & Deng, 2012b). The digital divide among citizens, however, increases the challenge in the ensuring public values of equity and self-development of citizens (Karunasena et al., 2011). Moreover, lack of local language content and poor accessibility standards in government websites further create a negative impact on public value creation. The assessment of e-government’s contribution to develop trust and ensure confidentiality reveals that security problems in public organisations such as unauthorised access to citizens’ information and loss of citizens’ information have the potential to destroy the public values of trust and confidentiality (Karunasena et al., 2011). Finally, the evaluation of the government’s efforts to ensure environmental sustainability reveals that in Sri Lanka the government has not taken adequate efforts to ensure environmental sustainability through e-government (Karunasena & Deng, 2012b).
Having identified the present status of e-government in Sri Lanka, the study explores how the existing practices in implementing e-government initiatives in Sri Lanka can be improved for delivering better public value. The study reveals that to maximise the public value creation through e-government public service delivery, the government should focus on ensuring the quality of the public information delivered through e-government, increasing the supply of online services with appropriate functionalities, increasing the number of e-enabled service counters, and revamping website with citizen-centric manner. Raising citizens’ awareness of the availability and usefulness existing e-government services is also essential (Karunasena & Deng, 2009a, 2009b).

Expediting the implementation of delayed e-government systems and continuing the capacity building activities of public officials are essential to increase the efficiency of public organisations (Karunasena et al., 2011; Karunasena & Deng, 2012b). Urgent attention should also be paid to enhancing public staff’s responsiveness to citizens’ inquiries through e-government channels. Revamping existing government websites in a way that public organisations can demonstrate their openness to citizens is also essential.

Immediate attention is required to eliminating security threats to the public information held in the e-government systems of government organisations (Karunasena & Deng, 2012b). Developing public trust in e-government is also essential for public value creation and steps need to be taken to this end. It is also highly recommended that the Sri Lankan government adopts various control measures to ensure environmental sustainability through e-government. Fair and equal distribution of e-government services to all citizens in society is vital to create public
value. Digital divide, therefore, needs to be addressed to prevent the creation of digitally excluded communities in society. Increasing the number of kiosks in rural areas, and expediting the development of rural telecommunication network project which promises affordable access to ICT are extremely important (Karunasena et al., 2012). Much attention should also be paid to developing appropriate content and e-services for socially excluded communities in the society.

8.3 Contributions of the Research

This research contributes to the field of e-government research from both the theoretical and practical perspectives. From the theoretical perspective, this research contributes to e-government research by developing a theoretical framework for evaluating the performance of e-government with the use of the concept of public value, and by demonstrating the applicability of the mixed-methods approach in evaluating the performance of e-government. From the practical perspective, this research provides a comprehensive investigation of the public value of e-government in Sri Lanka, which would be greatly helpful to e-government stakeholders to understand the effectiveness of e-government in Sri Lanka.

This research makes a significant contribution to the existing research on e-government impact assessments by developing a framework for evaluating the public value of e-government. The research demonstrates how the concept of public value with respect to the public value theory, sources of public value creation, and public values in the societies can be collectively used for assessing the impact of e-government on citizens. The developed framework would be the first in examining
the public value of e-government by considering all three sources of public value creation and many kinds of public value in a society. The framework addresses the limitations of the existing public value evaluation frameworks for effective evaluation of public value of e-government. Furthermore, this framework would be the first approach designed to evaluate the public value of e-government in developing countries. The framework would be greatly useful for evaluating public value of e-government in other developing countries such as Pakistan, Rwanda, and Cuba where similar e-government development models are implemented (Hanna, 2007).

This research further contributes to the literature on mixed-methods approach and its role in e-government research. More specifically, this research demonstrates how the convergent parallel mixed-methods research methodology can be employed in e-government research to fulfil the confirmatory and exploratory research objectives with the use of quantitative and qualitative data. It provides insights on how various procedures and strategies followed in the convergent parallel mixed-methods research methodology in formulating research questions, collecting and analysing qualitative and quantitative data, and triangulating quantitative findings can be used to fulfil the research objectives. This research is, therefore, a perfect example of the applicability of mixed-methods approach in e-government performance evaluation for obtaining a comprehensive understanding of the research phenomenon being studied.

Being the first in-depth study to evaluate the public value of e-government in Sri Lanka, this research demonstrates the practical significance of evaluating e-government from this particular perspective. This evaluation enables e-government policy makers in Sri Lanka to discover the extent to which the objectives of e-
government have been accomplished, and helps to ascertain the strengths and weaknesses of the implementation of e-government in terms of creating the public value for citizens. This helps the Sri Lankan government to further improve its e-government performance by formulating appropriate e-government policies and strategies to the development of e-government. Moreover, this study is helpful for Sri Lankan government to demonstrate accountability for the investment in e-government made by international donor agencies. This research would help to attract future support for e-government programs under the phase two of e-Sri Lanka initiatives.

8.4 Limitations and Future Research

Despite the significant contribution of this study to the e-government research, this study does have several limitations. The need for retesting and revalidating the framework is the first limitation of the study. Such a need arises because merging qualitative findings and quantitative results has led to the discovery of new factors and their attributes. A worthwhile future research on this area would be to test and validate the framework proposed in this study before using it as an instrument for evaluating the public value of e-government in Sri Lanka.

