An assessment of the extent to which the Zimbabwe School Examinations Council has embraced technology to enhance performance: (January 2009 to June 2013).

By

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A dissertation submitted in partial fulfillment of the requirements of the Master of Business Administration Degree at the Graduate School of Management, University of Zimbabwe.

Supervisor: Mr. G. Magaramombe

2013
DEDICATION

To my husband Reason and children for their support and encouragement.
DECLARATION

I, Elizabeth Machigere, I.D number 18-048292 H 18 do hereby declare that this dissertation is a result of my own effort in research, except to the extent indicated in my Acknowledgements, References and the comments included in the report, and that it has not been submitted in part or in full for any other degree to any other university.

Student’s signature…………………………………………………Date…………………………

Supervisor’s signature……………………………………………...Date…………………………
ACKNOWLEDGEMENTS

I would like to express my appreciation to the following people without which it would have been difficult to undertake the research:

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- The Almighty miracle working God for seeing me through the project.
ABSTRACT

This research focused on the assessment of the extent to which the Zimbabwe School Examinations Council has embraced technology to enhance performance. The overall objective of the study was to assess the extent to which the Zimbabwe School Examinations Council had embraced technology to enhance service delivery over the period January 2009 to June 2013.

The researcher adopted the quantitative research method to undertake the study. A sample size of 100 respondents was drawn from ZIMSEC Head Office in Harare where 195 employees were in post. The sample comprised three levels namely, top management, middle management and staff. These were drawn from different departments and comprised of both male and female employees with varied length of service at ZIMSEC.

The study found out that:

- Performance is being hampered by lack of adequate investment in ICT infrastructure.
- ZIMSEC does not have a critical mass of staff with the requisite ICT skills.
- ICT is not being fully prioritized in areas critical to organizational performance, especially organizational performance tracking, B2B relation management, organizational learning and growth, and innovation and change.
- Systems such as e-marking and e-registration have been adopted albeit at limited scale.

The study recommended that ZIMSEC should:

- Engage development and cooperating partners
- Develop staff ICT skills
- Prioritize ICT and automate business processes
- Fully embrace e-marking and e-registration

The recommended areas for further study were:

- The effect of the work environment on performance;
- Impact of staff motivation on performance; and
- Impact of staff skills and development on performance.
# TABLE OF CONTENTS

Dedication...........................................................................................................................i
Declaration..........................................................................................................................ii
Acknowledgements..........................................................................................................iii
Abstract..............................................................................................................................iv
List of Tables.....................................................................................................................xii
List of Figures...................................................................................................................xiv
List of Abbreviations.......................................................................................................xv

CHAPTER ONE..................................................................................................................1
INTRODUCTION.................................................................................................................1

1.0 Introduction....................................................................................................................1
1.1 Zimbabwe School Examinations Council Background..............................................1
1.1.1 ZIMSEC’s Brief Historical Background.................................................................2
1.1.2 Benefits of the Transformation from Examinations Branch to ZIMSEC..............2
1.1.3 ZIMSEC Strategic Goals.........................................................................................2
1.1.4 ZIMSEC Vision.......................................................................................................3
1.1.5 ZIMSEC Mission Statement..................................................................................3
1.1.6 ZIMSEC Core Values............................................................................................3
1.1.7 ZIMSEC’s Organizational Structure....................................................................3
1.1.8 Overview of ZIMSEC’s Challenges....................................................................4
1.2 Background to the Research.......................................................................................5
1.3 PESTL Analysis...........................................................................................................6
1.3.1 Political Factors.....................................................................................................6
1.3.2 Economic Factors..................................................................................................6
1.3.3 Social Factors.......................................................................................................7
1.3.4 Technological Factors..........................................................................................7
1.3.5 Legal Factors.......................................................................................................8
1.4 SWOT Analysis..........................................................................................................8
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.4.1</td>
<td>Strengths</td>
<td>9</td>
</tr>
<tr>
<td>1.4.2</td>
<td>Weaknesses</td>
<td>9</td>
</tr>
<tr>
<td>1.4.3</td>
<td>Opportunities</td>
<td>9</td>
</tr>
<tr>
<td>1.4.4</td>
<td>Threats</td>
<td>9</td>
</tr>
<tr>
<td>1.5</td>
<td>Statement of the Problem</td>
<td>9</td>
</tr>
<tr>
<td>1.6</td>
<td>Overall Research Objective</td>
<td>10</td>
</tr>
<tr>
<td>1.7</td>
<td>Main Research Question</td>
<td>11</td>
</tr>
<tr>
<td>1.8</td>
<td>Hypotheses</td>
<td>12</td>
</tr>
<tr>
<td>1.9</td>
<td>Scope of the Study</td>
<td>12</td>
</tr>
<tr>
<td>1.10</td>
<td>Significance of the Study</td>
<td>12</td>
</tr>
<tr>
<td>1.11</td>
<td>Research Assumptions</td>
<td>13</td>
</tr>
<tr>
<td>1.12</td>
<td>Research Structure</td>
<td>13</td>
</tr>
<tr>
<td>1.13</td>
<td>Chapter Summary</td>
<td>13</td>
</tr>
</tbody>
</table>