The context specific nature of the public value is another limitation of the study. As mentioned in the literature review, the meanings and interpretations of public values vary significantly from one state to another, or even from one society to another (Jorgensen & Bozeman, 2007). Hence, the public values adopted in this research would be different to the public values adopted in other countries. Moreover, public values evolve over time based on the societal needs (Samaratunge & Wijewardena,
2009). This could threaten the validity and reliability of the proposed framework for evaluating the performance of e-government. As a result, the framework needs to be validated and tested before using it as an instrument for evaluating the public value of e-government in different environments or different countries.

There are many public values in a society. The public value inventory of Jorgensen and Bozeman (2007), for example, identify seventy two public values in society. Due to the practical limitations of incorporating a large number of public values in the e-government evaluation process, this research has only selected a few public values which are more significant in assessing the performance of e-government. As a result, obtaining a complete inventory of public values through e-government is not possible. As a result, this research can be further extended by incorporating many other public values in the inventory of public values.

The under-representation of the public values of citizens who do not use e-government in their day-to-day life is another limitation of the study. The sample for the survey represents only the citizens who have used e-government initiatives in Sri Lanka. This research, therefore, takes into account the public values of e-government users. Low e-government usage among citizens challenges selecting a large sample for the research. Under-representation of the Tamil minority is another limitation of the research. A majority of the Tamil community in Sri Lanka lives in the rural Northern and Eastern provinces of the country where the civil war took place between the government and the Liberation Tigers of Tamil Eelam. As a result of inadequate security to access these conflict areas, the population from these areas had to be excluded from the research. As future research, this study needs to be extended into
the Northern and Eastern provinces of Sri Lanka by giving adequate opportunities to people in those areas to express their values on e-government.
References


References


References


References


Appendix A

The English Version of the Questionnaire

Survey on Perceived Public Values of e-Government Initiatives

This research aims to investigate your perceptions of the values of e-government.

E-government

In this survey, electronic government (e-government) refers to the use of information and communication technologies (ICT) in government activities for creating a better value for citizens. Thus, e-government includes electronic public service delivery (through websites, e-services, call centers), use of ICT in public organizations for internal administration and the use of ICT to enhance various socially desirable outcomes such as trust, equity, development of citizens, environmental sustainability and so forth.

This survey contains following sections

- Part I : demographic information
- Part II : your public values about various e-government initiatives

Your assistance is requested in anonymously answering the questions. Your responses will be strictly confidential.

Thank you in advance.
Part I- Demographic data

1. What is your District and Divisional Secretariat area?

2. What is your gender?
   - Male
   - Female

3. Which of these age groups are you in?
   - 16-20
   - 21-30
   - 31-45
   - 46-60
   - More than 60

4. Are you employed?
   - Yes
   - No
   - No, retired employee

5. To which category does your occupation belong?
   - Agriculture
   - Computer/IT
   - Trading
   - Medical/Health
   - Education (teaching)
   - Travel/Tourism
   - Student
   - Other, please specify

6. What is your educational level?
   - School
   - No schooling
   - Undergraduate degree
   - Postgraduate degree
   - Professional education

7. Do you use e-government?
   - Yes
   - No
Part II – The public value of e-government

This section is NOT about e-government in Sri Lanka. It seeks to find out what you would value and expect from the delivery of public services through an e-government. Please rate your responses according to the following scale.

[7 = Highly important…….. 1 = Not important at all]

8 To what extent is the delivery of quality information through e-government important to you?

[Tick (√) on the scale below: 7 = Highly important…….. 1 = Not important at all]

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<tbody>
<tr>
<td>8a</td>
<td>Accurate information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8b</td>
<td>Up-to-date information</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>8c</td>
<td>Relevant information</td>
<td></td>
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<tr>
<td>8d</td>
<td>Information with the right level of detail</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>8e</td>
<td>Simple and understandable information</td>
<td></td>
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</table>

9 To what extent are the following e-government service delivery initiatives important to you?

[Tick (√) on the scale below: 7 = Highly important…….. 1 = Not important at all]

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<tbody>
<tr>
<td>9a</td>
<td>Pay online</td>
<td></td>
<td></td>
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<tr>
<td>9b</td>
<td>Ability to do government services online (two way transaction)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>9c</td>
<td>Fill and submit online application forms (one way transaction)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>9d</td>
<td>Search interactive information (ex: train time table, agriculture information)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9e</td>
<td>Download government application forms and use them</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9f</td>
<td>Download archives (ex: gazettes, reports, press releases)</td>
<td></td>
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</table>

10 To what extent is citizen-focused e-government service delivery is important to you?

[Tick (√) on the scale below: 7 = Highly important…….. 1 = Not important at all]

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<tbody>
<tr>
<td>10a</td>
<td>Well organized and user friendly website layout</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>10b</td>
<td>Simple (easy to remember) website addresses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10c</td>
<td>A single website which provides links to other government websites (for example, <a href="http://www.gov.lk">www.gov.lk</a>)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>10d</td>
<td>A single website which provides information about all the government services (for example <a href="http://www.gic.gov.lk">www.gic.gov.lk</a>).</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>10e</td>
<td>Common look and feel of websites</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>10f</td>
<td>Designing websites for none internet savvy people (including features that support none internet savvy people)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10g</td>
<td>Frequently asked questions (FAQs) and site map</td>
<td></td>
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</tbody>
</table>
11. To what extent do you think that improving the performance efficiency of public organization through e-government is important?