**CHAPTER TWO**

**LITERATURE REVIEW**

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>Introduction</td>
<td>14</td>
</tr>
<tr>
<td>2.1</td>
<td>Definition of Terms</td>
<td>14</td>
</tr>
<tr>
<td>2.1.1</td>
<td>E-governance</td>
<td>14</td>
</tr>
<tr>
<td>2.1.2</td>
<td>Information Technology</td>
<td>14</td>
</tr>
<tr>
<td>2.1.3</td>
<td>Information and Communication Technology</td>
<td>15</td>
</tr>
<tr>
<td>2.1.4</td>
<td>Digital Divide</td>
<td>16</td>
</tr>
<tr>
<td>2.1.5</td>
<td>The Internet</td>
<td>16</td>
</tr>
<tr>
<td>2.1.6</td>
<td>Intranets</td>
<td>16</td>
</tr>
<tr>
<td>2.1.7</td>
<td>Information Systems</td>
<td>16</td>
</tr>
<tr>
<td>2.1.8</td>
<td>Networks</td>
<td>16</td>
</tr>
<tr>
<td>2.1.8.1</td>
<td>Local Area Network</td>
<td>16</td>
</tr>
<tr>
<td>2.1.8.2</td>
<td>Wide Area Network</td>
<td>17</td>
</tr>
<tr>
<td>2.1.8.3</td>
<td>Business Benefits of Networks</td>
<td>17</td>
</tr>
<tr>
<td>2.1.8.3.1</td>
<td>Advantages of Networks</td>
<td>17</td>
</tr>
<tr>
<td>Section</td>
<td>Title</td>
<td>Page</td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>2.1.8.3.2</td>
<td>Disadvantages of Networks</td>
<td>18</td>
</tr>
<tr>
<td>2.1.9</td>
<td>Business Models and Theoretical Framework</td>
<td>18</td>
</tr>
<tr>
<td>2.1.9.1</td>
<td>Business Model</td>
<td>18</td>
</tr>
<tr>
<td>2.1.9.1.1</td>
<td>The Seven S Model</td>
<td>19</td>
</tr>
<tr>
<td>2.1.9.2</td>
<td>Theoretical Framework</td>
<td>21</td>
</tr>
<tr>
<td>2.1.9.2.1</td>
<td>Technology Acceptance Model</td>
<td>21</td>
</tr>
<tr>
<td>2.1.9.2.2</td>
<td>Cumulative Model of Access</td>
<td>22</td>
</tr>
<tr>
<td>2.1.9.2.3</td>
<td>Theory of Reasoned Action</td>
<td>22</td>
</tr>
<tr>
<td>2.1.9.2.4</td>
<td>The Convergence Theory</td>
<td>23</td>
</tr>
<tr>
<td>2.1.9.2.5</td>
<td>Unified Theory of Acceptance and Use of Technology</td>
<td>25</td>
</tr>
<tr>
<td>2.1.9.2.6</td>
<td>The Diffusion Approach</td>
<td>25</td>
</tr>
<tr>
<td>2.1.9.2.7</td>
<td>The Theory of Planned Behavior</td>
<td>26</td>
</tr>
<tr>
<td>2.1.9.2.8</td>
<td>Model Underpinning the Research</td>
<td>26</td>
</tr>
<tr>
<td>2.2</td>
<td>Information Technology and Performance</td>
<td>26</td>
</tr>
<tr>
<td>2.3</td>
<td>Organizational Performance</td>
<td>29</td>
</tr>
<tr>
<td>2.3.1</td>
<td>Agency Theory</td>
<td>30</td>
</tr>
<tr>
<td>2.3.2</td>
<td>Resource Dependence Theory</td>
<td>30</td>
</tr>
<tr>
<td>2.3.3</td>
<td>Group/Decision Process Model</td>
<td>30</td>
</tr>
<tr>
<td>2.4</td>
<td>Performance Drivers</td>
<td>30</td>
</tr>
<tr>
<td>2.5</td>
<td>Technology Enablers and Impediments</td>
<td>31</td>
</tr>
<tr>
<td>2.6</td>
<td>Complimentary Assets</td>
<td>32</td>
</tr>
<tr>
<td>2.7</td>
<td>Overview of Technology and Organizational Performance</td>
<td>35</td>
</tr>
<tr>
<td>2.8</td>
<td>Information and Communication Technology Efficiency</td>
<td>37</td>
</tr>
<tr>
<td>2.9</td>
<td>Effects of Applying Information Technology on Efficiency of Organizations</td>
<td>39</td>
</tr>
<tr>
<td>2.10</td>
<td>Overview of E-Government Initiatives in Africa</td>
<td>40</td>
</tr>
<tr>
<td>2.11</td>
<td>Success Stories of e-Registration in Africa</td>
<td>44</td>
</tr>
<tr>
<td>2.11.1</td>
<td>Advantages of e-Marking</td>
<td>45</td>
</tr>
<tr>
<td>2.11.1.1</td>
<td>The Administrative Effect</td>
<td>45</td>
</tr>
<tr>
<td>2.12</td>
<td>Conceptual Framework</td>
<td>46</td>
</tr>
<tr>
<td>2.13</td>
<td>Chapter Summary</td>
<td>48</td>
</tr>
</tbody>
</table>
## CHAPTER THREE
### RESEARCH METHODOLOGY

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0 Introduction</td>
<td>49</td>
</tr>
<tr>
<td>3.1 Review of Research Philosophy</td>
<td>49</td>
</tr>
<tr>
<td>3.1.1 Positivism</td>
<td>49</td>
</tr>
<tr>
<td>3.1.2 Phenomenology</td>
<td>50</td>
</tr>
<tr>
<td>3.1.3 Epistemology</td>
<td>51</td>
</tr>
<tr>
<td>3.1.4 Realism</td>
<td>51</td>
</tr>
<tr>
<td>3.1.5 Interpretivism</td>
<td>52</td>
</tr>
<tr>
<td>3.2 Research Setting</td>
<td>52</td>
</tr>
<tr>
<td>3.3 Unit of Analysis</td>
<td>52</td>
</tr>
<tr>
<td>3.4 Population Sampling</td>
<td>53</td>
</tr>
<tr>
<td>3.4.1 Study Population</td>
<td>53</td>
</tr>
<tr>
<td>3.4.2 Sample Size</td>
<td>54</td>
</tr>
<tr>
<td>3.4.3 Sampling Method</td>
<td>54</td>
</tr>
<tr>
<td>3.4.3.1 Purposive Sampling</td>
<td>55</td>
</tr>
<tr>
<td>3.5 Research Instruments</td>
<td>55</td>
</tr>
<tr>
<td>3.5.1 Questionnaire Survey</td>
<td>56</td>
</tr>
<tr>
<td>3.5.1.1 Structure of the Questionnaire</td>
<td>58</td>
</tr>
<tr>
<td>3.5.2 Secondary Data</td>
<td>59</td>
</tr>
<tr>
<td>3.6 Triangulation</td>
<td>59</td>
</tr>
<tr>
<td>3.7 Data Validity and Reliability</td>
<td>60</td>
</tr>
<tr>
<td>3.7.1 Data Validity</td>
<td>60</td>
</tr>
<tr>
<td>3.7.2 Data Reliability</td>
<td>61</td>
</tr>
<tr>
<td>3.8 Ethical Considerations</td>
<td>62</td>
</tr>
<tr>
<td>3.9 Research Limitations</td>
<td>63</td>
</tr>
<tr>
<td>3.10 Data Analysis and Presentation</td>
<td>64</td>
</tr>
<tr>
<td>3.11 Chapter Summary</td>
<td>64</td>
</tr>
</tbody>
</table>
CHAPTER FOUR………………………………………………………………………………65
RESEARCH METHODOLOGY…………………………………………………………………65
4.0 Introduction…………………………………………………………………………...65
4.1 Overall Response Rate……………………………………………………………..66
4.2 Research Findings and Analysis………………………………………………66
4.2.1 Respondents Profiling……………………………………………………………...67
4.2.1.1 Distribution of Respondents by Level within ZIMSEC Structure…………67
4.2.1.2 Distribution of Respondents by Departments……………………………..67
4.2.1.3 Distribution of Respondents by Gender……………………………………….68
4.2.1.4 Distribution of Respondents by Length of Service…………………………68
4.2.2 Existing Information and Communication Technologies at ZIMSEC…………69
4.2.2.1 Perception of Existing Information Management Systems in Use at ZIMSEC……69
4.2.2.2 Perception of Readiness of ZIMSEC to Transform into ICT Driven Organization…………………….................................................................70
4.2.2.3 Perception of the Prioritization of ICT at ZIMSEC…………………………74
4.2.2.4 Perception of the Contribution of ICT to Enhanced Organizational Performance……………………………………………………………..77
4.2.2.5 Rating of Networks Currently in Use at ZIMSEC…………………………...79
4.2.2.6 Perceived Means of Communication with Internal and External Clients……80
4.2.2.7 Enterprise Resource Planning Systems Currently Being Used by ZIMSEC…..82
4.2.3 Impact of Information Technology on Management and Staff Performance……83
4.2.3.1 Staff Appreciation of the Application of IT in ZIMSEC’s Business Processes……83
4.2.3.2 Perception of the Application of IT in ZIMSEC’s Business Processes………..83
4.2.4 Impact of Information Technology on Service Efficiency………………………85
4.2.4.1 Perception of the Effect of the Harnessing of ICT to ZIMSEC’s Organizational Performance and Operational Efficiency…………………………85
4.2.4.2 Perception of the Potential Impact of Enhanced Harnessing of ICT on ZIMSEC’s Business Processes ………………………………………85
4.2.5 Problems Hampering the Harnessing of Information Technology at ZIMSEC….86
CHAPTER FIVE ................................................................. 96
CONCLUSION AND RECOMMENDATIONS ................................. 96