[ Tick (√) on the scale below: 7 = Highly important........... 1 = Not important at all ]

11a. IT enabled public service counters for better performance
11b. Re-designed (re-engineered) public sector functions for better performance
11c. Improved ICT infrastructure within the public organizations for better performance (networks, databases, new computer applications)
11d. Sharing public information among organizations through networks to reduce redundant information supply by the citizens.
11e. Empowered public sector staff with ICT
11f. Cut excess staff by implementing information systems to reduce administration burdens on government

12. To what extent do you think that improving the openness of public organizations through e-government is important?

[ Tick (√) on the scale below: 7 = Highly important........... 1 = Not important at all ]

12a. Public policy drafts, laws or regulations online for public consultation
12b. Public organizations disclose their budget/expenses online to show accountability of their expenses
12c. Public organizations disclose their annual plan and progress online to show their accountability of achieving public goals
12d. Citizens make complaints online
12e. Publish tenders online to increase the transparency
12f. Display staff’s contact information online
12g. Public organizations display their contact information online
12h. Display organizational charts, duties and responsibilities of public sector staff.

13. To what extent do you think that improving the responsiveness of public organizations through e-government is important?

[ Tick (√) on the scale below: 7 = Highly important........... 1 = Not important at all ]

13a. Display citizen charter online (citizen charter specifies the minimum number of days that a public organization takes to process or deliver a service)
13b. Ability to make inquiries online
13c. Government officials send follow up emails for your emails or inquires
13d. Online case tracking (ex: status of an application submitted to a government organization)
13e. Automatic responses to online submissions and emails.
To what extent do you think that equity as an outcome of e-government is important to you and the society?

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<th></th>
<th>Tick (✓) on the scale below: 7 = Highly important…….. 1 = Not important at all</th>
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</thead>
<tbody>
<tr>
<td>14a</td>
<td>Provision of government websites’ content in local languages</td>
</tr>
<tr>
<td>14b</td>
<td>Establishment of e-government access/ or resources centres (ex: Nanasala/Vidhattha) in rural and semi-urban areas to provide better access to e-government services</td>
</tr>
<tr>
<td>14c</td>
<td>Websites which comply with the accessibility standards to support people with special needs (ex: hearing, visual problems)</td>
</tr>
<tr>
<td>14d</td>
<td>Content for the socially disadvantaged people (poor people)</td>
</tr>
<tr>
<td>14e</td>
<td>Provide appropriate content to address the needs of ethnic minorities</td>
</tr>
<tr>
<td>14f</td>
<td>Provide cultural and religious information</td>
</tr>
</tbody>
</table>

To what extent do you think that self-development of citizen as an outcome of e-government is important?

| 15     | ICT resources such as Computers, Printers, Scanners, and Internet in for public access. |
| 15b    | Low cost ICT trainings programs conducted by Nanasala centres                      |
| 15c    | Content that supports students education (ex: digital text books, digital libraries, Shilpasaura initiatives) |
| 15d    | Software applications available in e-government resources centers that develop social and networking skills of children |
| 15e    | Resources for distance learning                                                   |

To what extent do you think that trust as an outcome of e-government is important?

| 16a    | Security and privacy statement of all government websites                         |
| 16c    | Trustworthiness of online interactions with government                            |
| 16d    | Public organizations protects your information held in e-government systems       |
| 16e    | Credible information dissemination through government websites                    |
| 16f    | A regulatory framework to secure citizens’ e-government interactions              |

To what extent do you think that ability to participate in democratic decision making through e-government is important?

| 17a    | Government keeps you informed about upcoming                                    |
policies that affect you through websites (ex: online news letters, bulletin boards)

17b The opportunity to actually participate online in public discussions and policy making

17c The government takes your opinion for actual decision making

17d Ability to post a topic (set up an agenda) for public discussions

18 To what extent do you think that environmental sustainability as an outcome of e-government is important?

[Tick (√) on the scale below: 7 = Highly valuable…….. 1 = Not valuable at all]

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<th></th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
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<tbody>
<tr>
<td>18a</td>
<td>Developing e-government applications which help to limit duplication effort and resources</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>18b</td>
<td>Switch off computers, printers and other ICT equipment when not needed (energy saving)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>18c</td>
<td>Reduction of paper printing (double side printing, use electronic copies)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>18d</td>
<td>Recycling consumable equipment (ex: papers, ink cartridges etc)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>18e</td>
<td>Taking your inputs for implementing ‘Green Information Technology’ policy formulation within the government</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>18f</td>
<td>Retire energy inefficient computers systems</td>
<td>☐</td>
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Appendix B

The Sinhala Version of the Questionnaire

මඟ-ඉරුණුරාජ්‍යපිළිබඳ පුරාවැසියන්ගේ ගැලඩුවටිනාකම්

මඟ (e-Government) පිළිබඳ පුරාවැසියන්ගේ ගැලඩුවටිනාකම් (public values) පිළිතුරු

මඟය දනට අයත් ඉරුණු (e-government) පිළිබඳ පුරාවැසියන්ගේ ගැලඩුවටිනාකම්

මඟ (better value) දනට අයත් ඉරුණුලට අයත් ඉරුණුවට අයත් ඉරුණුමකි. 

(ඉන්දියාප්රාජ්‍යයේ, ඉන්දියාපුරාජ්‍යයේ, ඉන්දියාපුරාජ්‍යයේ)

ඉන්දියාපිළිබඳ පිළිබඳ පුරාවැසියන්ගේ ගැලඩුවටිනාකම්

(ඉන්දියාපිළිබඳ පිළිබඳ පුරාවැසියන්ගේ ගැලඩුවටිනාකම්)

ඉන්දියාපිළිබඳ පුරාවැසියන්ගේ ගැලඩුවටිනාකම්

(ඉන්දියාපිළිබඳ පිළිබඳ පුරාවැසියන්ගේ ගැලඩුවටිනාකම්)

I කොටස්: මන්විකාස ගතොරතුරු

II කොටස්: විවිධ්‍රාජ්‍ය ගිල්ලියාවල විවිධ්‍රාජ්‍ය ගුවදී

ගමම සමීක්ෂණය පිළිබඳ ඉතිහාසීක කිසියම් නැතින් අමතනු මැනවි

+610432016248

info@kanishkatwk@gmail.com

කොටස්: මන්විකාස ගතොරතුරු

III කොටස්: ඉරුණුකාන්තාවන්

සිංහල ප්‍රකාංශයක් ඇති මන්විකාස අංකය විවිධ්‍රාජ්‍ය අංකය විසින්

III කොටස්: ඉරුණුකාන්තාවන්

සිංහල ප්‍රකාංශයක් ඇති මන්විකාස අංකය විවිධ්‍රාජ්‍ය අංකය විසින්

kanishkatwk@gmail.com
1  කොටස - දිස්ත්‍රික්කය දියුණින්

1. කොටස් දිස්ත්‍රික්කය මෙහෙළ දිනුමූල ලබාදීම මෙහෙයි?

2. කොටස් දිස්ත්‍රික්කය මෙහෙයි?
   □ වඩාත්කම්
   □ බැඳුම

3. කොටස් දිස්ත්‍රීක්කය පවුලුකම් දිනුමූල ලබාදීම සම්බන්ධ ය?
   □ 16-20
   □ 21-30
   □ 31-45
   □ 46-60
   □ 600 ආසල්

4. කොටස් දිස්ත්‍රීක්කය සිටියේ ලුන්තස්?
   □ අඟ
   □ අඟ
   □ අඟ, බිසිමිස්. අඟ

5. කොටස් දිස්ත්‍රීක්කය සිටියේ දිනුමූල ලබාදීම සම්බන්ධ ය?
   □ ඔක්කම් / පොළපු
   □ පොළපු / පුරාසන සම්බන්ධ
   □ ටොඩුල්ලිය
   □ ලුන්තස්
   □ ආරම්භ කරන්න
   □ පොළපු / පොළපු සම්බන්ධ
   □ පොළපු / පොළපු සම්බන්ධ

6. කොටස් දිස්ත්‍රීක්කය දිනුමූල සම්බන්ධ ය?
   □ මෙහෙදී දෙන
   □ මෙහෙදී දෙන
   □ පෝන්ටන දෙන
   □ පෝන්ටන දෙන
   □ පෝන්ටන දෙන
   □ පෝන්ටන දෙන
   □ පෝන්ටන දෙන

7. කොටස් දිස්ත්‍රීක්කය දිනුමූල සම්බන්ධ ය?
   □ අ අ
   □ අ අ
II e-government संबंधी विश्वासीत्व

8. e-Government नेतृत्व अनुसार गैरशास्त्रीय (quality information) नये गैरतृत्व तथा गैरशास्त्रीय अनुसार नये गैरतृत्व बनाने क्या नये जाता है?

(यह विविधता स्थायी है (✓) ध्यान करें। 7 = नये गैरशास्त्रीय 1 = नये गैरशास्त्रीय अनेक)

9. नये गैरशास्त्रीय e-सेवा (e-services) नये गैरतृत्व तथा नये गैरशास्त्रीय अनुसार नये गैरतृत्व बनाने क्या नये जाता है?

10. नये गैरतृत्व संबंधी विश्वासीत्व (citizen centric) नये गैरतृत्व नये गैरतृत्व तथा नये गैरतृत्व बनाने क्या नये जाता है?

11. नये गैरतृत्व संबंधी विश्वासीत्व नये गैरशास्त्रीय अनुसार (performance efficiency) नये गैरतृत्व नये गैरतृत्व अनुसार नये गैरतृत्व बनाने क्या नये जाता है?
### 11. උපකරණ කලාවේ නාමය අතික්ණීම (වශවිතමය). 7 = ප්‍රමාණය ප්‍රති 1 = සැලකාමෙන්ම සාමාජිකය(වටාමන්)

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<td>11a</td>
<td>සුවිශේෂයක නාමය අතික්ණීම (වශවිතමය)</td>
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<tr>
<td>11b</td>
<td>ඉදිරිය සුවිශේෂයක නාමය අතික්ණීම (වශවිතමය) (වටාමන්)</td>
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<td>11c</td>
<td>ඉදිරිය සුවිශේෂයක නාමය අතික්ණීම (වශවිතමය) (වටාමන්)</td>
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<td>11d</td>
<td>ඉදිරිය සුවිශේෂයක නාමය අතික්ණීම (වශවිතමය) (වටාමන්)</td>
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<td>11e</td>
<td>ඉදිරිය සුවිශේෂයක නාමය අතික්ණීම (වශවිතමය) (වටාමන්)</td>
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<td>11f</td>
<td>ඉදිරිය සුවිශේෂයක නාමය අතික්ණීම (වශවිතමය) (වටාමන්)</td>
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### 12. E-government කිසියම ලක් වනවාද විසාසමය (openness) කිසියම ලක් වනවාද විසේස අදේලදෙනීම?