5.0 Introduction ........................................................................... 96
5.1 Research Conclusions ......................................................... 96
5.1.1 Information and Communication Technologies in ZIMSEC ........................................ 96
5.1.2 Impact of Information Technology on the Service Quality ........................................... 97
5.1.3 Impact of Information Technology on Economy ............................................................ 97
5.1.4 Impact of Information Technology on Efficiency .......................................................... 97
5.1.5 Impact of Information Technology on Effectiveness ....................................................... 98
5.2 Declaration on Research Hypotheses ........................................ 98
5.3 Recommendations ............................................................... 98
5.3.1 Engage Development and Cooperating Partners ............................................................ 98
5.3.2 Develop Staff ................................................................... 99
5.3.3 Prioritize ICT .................................................................... 99
5.3.4 Embrace ICT ..................................................................... 99
5.3.5 Automate Business Processes........................................................................99
5.3.6 Fully Embrace e-Marking and e-Registration..................................................99
5.3.7 Align Business Strategy and ICT Policy..........................................................99
5.3.8 Implement ICT Policy.......................................................................................100
5.4 Contribution to Literature..................................................................................100
5.5 Areas for Further Research.................................................................................101

REFERENCES...........................................................................................................102
APPENDIX I..............................................................................................................108
APPENDIX II............................................................................................................109
APPENDIX III..........................................................................................................110
LIST OF TABLES

Table 2.1: Complimentary Social, Managerial and Organizational Assets Required to Optimize Returns from Information Technology Investments…………………………...33

Table 3.1: Breakdown of ZIMSEC Respondents………………………………………………….54

Table 4.1: Overall Response Rate……………………………………………………………...66

Table 4.2: Distribution of Respondents by Length of Service……………………………………69

Table 4.3: Perception of ZIMSEC:s Readiness to Transform into an ICT Driven Organization……………………………………………………………………………71

Table 4.4: Distribution of Respondents by Level within ZIMSEC vs ICT Readiness Cross Tabulation……………………………………………………………………………71

Table 4.5: Chi-Square Tests 1………………………………………………………………………72

Table 4.6: Distribution of Respondents by Departments vs ICT Readiness Cross Tabulation……………………………………………………………………………72

Table 4.7: Chi-Square Tests 2………………………………………………………………………73

Table 4.8: Distribution of Respondents by Length of Service vs ICT Readiness Cross Tabulation……………………………………………………………………………73

Table 4.9: Chi-Square Tests 3………………………………………………………………………74

Table 4.10: Distribution of Respondents by Level within ZIMSEC vs ICT Prioritization Cross Tabulation………………………………………………………………….74

Table 4.11: Chi-Square Tests 4………………………………………………………………………75

Table 4.12: Distribution of Respondents by Departments vs ICT Prioritization…………………75

Table 4.13: Chi-Square Tests 5………………………………………………………………………76

Table 4.14: Distribution of Respondents by Length of Service vs ICT Prioritization Cross Tabulation………………………………………………………………….76

Table 4.15: Chi-Square Tests 6………………………………………………………………………77

Table 4.16: Perception of the Contribution of ICT to Enhanced Organizational Performance……………………………………………………………………………78

Table 4.17: Impact of Enhanced ICT on Efficiency and Cost Reduction…………………………85
Table 4.18: Potential Impact of Enhanced Harnessing of ICT in ZIMSEC’s Business Processes

Table 4.19: Possible Means for Harnessing ICT to Realize Improved Service Delivery at ZIMSEC

Table 4.20: Hypotheses 1 Model Fitting Information

Table 4.21: Pseudo R-Square 1

Table 4.22: Parameter Estimates 1

Table 4.23: Hypothesis 2 Model Fitting Information

Table 4.24: Pseudo R-Square 2

Table 4.25: Parameter Estimates 2

Table 4.26: Hypotheses 3 Omnibus Tests of Model Coefficients

Table 4.27: Omnibus Tests of Model Coefficients

Table 4.28: Model Summary

Table 4.29: Hypothesis 4 Model Fitting Information

Table 4.30: Pseudo R-Square 3

Table 4.31: Parameter Estimates 3
LIST OF FIGURES

Figure 1.1: ZIMSEC Organizational Structure ............................................................... 4
Figure 2.1: Components of a Business Model ............................................................... 19
Figure 2.2: The Seven S Model ..................................................................................... 20
Figure 2.3: Conceptual Framework .............................................................................. 47
Figure 4.1: Distribution of Respondents by Level Within ZIMSEC ............................. 67
Figure 4.2: Distribution of Respondents by Departments ......................................... 68
Figure 4.3: Distribution of Respondents by Gender .................................................... 68
Figure 4.4: Perception of Information Management Systems in Use at ZIMSEC ....... 70
Figure 4.5: Perceived ZIMSEC Clients ....................................................................... 79
Figure 4.6: Perceived Existing Networks in Use at ZIMSEC ..................................... 80
Figure 4.7: Perceived Means of Communication with Internal Clients .................... 81
Figure 4.8: Perceived Means of Communication with External Clients ................... 81
Figure 4.9: Perceived ERP Systems in Use at ZIMSEC .............................................. 82
Figure 4.10: Perceived Means for Enhancing Existing ERP Systems at ZIMSEC ..... 82
Figure 4.11: Staff Appreciation of ICT Skills .............................................................. 83
Figure 4.12: Perception of the Application of ICT in ZIMSEC’s Business Processes .. 84
Figure 4.13: Perceived Problems in Harnessing ICT at ZIMSEC ............................... 87
Figure 4.14: Perceived Effect of Enhanced Harnessing of ICT on Transaction Costs and Operational Efficiency ................................................................. 88
Figure 4.15: Perceived Impact Enhanced ICT Systems on ZIMSEC’s Service Delivery . 89
### LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BI</td>
<td>Behavioral Intention</td>
</tr>
<tr>
<td>CRM</td>
<td>Customer Relationship Management</td>
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<tr>
<td>DOI</td>
<td>Diffusion of Innovation</td>
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<td>EASCS</td>
<td>Eastern Africa Submarine Cable System</td>
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<td>ERP</td>
<td>Enterprise Resource Planning</td>
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<td>FoSs</td>
<td>Front Office Services</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communication Technology</td>
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<td>IDRC</td>
<td>International Development Research Centre</td>
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<td>IIA</td>
<td>Internet Initiative for Africa</td>
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<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>IMS</td>
<td>Information Management System</td>
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<tr>
<td>LAN</td>
<td>Local Area Network</td>
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<td>MIS</td>
<td>Management Information System</td>
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<td>MDA</td>
<td>Ministries, Departments and Agencies</td>
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<td>MTP</td>
<td>Medium Term Plan</td>
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<td>NRI</td>
<td>Network Readiness Index</td>
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<td>PC</td>
<td>Personal Computer</td>
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<td>PESTL</td>
<td>Political, Environmental, Social, Legal</td>
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<td>PIL</td>
<td>Purpose in Life</td>
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<td>PSOs</td>
<td>Public Service Organizations</td>
</tr>
<tr>
<td>SN</td>
<td>Subject Norm</td>
</tr>
<tr>
<td>SPMS</td>
<td>Strategic Permanent Measurement Systems</td>
</tr>
<tr>
<td>SWOT</td>
<td>Strengths, Weaknesses, Opportunities and Threats</td>
</tr>
<tr>
<td>TAM</td>
<td>Technology Acceptance Model</td>
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<td>Abbreviation</td>
<td>Full Form</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------</td>
</tr>
<tr>
<td>TTF</td>
<td>Task Technology Fit</td>
</tr>
<tr>
<td>TPB</td>
<td>Theory of Planned Behavior</td>
</tr>
<tr>
<td>TRA</td>
<td>Theory of Reasoning Action</td>
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<tr>
<td>UAUT</td>
<td>Unified Theory of Acceptance and Use of Technology</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations International Children’s Education Fund</td>
</tr>
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<td>UNDP</td>
<td>United Nation Development Programme</td>
</tr>
<tr>
<td>VSAT</td>
<td>Very Small Aperture Technology</td>
</tr>
<tr>
<td>WACS</td>
<td>West Africa Cable System</td>
</tr>
<tr>
<td>WAN</td>
<td>Wide Area Network</td>
</tr>
<tr>
<td>WEF</td>
<td>World Economic Forum</td>
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<tr>
<td>ZIMSEC</td>
<td>Zimbabwe School Examinations Council</td>
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CHAPTER ONE