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<tbody>
<tr>
<td>12a</td>
<td>කලාව කරුණායකය (public consultation) කහන් සැකිල්ල (drafts) සුවිශේෂයක ප්‍රති (plans)</td>
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<td>12b</td>
<td>කලාව කරුණායකය සුවිශේෂයක ප්‍රති (plans) කහන් සැකිල්ල (drafts) සුවිශේෂයක ප්‍රති (plans)</td>
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<td>12c</td>
<td>කලාව කරුණායකය සුවිශේෂයක ප්‍රති (plans) කහන් සැකිල්ල (drafts) සුවිශේෂයක ප්‍රති (plans)</td>
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<td>කලාව කරුණායකය සුවිශේෂයක ප්‍රති (plans) කහන් සැකිල්ල (drafts) සුවිශේෂයක ප්‍රති (plans)</td>
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<td>කලාව කරුණායකය සුවිශේෂයක ප්‍රති (plans) කහන් සැකිල්ල (drafts) සුවිශේෂයක ප්‍රති (plans)</td>
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### 13. යටතා කලාවේ නාමය ඇතිපාල සුවිශේෂයක ප්‍රති (responsiveness) E-government කිසියම ලක් වනවාද විසේස අදේලදෙනීම?

<table>
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<th>4</th>
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</tr>
</thead>
</table>
| 13a |  විලියම් ප්‍රතිවිද්‍යාව සුවිශේෂයක ප්‍රති (online) කහන් සුවිශේෂයක ප්‍රති (online) ශැලුක කරන් සුවිශේෂයක ප්‍රති (online) කහන් සුවිශේෂයක ප්‍රති (online) ශැලුක කරන් සුවිශේෂයක ප්‍රති (online)
තිලාවවලට විශේෂ අවශය (ethnic minorities) පලිජෝගය නව අර්ධ්‍යාංකික කිරීම (economic hardships) නව විමසුම්වලට රාජ්‍යගවබ් සසථකානර් ස්තානයයක් වශයෙන් සහ (V) අවයව කළ හැක (3 = කොහොමද අල්ලියක වැදගත්), (7 = අොහෝවූ අල්ලියක වැදගත්)

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<th>7 6 5 4 3 2 1</th>
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</tbody>
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| 144 e-Government අවස්ථාවක් අවස්ථාවක් (෉: \textit{government/development}) විධාන සහ (V) උදාහරණයක් වැදගත් කිසිදු වැදගත් කිසිදු වැදගත් කිසිදු වැදගත් කිසිදු වැදගත් කිසිදු වැදගත් කිසිදු වැදගත් කිසිදු වැදගත් කිසිදු වැදගත් කිසිදු වැදගත් කිසිදු වැදගත් කිසිදු වැදගත් 
| 145 (වැදගත් අතහසි අතහසි) අවස්ථාවක් වැදගත් කිසිදු වැදගත් කිසිදු වැදගත් කිසිදු වැදගත් කිසිදු වැදගත් කිසිදු වැදගත් කිසිදු වැදagli කිසිදු වැදගත් 
| 146 අමාක්ෂාන කලාවත් (special needs) අවස්ථාවක් වැදagli කිසිදු වැදගත් කිසිදු වැදගත් කිසිදු වැදගත් කිසිදු වැදගත් 
| 147 අමාක්ෂාන කලාවත් (ethnic minorities) අවස්ථාවක් වැදagli කිසිදු වැදගත් කිසිදු වැදගත් කිසිදු වැදගත් 
| 148 e-Government අවස්ථාවක් අවස්ථාවක් (෉: \textit{government/development}) විධාන සහ (V) උදාහරණයක් වැදගත් 

15 e-Government අවස්ථාවක් අවස්ථාවක් (self-development) අල්ලියක වැදගත් අතහසි සහ (V) උදාහරණයේ වැදගත් 

<table>
<thead>
<tr>
<th>මෙම 15 මුණිදා යොමුකරණය විසින් අවස්ථාවක් (self-development) අල්ලියක වැදගත් අතහසි සහ (V) උදාහරණයේ වැදගත්?</th>
<th>7 6 5 4 3 2 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>151 අමාක්ෂාන කලා (ICT) අවස්ථාවක් (self-development) වැදගත් කිසිදු වැදගත් කිසිදු වැදගත් කිසිදු වැදගත් කිසිදු වැදගත් කිසිදු වැදගත් කිසිදු වැදගත් කිසිදු වැදගත්</td>
<td></td>
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<tr>
<td>152 අමාක්ෂාන කලාවත් (special needs) වැදගත් කිසිදු වැදගත්</td>
<td></td>
</tr>
<tr>
<td>153 අමාක්ෂාන කලාවත් (social) වැදගත් network skills</td>
<td></td>
</tr>
</tbody>
</table>

Appendices
16 e-government පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව (trust) කොහොමද මුදල් ගොඩ කියාව ගකොගතක් දුරට වැදගත් ගේ යයි ේබ සිතන්ගනිත ද විදය පාවාමය පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිළිබඳව පිීබඳව පිීබඳව
Appendix C

The English Version of the Interview Questions

1. The Screening Questions for Selecting Participants for Interviews
   a. Do you use e-government in your day-to-day activities?
   b. What are your district and divisional secretariat?

2. Interview Questions
   2.1 Demographic information
   a. What is your age group?
   b. What is your occupation?

   2.2 Perceptions about the value of delivering quality public services through e-government
   a. Do you think delivery of quality public service through e-government is valuable to you?
   b. Why do you think delivering quality information through e-government is valuable?
   c. What do you expect from the delivery of public services through e-government?
   d. How does public service delivery through e-government in Sri Lanka create value to you / what initiatives have been put place?
   e. What can you say about the value of quality of information, e-services, channels, and usability features of public service delivery channels?
2.3 Perceptions about the value of operating effective public organisations through e-government

a. Do you think operating effective public organisation through e-government is valuable to you?

b. Why do you think operating effective public organisation through e-government is valuable?

c. What do you expect from operating effective public organisation through e-government?

d. How does operating effective public organisation through e-government create value to you/ what initiatives have been put place in Sri Lanka?

e. What can you say about the value of improving the organisational efficiency, openness and responsiveness through e-government?

f. How do you think the government should improve the value of operating effective public organisation through e-government for creating better value for you?

2.4 Perceptions about the value of achieving socially desirable outcomes through e-government

a. What type of socially desirable outcomes do you expect from e-government?

b. What type of socially desirable outcomes do you expect from e-government for your society?

c. How is ensuring equity through e-government valuable to you and your society?
d. How is ensuring self-development of citizens through e-government valuable to you and to your society?

e. How is building trust through e-government valuable to you and to your society?

f. How is ensuring participatory democracy through e-government valuable to you and to your society?

g. How is ensuring environmental sustainability through e-government valuable to you and to your society?

h. What e-government initiatives have been put place in Sri Lanka for ensuring equity, trust, participatory democracy, self-development and environmental sustainability?

i. How do you think the government should improve the creation of socially desirable outcomes through e-government?
Appendix D

The Sinhala Version of the Interview Questions

1. The Screening Questions for Selecting Participants for the Interviews
   a. මෙම පද.nr. විශේෂ කලාපයේදී දක්වා ගත දදුන්වම්? 
   b. මෙහි පැකිෂීම කියවම ඇති විට එම කලාපයේදී දක්වා ගත දදුන්වම්? 

2. Interview Questions

2.1 පෙන්වාදා ගතදා
   a. මෙහි පැකිෂීම ද දක්වා ගෙන තී පවතී අනුව? 
   b. මෙහි පැකිෂීම ද දක්වා ගෙන තී පවතී අනුව? 

2.2 මෙම ප්‍රාමික උපකරණය ඊජී ලැබූ ක්‍රමය සහ ක්‍රමය ක්‍රමය හා සිදුවීමට පිළිබඳ ක්‍රමය
   a. මෙම උපකරණය ඊජී ක්‍රමයදී ක්‍රමය සහ ඊජී ක්‍රමයදී ක්‍රමයට හා ක්‍රමය සහ ක්‍රමයට ගනිමිද? 
   b. මෙම උපකරණය ඊජී ක්‍රමයදී ක්‍රමය සහ ඊජී ක්‍රමයදී ක්‍රමයට හා ක්‍රමයට ගනිමිද? 
   c. මෙම උපකරණය ඊජී ක්‍රමයදී ක්‍රමය සහ ඊජී ක්‍රමයදී ක්‍රමයට ගනිමිද? 
   d. මෙම උපකරණය ඊජී ක්‍රමයදී ක්‍රමයදී ක්‍රමය සහ ඊජී ක්‍රමයදී ක්‍රමයට ගනිමිද? 
   e. මෙම උපකරණය ඊජී ක්‍රමයදී ක්‍රමය සහ ඊජී ක්‍රමයදී ක්‍රමයට ගනිමිද? 
   f. මෙම උපකරණය ඊජී ක්‍රමයදී ක්‍රමයදී ක්‍රමය සහ ඊජී ක්‍රමයට ගනිමිද?
2.3 වේනාන්තවල ආකාරයේ දෙදන කාමර්කුණාය පිවිතරණය කරන වේනාන්තවල කාමර්කුණායන්ගේ ප්‍රතිභාඨයන්ගේ විශේෂත්වයන් සහ විශේෂත්වයන්ගේ විශේෂීත්වයන්

a. වේනාන්තවල අපුරුෂ දෙදන කාමර්කුණාය පිවිතරණය කරන වේනාන්තවල ප්‍රතිභාඨයන් විශේෂත්වයන් සහ විශේෂත්වයන්

b. වේනාන්තවල මිය පිවිතරණය කරන වේනාන්තවල ප්‍රතිභාඨයන් විශේෂත්වයන් සහ විශේෂත්වයන්

c. වේනාන්තවල අපුරුෂ දෙදන කාමර්කුණාය පිවිතරණය කරන වේනාන්තවල ප්‍රතිභාඨයන් විශේෂත්වයන් සහ විශේෂත්වයන්

d. වේනාන්තවල අපුරුෂ දෙදන කාමර්කුණාය පිවිතරණය කරන වේනාන්තවල ප්‍රතිභාඨයන් විශේෂත්වයන් සහ විශේෂත්වයන්