INTRODUCTION

1.0 Introduction

The chapter outlines the Zimbabwe School Examinations Council’s historical background, background to the research, statement of the problem, research objectives, research questions, the significance of the study and the research structure. The research focused on the case of the Zimbabwe School Examinations Council and sought to assess the extent to which the parastatal has embraced technology with the view to enhance performance. Performance in this context relates to efficiency and quality of service delivery. This presupposes that the Zimbabwe School Examinations Council has a purpose in life (PIL) which gives reasons for its establishment as a government agent. Thus as an agent or arm of government it is supposed to serve and satisfy the needs of its stakeholders which include the state, the general public, business community, civil society as well as the management and staff of the Zimbabwe School Examinations Council in an effective and efficient manner.

1.1 Zimbabwe School Examinations Council Background

The Zimbabwe School Examinations Council (ZIMSEC) was established in terms of the Zimbabwe Examinations Council Act of 1994, under Chapter 25:18 and it commenced on 1st July 1995. It is a board corporate with the mandate of running examinations of both primary and secondary schools. Before it came into being as ZIMSEC it was known as the Examinations Branch department governed by the Education Act Chapter 25:04 under the Ministry of Education, Sport, Arts and Culture. Given on the next page is the detailed historical evolution of ZIMSEC.
1.1.1 ZIMSEC’s Brief Historical Background
According to the [www.zimsec.co.zw](http://www.zimsec.co.zw) ZIMSEC’s evolution started with the Government of Zimbabwe’s decision to localize Ordinary and Advanced Level Examinations in 1983. In 1994 the lot first group of examiners was trained and ZIMSEC was formally established through the promulgation of the Zimbabwe School Examinations Council Act (ZIMSEC Act 1994). The ZIMSEC Board of Directors were appointed in November 1995 whilst the substantive appointment of ZIMSEC Executive Director was made in July 1996. Regarding Ordinary and Advanced Level examinations complete localization was done in 1995 and 2003 respectively.

1.1.2 Benefits of the Transformation from the Examinations Branch into ZIMSEC
The [www.zimsec.co.zw](http://www.zimsec.co.zw) indicates that the transformation from the Examinations Branch to ZIMSEC helped to localize O-Level and A-Level examinations which brought a number of benefits including the following:

- Foreign currency savings.
- Capacity building and skills transfer.
- Decolonization of the of the school curricula.

1.1.3 ZIMSEC Strategic Goals
According to [www.zimsec.co.zw](http://www.zimsec.co.zw) “The aim of ZIMSEC is to offer an excellent, value driven, educational assessment and responsive awarding systems. Through maximum capacity utilization, the Council is gearing itself to continually exceed expectations. ZIMSEC carries out quality assessment to guarantee the quality of manpower for national development. It identifies potential talents, competencies, and skills for future leaders of industry, commerce, and government; feeds institutions of higher learning and the employment sector. ZIMSEC sets standards for levels of academic expertise of Zimbabwean nationals for use locally and internationally.”
1.1.4 ZIMSEC Vision

The Vision for ZIMSEC according to its Strategic Plan is “To be the centre of excellence within the sub-region and beyond in Quality Assessment in Education.”

1.1.5 ZIMSEC Mission Statement

The ZIMSEC’s Strategic Plan cites the Mission Statement of the institution as “The quality assessment of candidates’ learning/ performance and awarding of nationally and internationally recognized certificates at different levels of the education system, while optimally utilizing the Human and Material resources available to ZIMSEC.”

1.1.6 ZIMSEC Core Values

According to the ZIMSEC’s Strategic Plan its core values are as follows:

- Accountability
- Commitment
- Innovation
- Integrity and Honesty
- Professionalism
- Security and Confidentiality

1.1.7 ZIMSEC’s Organizational Structure

ZIMSEC is headed by the Executive Director who is accountable to the Minister of Education, Sport, Arts and Culture through the Board of non-executive Directors. The Executive Director is aided by Deputy Director and six Assistant Directors namely, Finance, Research and Development, Test Development, Examinations Administration, Human Resources, and Information Services. In addition there are three units which
more or less are part of corporate services headed by managers namely, Properties, Information and Publication and Audit.

The current ZIMSEC structure according to the Zimbabwe School Examinations Council records as at March 2013 was as shown below in Figure 1.1.

![ZIMSEC Organizational Structure](image)

**Figure 1.1 ZIMSEC Organizational Structure**

**Source:** ZIMSEC Staff Establishment Chart, March 2013

According to the current ZIMSEC organogram, the institution has an establishment of 379 posts of which 299 are in post and 80 are vacant posts. Organizationally, ZIMSEC has a decentralized structure with the Executive Management based in Harare and Regional Managers in nine administrative regions namely: Harare, Manicaland, Masvingo, Mashonaland East, Mashonaland Central, Mashonaland West, Midlands, Matebeleland North and Matebeleland South.

**1.1.8 Overview of ZIMSEC’s Challenges**

The Zimbabwe School Examinations Council’s Strategic Planning Review (2011:5) cites that, “The Zimbabwe School Examinations Council (ZIMSEC) remains saddled with various internal and external challenges including but not limited to image and public perception, customer handling, service delivery, quality of service, financing, skills shortage and retention, technology, organizational culture, among several other
challenges.---The decade of 2000 to 2010 has been accepted as a decade of turmoil in Zimbabwe, and as such the consistent application and achievement of goals and targets has been extremely difficult."

Zimbabwe Medium Term Plan 2011-2015 (2011:174), states that, “Since 2000, the Public Service has been experiencing severe social and economic challenges characterized by limited resources, massive brain drain, essential skills flight and capacity depletion. The Public Service inevitably plays an instrumental role in driving the economic recovery and transformation of Zimbabwe. A skilled and dedicated resource base across all Ministries is critical to the effective design and implementation of policies and programmes that will achieve the strategic objectives of the Medium Term Plan.”

1.2 Background to the Research
There has been too much noise on how slow service delivery is in all sectors of government in general and the Zimbabwe School Examinations Council has not been spared. It has come under the spotlight for failing to meet deadlines, for example, delays in the processing and release of examination results.