2.4 වේනාන්තවල කාමර්කුණාය පිවිතරණය කරන වේනාන්තවල කාමර්කුණායන්ගේ විශේෂත්වයන් සහ විශේෂත්වයන්

a. වේනාන්තවල අපුරුෂ දෙදන කාමර්කුණාය පිවිතරණය කරන වේනාන්තවල ප්‍රතිභාඨයන්

b. වේනාන්තවල අපුරුෂ දෙදන කාමර්කුණාය පිවිතරණය කරන වේනාන්තවල ප්‍රතිභාඨයන්

c. වේනාන්තවල අපුරුෂ දෙදන කාමර්කුණාය පිවිතරණය කරන වේනාන්තවල ප්‍රතිභාඨයන්

d. වේනාන්තවල අපුරුෂ දෙදන කාමර්කුණාය පිවිතරණය කරන වේනාන්තවල ප්‍රතිභාඨයන්

e. වේනාන්තවල අපුරුෂ දෙදන කාමර්කුණාය පිවිතරණය කරන වේනාන්තවල ප්‍රතිභාඨයන්

f. වේනාන්තවල අපුරුෂ දෙදන කාමර්කුණාය පිවිතරණය කරන වේනාන්තවල ප්‍රතිභාඨයන්

g. වේනාන්තවල අපුරුෂ දෙදන කාමර්කුණාය පිවිතරණය කරන වේනාන්තවල ප්‍රතිභාඨයන්

h. වේනාන්තවල අපුරුෂ දෙදන කාමර්කුණාය පිවිතරණය කරන වේනාන්තවල ප්‍රතිභාඨයන්
Appendix E

The Invitation to Participate in the Research

INVITATION TO PARTICIPATE IN A RESEARCH PROJECT
PROJECT INFORMATION STATEMENT

Project Title:

Investigator:
o Kanishka Karunasena Thanthri Waththage (PhD Student, School of BIT, RMIT University, e75502@ems.rmit.edu.au)

Supervisors
o Prof. Hepu Deng (Professor of Information Systems, School of BIT, RMIT University, Hepu.deng@rmit.edu.au, +61 03 9925 5823)
o Prof. Mohini Singh, Professor of Information Systems, School of BIT, RMIT University, mohini.singh@rmit.edu.au, +61 03 9925 1355)

Introduction
I am a PhD student at the School of Business Information Technology, RMIT University, Melbourne, Australia.
You are kindly invited to participate in my research project aiming to develop a conceptual framework for evaluating public value of e-government in Sri Lanka. The interview and survey are designed to seek your opinions of the public value of e-government initiatives in Sri Lanka. This information sheet describes the project in plain English. Please read this sheet carefully and be confident that you understand its contents before deciding whether to participate in the interview (and, or survey) or not. If you have any questions about the project please do not hesitate to contact me.

Who is involved in this research project?
This research is being conducted as part of my PhD study. I am being supervised by Prof. Hepu Deng and Prof. Mohini Singh. This research project has been approved by the Portfolio Human Research Ethics Sub Committee. The proposal describing the PhD research and this methodology has been accepted by the Research and Development Unit in the Faculty of Business at RMIT University.
Why is it being conducted?
The research aims to develop a framework which can be used in Sri Lanka for evaluating the public value of e-government. Such a framework can be utilized to gauge the public value of e-government development in Sri Lanka. Findings will be useful for the government of Sri Lanka to examine whether present e-government development activities are worthwhile or not.

Why have you been approached?
Your contribution to this project will involve in participating in an interview and, or survey conducted by me. Your participation in those activities is completely voluntary and you can withdraw from these activities at any point of time. You have been approached for the purposes of this research because you may be a citizen who consumes e-government services.

What is the project about? What are the questions being addressed?
The primary research question is;

What is the public value of e-government initiatives in Sri Lanka?

To help answer this question, several subsidiary questions are developed as follows:

What are the public values of e-government from the perspective of citizens?

How do e-government projects in Sri Lanka create public value for its citizens?

What are the critical factors for evaluating the public value of e-government in Sri Lanka?

What is the appropriate framework for evaluating the public value of e-government in Sri Lanka?

If I agree to participate, what will I be required to do?
You will be invited to participate in an interview for approximately 1/2 hour, and or to participate in a survey which will not take more than 15 minutes. During the interviews, you will be asked about your values and perceptions in relation to e-government initiatives in Sri Lanka. You may choose not to answer any particular question. This interview will be recorded (audio only) and you (the participant) have the right to request that recording cease at any stage during the interview. During the survey you will be given a set of questions to answer on the same research topic.