The Zimbabwe School Examinations Council caters for the nation as a whole. The Head Office coordinates its activities through regions that are headed by Regional Managers. The research will contribute to the body of knowledge through the identification of technology harnessing gaps and recommendations suggested. When implemented, these recommendations will assist ZIMSEC in the provision of quality services in an economic, efficient and effective manner. It would also assist ZIMSEC to come up with customer centered services.

It was then vital to examine the environmental factors affecting the Zimbabwe School Examinations Council. This was amplified through PESTL analysis. PESTL may be
defined as a strategic planning and management analytical tool used to identify environmental factors affecting the organization.

The Zimbabwe Tourism Authority Strategic Plan (2010-2012:9) states that, “PESTEL analysis takes stock of the political, economic, social, technological, legal and ecological environments.”

1.3 PESTL Analysis
The following is the PESTL Analysis for ZIMSEC:

1.3.1 Political Factors
There has been remarkable improvement in the perception of Zimbabwe in the local and international arena since the consummation of the Government of National Unity (GNU) in 2009 to date. The prevailing political stability has in turn bolstered investor confidence and re-engagement by the international community. The prevailing political stability has also led to increased support for community development programmes from the development and cooperating partners, for example, the United Nations International Children’s Emergency Fund (UNICEF) and the United Nations Development Programme (UNDP).

If the prevailing political stability and certainty post GNU was to be sustained it would enable ZIMSEC to court other cooperating partners for financial support of its programmes, for example, ICT investment and institutional reform and capacity building.

1.3.2 Economic Factors
Although the country’s economy is on the recovery track, there is still evidence of the following negative factors, including recurring budget deficit, price distortions, and unstable water and energy supplies to mention just a few, which if allowed to go unchecked would negatively impact on the performance of the parastatal.
The macro-economic stability is important to organizations within the public and private domains. Macro-economic stability would enable ZIMSEC to increase its revenue base and give impetus for sustained growth and development.

**1.3.3 Social Factors**

Despite a notable decline in HIV and AIDS infection rates, HIV and AIDS remain one of the greatest factors contributing to high morbidity. The situation is compounded by among other factors, dilapidated health infrastructure, insufficient financial resources to procure essential medicines, equipment, antiretroviral therapy and inefficient transport and communication systems.

High morbidity resulting from HIV and AIDS would certainly lead to the depletion of the productive human resource base hence the need for ZIMSEC to continuously raise awareness about the disease among its workforce in particular the ICT department.

**1.3.4 Technological Factors**

The Zimbabwe Medium Term Plan 2011-2015 (2011:74) cites that, “Currently, the ICT sector is dominated by fifteen internet access and public data service licenses issued and over thirty internet service providers. The government is working on coordinating and rationalizing the investment in fibre optic cable to the undersea cable to facilitate speedy and reliable connectivity at a lower cost.”

Undoubtedly, investment in ICT infrastructure will benefit the national economy and the Zimbabwe School Examinations Council is no exception. It is however important to note the positive outcomes from ICT will depend on a number of factors including the availability of the network to the remote parts of both urban and rural areas, the service fee levels and the effectiveness of enabling drivers, for example power supply. This initiative by government will also enable all sectors to join the competition or beat the competition when they compete with other nations globally.
1.3.5 Legal Factors
The Zimbabwe Medium Term Plan 2011-2015 (2011:75), states that “The enactment of the envisaged Information and Communication Technology (ICT) Bill 2011 will give the impetus to the implementation of the E-Government connectivity and services for all government ministries and public institutions which in turn will not only make ICT products and services accessible to the wider population but also promote the efficient and effective delivery of services as well as transform the country into a knowledge based economy.”

A friendly ICT regulatory and legal policy framework would incentivize organizations ZIMSEC included to make increased investments in ICT infrastructure thereby improving productivity and the provision of quality, efficient and cost effective services to clients and stakeholders.

1.4 SWOT Analysis
Stockdale and Steeper (2012:6) express that “...SWOT analysis is used to identify strengths, weaknesses, opportunities and threats to an organization. Then a plan is created to minimize areas of weakness and limit threats, whilst maximizing opportunities and strengths”.

Hill and Jones (2007:19) state that, “The comparison of strengths, weaknesses, opportunities, and threats is normally referred to as a SWOT analysis. Its central purpose is to identify the strategies that will create a company- specific business model that will best align, fit or match a company’s resources and capabilities to the demands of the environment in which it operates”.

According to the researcher, the Zimbabwe School Examinations Council has the following SWOT: -
1.4.1 Strengths

- Experienced staff
- Critical mass of tertiary educated personnel

1.4.2 Weaknesses

- Inadequate funding
- Centralized management structure
- Disparities in ICT resource endowments in different geographic areas
- Limited infrastructure for regional operations
- Ineffective means of communication with stakeholders
- High ICT staff turnover

1.4.3 Opportunities

- Brain gain from the Zimbabwean Diaspora returning back to join ZIMSEC
- Continued macro economic stabilization
- Organizational learning
- Available new and advanced information technologies
- Investment opportunities in ZIMSEC by both local and foreign partners

1.4.4 Threats

- National policy inconsistencies
- Uncertainty in macro-economic outlook
- Uncertain political stability

1.5 Statement of the Problem

The Zimbabwe School Examination Council is saddled by a number of problems. The Zimbabwe School Examinations Council Strategic Planning Review (2011:5) cites that, “ZIMSEC remains saddled with various internal and external challenges including but not limited to image and public perception, customer handling, service delivery, quality of
service, financing, skills shortage and retention, technology, organizational culture, among several other challenges.” The researcher’s emphasis in this study was on how the harnessing of ICT has impacted ZIMSEC’s service delivery as measured by **service quality, transaction costs and the operational efficiency and effectiveness**.

The Zimbabwe School Examination Council Strategic Planning Review (2011:19) states that, “In recent years the parastatal has suffered from a poor operational environment. There were, quality control problems, poor distribution system, delays in mark-sheets, delays in release of results, overloading of certain staff ….”

The administration of examinations posed problems as well and these had to do with wrong registration of candidates at centres, problem of pirate candidates, candidates receiving results for subjects not sat for, inadequate registration time and extension, transcription errors by examiners and problems with marks processing, question paper shortages at centres due to the manual counting at the printing press, misprints, premature opening of question papers at centres, mix up of question papers at centres, incomplete question papers, question paper leakages at examination centres resulting in lack of brand credibility.

Given the central role technology plays in driving performance in the 21st Century, and given the incessant complaints the Zimbabwe School Examination Council receives from stakeholders in respect of service delivery, this justifies the question of the extent to which ZIMSEC has embraced information technology as a driver of performance.

**1.6 Overall Research Objective**

The main objective of the study was to assess the extent to which the Zimbabwe School Examinations Council has embraced technology through e-marking, e-exam setting, e-registration, e-customer relationship management and e-B2B relationship management to enhance service delivery as measured by service quality, economy, efficiency and effectiveness over the period January 2009 to June 2013.
The study aimed at achieving the following specific objectives:-

a) To identify the information technologies used by the Zimbabwe School Examinations Council over the period covered by the study.
b) To assess the impact of information technology on service quality.
c) To assess the impact of information technology on efficiency.
d) To assess the impact of information technology on economy (transaction costs).
e) To assess the impact of information technology on effectiveness.
f) To make any necessary recommendations in light of the study findings.

1.7 Main Research Question
The main research question was:
To what extent has the Zimbabwe School Examinations Council embraced technology to enhance service delivery as measured by service quality, economy, efficiency and effectiveness?

The research sub-questions were:-

a) Which information and communication technologies have been embraced by the Zimbabwe School Examinations Council over the period under study?
b) What has been the impact of information technology on service quality?
c) What is the impact of technology on service efficiency?
d) What has been the impact of information technology economy?
e) What is the impact of technology on effectiveness?
f) What recommendations have to be made in light of the study findings?
1.8 Hypotheses

In light of the emphasis on the assumed positive effect of harnessing ICT on the Zimbabwe School Examinations Council’s organizational performance and service delivery as measured by service quality, economy, efficiency and effectiveness, the researcher came up with the following hypotheses:

H1: The harnessing of ICT has a positive effect on service quality.
H2: The harnessing of ICT has a positive effect on economy (transaction costs).
H3: The harnessing of ICT has a positive effect on service efficiency.
H4: The harnessing of ICT has a positive effect on effectiveness.

1.9 Scope of the Study

The study shall focus on the extent to which the Zimbabwe School Examinations Council has embraced technology in order to enhance service delivery during the period January 2009 to June 2013, in Harare.

1.10 Significance of Study

From a theoretical perspective, the study will aid understanding in knowing whether ZIMSEC has embraced ICTs or not and how these ICTs have influenced service delivery in terms of service quality, efficiency, economy and effectiveness. The potential benefits of the study are among others, speeding up response times, emphasizing quality and continuous improvement, flexible operations, cost reduction and the creation of a lean workforce which in turn implies reduction in employment costs. The beneficiaries of this study are the Zimbabwe School Examinations Council, the Government in general, the Ministry of Education, Sport, Arts and Culture, the business community, non-governmental organizations (NGOs), schools, teachers, parents and students. Research and tertiary institutions will also benefit from this study as well as stakeholders such as suppliers and development and cooperating partners.
1.11 Research Assumptions
The following were assumptions for the research:

i. ZIMSEC has embraced technology in order to improve service delivery.
ii. Research study information will be true reflection of the obtaining situation at ZIMSEC.
iii. The sample will be as near representation as possible to the study population.
iv. The respondents will be honest and truthful in their responses.

1.12 Research Structure

Chapter 1 introduces the project and outlines the background to the study, research objectives, scope and justification of the study.

Chapter 2 focuses on the review of literature including the theoretical underpinnings and analysis of published data pertaining to the subject under study. The review provides benchmarks for the discussion of results in chapter 4.

Chapter 3 outlines the research methodology adopted by the researcher to undertake the study.

Chapter 4 The chapter dwells on the analysis, interpretation and presentation of the research findings.

Chapter 5 outlines the major conclusions and recommendations of the study.

1.13 Chapter Summary

The chapter presented among other issues the background to the study, research objectives, proposition, justification, and scope of the study.
CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction
This section gives a review of literature relevant to the study. It also outlines the relevant theoretical underpinnings. Key terms and concepts relevant to the importance of technology to organizational performance will also be discussed. Performance enablers and impediments are highlighted as well as success stories.

2.1 Definition of Terms
There is need to define some key terms for purposes of clarity. The idea is not to leave people wondering about what this study is all about because the area of study is framed around these key words and phrases. Defining these terms will give the reader an insight into the gist of the matter.

2.1.1 E-governance
According to Laudon and Laudon (2010) E-government relates to the harnessing and deployment of ICT technologies with the view to make public delivery of services more effective and efficient for the benefit of the general public, business and the civil society. This could be made possible, for example, through the use of online services such as internet and email, as well as the linking of government agencies through local and wide area networks.

Marshall (2007) notes that the deployment of E-governance through harnessing of ICTs has the potential to yield benefits at different levels of government national to local government in the main the effective and efficient provision of public services. Marshall goes on to the harnessing of ICT will make service providers to provide value for money services presumably to their clients and stakeholders.
2.1.2 Information Technology
According to Shaukat and Zafarullah (2009:25) express that, “Information Technology (IT) is a general term that describes any technology that helps to produce, manipulate, process, store, communicate, and/or disseminate information.” Shelly et al. (2004) say that, “IT includes hardware, software, database, networks and other related components which are used to build information systems.” Information technology (IT) according to Baltzan P. and Phillips A. (2009) entails the computers to generate information relevant to the organization. Laudon and Laudon (2009) submit that information technology (IT) is made up of necessary computer hardware and software which organizations acquire to aid their business processes.

2.1.3 Information and Communication Technology
Anderson (2010:13) states that, “ICT is an all encompassing term that includes the full gamut of electronic tools by means of which we gather, record and store information, and by means of which we exchange and distribute information.”

Hameed (2005:305) says that, “The term Information and Communication Technologies (ICT) was coined to reflect the seamless convergence of digital processing and telecommunication.”

2.1.4 Digital Divide
The digital divide can be defined as the differences in society or among nations or regions with respect to access to information and technology, for example, internet access. This could be occasioned by a number of factors including differences in terms of resource endowments, varying levels of affordability and investment in ICT infrastructure.
2.1.5 The Internet
Hugo (2006) asserts that the internet is the worldwide communications platform which relies on the use of computers and other devices to transmit messages in different formats.

Haag and Cummings (2010) note that the internet as medium of communication connects people and organizations from different counties from the various parts worldwide.

2.1.6 Intranets
Masrek, Karim and Hussen (2007:213) state that, “Intranet is a term used to describe the use of internet technologies internally within an organization rather than externally…”

Laudon and Laudon (2009) concur with Masrek, Karim and Hussen (2007) when they say that intranets are used within organization to among other things improve internal communication and enhance internal business processes.

2.1.7 Information Systems
Laudon and Laudon (2009:11) assert that an information system (IS) is a tool used to collate, store, process and disseminate strategic and operational information and therefore aids decision making processes.

2.1.8 Networks
2.1.8.1 Local Area Network
Bocij, Chaffey, Greasley and Hickie (2003:161) state that, “Small scale networks within a workgroup or single office are known as local-area networks (LANs).” Accordingly, a LAN can only deployed within a limited range within a locality, for example, a single company premises.
2.1.8.2 Wide Area Network

Bocij, Chaffey, Greasley and Hickie (2003:161) say “Large-scale networks which are national or international are known as wide-area networks (WANs). Wide-area network (WANs) are networks covering a large area which connect businesses in different parts of the same city, different parts of a country or different countries.”

2.1.8.3 Business Benefits of Networks

Bocij, Chaffey, Greasley and Hickie (2003:162) state that, “Networks are vital to a business. They are important for the cost savings and improved communications that arise from an internal network. Beyond this they are truly vital, because they help a business reach out and connect with its customers, suppliers and collaborators. Through doing this a company can order new raw materials more rapidly and cheaply from its suppliers and keep in touch with the needs of its customers.”