What are the risks or disadvantages associated with participation?
There are no apparent or hidden risks in participating in this research as it only involves a discussion of the perceptions about the value of e-government. If any questions may cause you concern, you are free not to answer them. You will not be asked to provide any personal information and personal records. If you (the participant) are unduly concerned about your responses to any of the interview questions or survey question or if you find participation in the interview/survey distressing you should advise the researcher that you either want to strike that discussion from the record or discontinue the interview/survey. The researchers will discuss your concerns with you confidentially and suggest appropriate follow-up if necessary.

What are the benefits associated with participation?
Research finding will be helpful to develop and validate a framework to evaluate the public value of e-government. Your contribution is so important since you are a stakeholder of e-government and also an ultimate beneficiary. Participating in the survey or, and interview is a valuable opportunity for you to express ‘what you want’ from e-government. Outcome of the
research will be presented to ICT Agency of Sri Lanka, the implementation agency of e-government projects, for further action. The researcher is happy to make available to you, the participant, any results, papers, and other outcomes from this research.

**What will happen to the information I provide?**
All recorded data will be transcribed and encrypted and archived. The transcribed data will be kept during the analysis phase of the research on the primary researcher’s desktop computer and will be stored at RMIT in the School of Business Information Technology. A USB storage device will be used to backup the encrypted data, and stored in a secure place (offsite at primary researcher’s residence). All the data will be kept for 5 years upon completion of the project, after which it will be destroyed.

The interview and survey data will be treated in a strictly confidential way and will only be viewed by the researchers involved in this project. Any outcomes from this research will be of a general nature without any details of specific participants disclosed. Where a participant’s words are directly quoted in a publication, it will be with absolute anonymity.

**What are my rights as a participant?**
You have the right to withdraw your participation at any time, without prejudice. You have the right to have any unprocessed data withdrawn and destroyed, provided it can be reliably identified and it does not increase the risk for the participant. Participants also have the right to have any questions, in relation to the project and their participation, answered at any time.

**Whom should I contact if I have any questions?**
The primary investigator (Kanishka Karunasena, Thanthri Waththage, e75502@ems.rmit.edu.au or +61 04 32016248) or his supervisor (Prof. Hepu Deng – Hepu.Deng@rmit.edu.au or +61 03 9925 5823) should be contacted, contact details are given above.

Yours Sincerely

T.W. Kanishka Karunasena
PhD candidate

Dr. Hepu Deng
Professor of Information Systems

Any complaints about your participation in this project may be directed to the Secretary, Portfolio Human Research Ethics Sub Committee, Business Portfolio, RMIT, GPO Box 2476V, Melbourne, 3001. The telephone number is (03) 9925 5594 or email address rdu@rmit.edu.au. Details of the complaints procedure are available from the above address or [http://www.rmit.edu.au/council/hrec](http://www.rmit.edu.au/council/hrec)
## Appendix F

### The Kolmogorov-Smirnov Test Results

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Appendix G

Reliability of the Questionnaire

Table G.1 The reliability of the questionnaire

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<td>Functionalities of e-Services</td>
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<td>User-orientation</td>
<td>10a to 10g</td>
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Appendix H

Re-specified One-factor Measurement Models

Note: The re-specification of the construct ‘SERVI’ suggests two factors, namely, SERVI 1 and SERVI 2.

Figure H.1 The re-specified measurement model of SERVI

Figure H.2 The re-specified measurement model of SERVI 1

Figure H.3 The re-specified measurement model of SERVI 2
Figure H.4  The re-specified measurement model of USERO

Figure H.5  The re-specified measurement model of ORGEF

Figure H.6  The re-specified measurement model of OPENN
Figure H.7  The re-specified measurement model of RESPO

Figure H.8  The re-specified measurement model of EQUIT

Figure H.9  The re-specified measurement model of SELFD
Figure H.10  The re-specified measurement model of TRUST

Figure H.11  The re-specified measurement model of PARTI

Figure H.12  The re-specified measurement model of ENVIR
Appendix I

Formulas for AVE and Coefficient H Calculation

1. AVE Calculation

\[ \text{AVE} = \frac{\sum_{i=1}^{n} \lambda_i^2}{n} \]  

In the Formula (1), the λ represents SFL, and i is the number of items.

2. Coefficient H calculation

\[ H = \frac{1}{1 + \left( \frac{1}{\lambda_1^2} + \frac{1}{\lambda_2^2} + \ldots + \frac{1}{\lambda_n^2} \right)} \]  

In the Formula (2), λ represents the SFL and n is the number of items.
Appendix J

The Discriminant Validity Tests Results of the First-order Factors

Table J.1  The discriminant validity test results of the first-order factors

<table>
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<th>SERVI2</th>
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Chi-square difference ($\Delta x^2$) among constrained and un-constrained models where all the $\Delta x^2$ values are significant at $p < 0.001$.
Appendix K

The Higher-order Measurement Models

![Diagram of the un-estimated higher-order model for EPO]

**Figure K.1** The un-estimated higher-order model for EPO

![Diagram of the estimated higher-order model for EPO]

**Figure K.2** The estimated higher-order model for EPO
Figure K.3  The un-estimated higher-order model for ASO
Figure K.4  The estimated higher-order model for ASO
Figure K.5  The higher-order model with DPS and EPO constrained
Figure K.6  The higher-order model with DPS and ASO constrained
Figure K.7  The higher-order model with EPO and ASO constrained