2.1.8.3.1 Advantages of Networks

The main advantages of introducing networks are:

- Reduced communication costs depending on the type of communication system used.
- Shortened information transfer time.
- Enhanced information dissemination and sharing.
- Enabled integration of hardware such as computers, printers and servers.
- Advanced ways of doing business and working.
- Enabled operation of geographically separate businesses through the use of a wide area communications technology.
- Enhanced collaboration with business partners.
2.1.8.3.2 Disadvantages of Networks

The main disadvantages of introducing networks are:

- The initial setup cost may be considerably high.
- When implementing or updating the network there may be considerable practical difficulties. Deploying cables may be very disruptive to staff doing their daily work.
- In the long term, companies become reliant on networks, and breaks in service can be very disruptive. For this reason investment in network maintenance is vital.
- Security is reduced through introducing a network, since there are more access points to sensitive data. Data may also be intercepted when it is transferred from one site to another.

2.1.9 Business Models and Theoretical Framework

2.1.9.1 Business Model

In line with the assertion by Hill and Jones (2007), a business model may be defined as a tool or concept that aids a firm’s management in strategic decision making processes for example, how the firm could achieve increased productivity, return on investment and market share growth. According to Hill and Jones (2007), the benefits of a business model determines how among others, a company:

- picks and keeps its customers;
- differentiates its products;
- generates value for its customers;
- produces its goods or services;
- attains and sustains high productivity and profitability levels; and
- Grow the business overtime
Lynch (2009:738) states that, “A business model is a formula that summaries the essential elements of a strategy that will deliver the company’s profits in a particular strategic context. Its benefits is that it brings together some of the main strategic elements in a way that allows communication and debate across the organization.”

The essential elements of the business model according to Lynch (2009) can be illustrated through Figure 2.1 below.

**Figure 2.1: Components of a Business Model**

**Source:** Lynch R. Strategic Management, (2009:738)

### 2.1.9.1.1 The Seven Ss Model

The Seven Ss according to Hindle, T. (2003:199), “is a framework developed in the late 1970s and early 1980s for analyzing organizations and looking at the various elements that make them successful (or not).” The model was developed by Tom Peters and Robert Waterman and has been adapted and widely used by McKinsey and Co. in strategic planning and management processes and because this in business the model has also been called the McKinsey “Seven S” Model.

Forcarille (2003) notes that the Seven S Model as put by Tom Peters and Robert Waterman “provides the ideal framework for the implementation of strategic change”. This view is shared by Hindle, T. (2009:199) who asserts that the model “helped to
change managers’ thinking about how companies could be improved”. The Seven S Model has seven aspects (see Figure 2 below) which according to Hindle (2009:199) are as follows:

- **Strategy** – the route that the organization has chosen for its future growth.
- **Structure** – the way in which the organization is put together; how its different bits relate to each other.
- **Systems** – the formal and informal procedures that govern everyday activity; today this increasingly involves the implementation of information technology.
- **Skills** – the distinctive capabilities of the people who work for the organization.
- **Shared values** – originally called superordinate goals, the things that influence a group to work together for a common aim.
- **Staff** – the organization’s human resources.
- **Style** – the way in which the organization’s employees present themselves to the outside world, to suppliers and to customers.

![Figure 2.2: The Seven S Model](source: Forcarrille R. A. (2003:19) Module 4: Strategic Management)
The 7 S Model is an essential business model that is used in strategic planning. It arguably enables an organization to take a helicopter view in the appreciation of the needs, problems and/or challenges facing the organization. In this research, the researcher found three aspects of the 7 S Model namely, staff, skills and systems relevant in unpacking the research problem.

2.1.9.2 Theoretical Framework

Oye, Iahad and Rahim, (2012:103) cite that, “With the development of ICT and the diverse fields it affects, various theoretical models have been proposed for a better understanding concerning its diffusion, adoption, acceptance, and usage. Among them three theories have been influential: Davis and associates’ Technology Acceptance Model (TAM), Diffusion of Innovation (DOI) theory, and Rieber and his associates’ five step hierarchical model of technology diffusion adapted the Theory of Reasoned Action (TRA) and developed the Technology Acceptance Model (TAM) to explain the behavioral intention and actual behavior of a person’s computer usage. According to TRA, a person’s specified behaviour is determined by the person's attitude and subjective norms. Behavioral intention (BI) is a prerequisite of the likelihood of performing a specific behavior. Hence, TAM postulates that a person’s computer usage is mainly affected by his or her BI.”

2.1.9.2.1 Technology Acceptance Model

Oye, Noorminshah and Rahim (2011: 534) say that, “Technology Acceptance Model was adapted from the Theory of Reasoned Action, but does not include attitude as a construct. Technology Acceptance Model instead uses two measures Perceived Usefulness and Perceived Ease of Use.…….. Ajzen states that an individual’s belief influences his/her attitude towards various situations. The user’s attitude joins with subjective norms to shape the behavior intentions of each individual. This theory was further refined and called the theory of planned behavior (TPB) which is also titled the extended theory of reasoned action. The Theory of Planned Behavior is a general behaviour model which can be used to study broader acceptance situations than the
Technology Acceptance Model but it has been applied to information systems studies. The TAM model, and its derivations, gradually became the accepted model for research in information systems adoption cases. ......The advantages of a TAM is that it is specifically designed to address the acceptance of IS technology. The TAM model replaced the first three attitudinal constructs from the TPB with two technology acceptance measures perceived usefulness and perceived ease of use. This was done in an attempt to simplify the model making prediction of acceptance easier to predict. In a meta-analysis study on Technology Acceptance Model with 88 published studies it was concluded that the Technology Acceptance Model is a valid and robust model.”

Korpelainen (2011:14) states that, two theoretical constructs, perceived usefulness and perceived ease of use, are the fundamental determinants of system use, and predicts attitudes toward the use of the system in TAM. Perceived usefulness refers to “the degree to which a person believes that making use of a particular system would enhance his or her job performance.” And perceived ease of use refers to “the degree to which a person believes that using a particular system would be free of effort.”

2.1.9.2.2 Cumulative Model of Access
Czerniewicz and Brown (2005:45) state that, “Van Dijk ..... developed what he calls a cumulative model of access, whereby different kinds of access are experienced at successive stages and are conditional on one another. Mental access (motivation) is required first. Once this has been achieved, a person can mobilize material access (hardware). This will lead to skills access (which incorporates strategic, instrumental and informational skills) and only then is access to full usage obtained.”

2.1.9.2.3 Theory of Reasoned Action
Alam, Jani, Omar Hossain and Ahsan (2012:47) say that, “The theory was born largely out of frustration with traditional attitude – behavior research. Theory of Reasoned Action (TRA was derived from previous research focusing mainly on attitude, ultimately discussed on attitude and behavior. Theory of Reason Action constructs with three
components, that is, behavioral intention (BI), attitude (A) and subjective norm (SN). According to TRA a person’s behavioral intention depends on the attitudinal behavior of the person and subjective norm (BI=A+SN). If a person intends to do a behavior that person’s will does it.”

According to Korpelainen (2011:15), “The Theory of Reasoned Action (TRA) originates from social psychology and it is a special case of the Theory of Planned Behavior (TPB). Fishbein and Ajzen (1975) developed TRA in an attempt to explain the links between the beliefs, attitudes, norms, intentions, and behaviors of individuals. The theory assumes that a person’s behavior is dependent on a person’s behavioral intention to perform it, and the intention itself is dependent on a person’s attitude and his or her subjective norms towards the behavior. The subjective norm refers to “the person’s perception that most people who are important to him think he should or should not perform the behavior in question.

According to Eyitayo (2012:651) “Management information system (MIS) researchers have developed models to study the software utilization choices of end users. One commonly employed model is the Technology Acceptance Model (TAM). Davis’ research examines external variables that determine or influence attitudes towards IT use. TAM however does not consider user characteristics, nor does it consider task characteristics. Goodhue and Thompson (1995) developed the Task Technology Fit (TTF) model which combines task characteristics and technology characteristics in an attempt to develop a more comprehensive model. The TTF model is significant in introducing task and fit, but it does not consider user characteristics.”

2.1.9.2.4 The Convergence Theory
Bradley (2006:184) states that, “The converging technologies are: computer technology, tele-technology, and media technology. The convergence process is enforced all the time by smaller, cheaper, and more powerful technical components. ICT is increasingly being used in almost every activity and embedded in more and more things (ubiquitous
computing). Both Convergence and Interactions are important features in the model. Convergence here means a move towards a common content. Interaction means that technology interacts with the social world with values and beliefs. There are four levels of analysis individual, organizational, communital, and societal. The main constituents of the convergence theory are as presented:

- **Globalization:** A convergence is occurring between Technology, Norms/Values (Economy) and Labour Market and is entitled Globalization.
- **ICT:** A convergence of computer technology, telecommunication technology and media technology is occurring to become what is defined as ICT. In these organizations knowledge is managed in new ways.
- **Life Environment:** Work Environment and Public Environment are converging to a life environment, where the work and public environments move into our homes. A new emphasis on certain dimensions in the present psychosocial environment as well as identifying quite new dimensions in the psychosocial environment is important.
- **Life Role:** The Professional Role, The Private Role, and Citizen Role converge to become a Life Role. Role and role formation are central concepts in social psychology and represent a level between structures and the individual. A role appears where psychology and sociology are meeting, and social psychology emphasizes the interaction between the levels of analysis. In democracies the individual can influence and form his/her role/roles and is not solely a victim for structures.”

Bradley (2006) further says that the individual is affected by ICT, the Life Environment with its sub environments, the Life Role with its three sub components of values, technology, and labour market. However, the individual in turn can also influence all the components that affect him. With regard to effect of the convergence theory on human beings it was observed that ICT has changed the following human qualities so far:
identity and self perception; social competence; creativity; integrity; trust; dependence; and vulnerability.

2.1.9.2.5 Unified Theory of Acceptance and Use of Technology

Korpelainen 2011:16) states that, “Venkatesh…… developed the unified model through reviewing eight models which explain ICT usage, namely, Theory of Reasoned Action (TAM), the motivational model, Theory of Planned Behavior (TPB), a model combining TAM and TPB, the model of PC utilization; Diffusion of Innovation (DOI), and the social cognitive theory. The purpose of Unified Theory of Acceptance and use of UTAUT is to explain a user’s intentions to use ICT and the subsequent user behavior. The model considers four constructs as direct determinants of user acceptance and usage behavior, namely performance expectancy, effort expectancy, social influence, and facilitating conditions. There are four key moderating variables: gender, age, experience, and voluntariness of use. The authors stated that UTAUT provides a tool for managers to assess the likelihood of success of technology introductions and to understand the drivers of acceptance in order to design interventions, which include for example, training or marketing. UTAUT focuses on users who may be less willing to adopt and use new systems.”

2.1.9.2.6 The Diffusion Approach

Omona, Weide and Lubeya (2010:87) state that, “Rodgers’Diffusion of Innovation Theory …. argues that the media and interpersonal contacts provide information that influences a person’s opinions and judgment. The theory incorporates three components, namely the innovation decision process, innovation characteristics, and adopter characteristics. The innovation decision process categorizes the steps an individual takes from awareness of innovation, through the formulation of an attitude to the innovation, on the decision on whether to implement, and finally confirmation of this approach, that is, knowledge, persuasion, decision, implementation and confirmation. The characteristics of innovation which may include compatibility, complexity,
observability, relative advantage and attempt have an impact on the likelihood of acceptance and adoption, and also on the rate at which innovation process develops.”

2.1.9.2.7 The Theory of Planned Behavior
Korpelainen (2011:16) says, “the Theory of Planned Behavior (TPB) focuses on cognitive self regulation. The only difference between it and the Theory of Reasoned Action model, is that it takes into account an additional construct, namely perceived behavioral control. Perceived behavioral control refers to the perception of control over the performance of a given behavior. In Theory of Reasoned Action rational considerations determine the choices and behaviors of individuals, and individual plans determine behavior. Intentions refer to individuals’ plans and motivations to commit a specific act. Intentions also portray individual attitudes and the extent to which individuals consider a specific act as desirable or favourable.

2.1.9.3 Model Underpinning the Research
The researcher adopted the UTAUT model for purposes of this research because it is an improved and very popular version. The model considers four constructs as direct determinants of usage behavior and user acceptance namely performance expectancy, effort expectancy, social influence, and facilitating conditions using four key moderating variables such as gender, age, experience, and voluntariness. The model provides a basic framework for managers to assess the likelihood of success of technology introductions and to understand the drivers of acceptance in order to design interventions, which include for instance, training or marketing. As such, the researcher found the UTAUT model to be relevant to the overall research objective.

2.2 Information Technology and Performance
Information technology is critical to organizational performance. As rightly noted by Laudon and Laudon (2009) information technology helps organizations in various areas of their value chain including the enhancement of service quality, customer and
business relationship management and productivity planning, monitoring and controlling.

Arguably, there is a correlation that exists between IT and business performance. Some authors do agree that technology is a performance driver and that businesses have to adapt to technological changes in order for them to survive. Instead, they have to adapt to new ways of doing things or otherwise become extinct like the dinosaur. If they make an effort and change the results will speak for themselves in the form of success stories.

Baltzan and Phillips (2009) note that organizations that seek to use technology to their advantage need to fully appreciate the problems at hand before tapping into IT. More so, there is need for organizations to appreciate how IT systems work.

Baltzan and Phillips (2009) are supported Laudon and Laudon (2010) on the view that businesses that strive to align IT with the strategic objectives of business reap more benefits including increased profitability and competitiveness.

Some authors however argue that technology is not an end in itself but a means to an end. As rightly noted by Haag and Cummings (2010), the use of technology in business without monitoring its return on investment will not help firms to realize benefits including innovation, increased productivity and efficient provision of products and services.

Flanagan and Finger (2006:331) cite that, “….a successful initiative depends on more than the mere injection of new technology into your organization. It’s the commitment, dedication, enthusiasm, skills, and knowledge of employees and other users that matter. Take steps to foster their involvement.”

Laudon and Laudon (2009:14) say, “A business is only as good as the people who work there and run it. Likewise with information systems they are useless without skilled
people to build and maintain them, and without people who can understand how to use the information in a system to achieve business objectives…. technology”.

Baltzan and Phillips (2009) further note that IT is critical to the success of the organization as it aids the employees to be more creative and productive.

Hugos (2006:124) say “Technology can be impressive, but in business, technology is only important in so far as it enables a company or an entire supply chain to profitably deliver valuable products and services to its customers. Do not let the complexity or the details of any technology or system to be a distraction from the basic truth. Indeed any technology that is highly complex or that is touted as being state of the art or leading edge is probably more suited for a research laboratory than it is for a business operation.”

McNurlin, Ralph, Sprague and Bui (2009:46) say that, “Today, IT is pervasive in organizations and is a mandatory link between enterprises, business partners, and competitors alike. Hence it affects every aspect of organizational operations and performance, and is leading to the formation of business ecosystems in which organizations operate. Proper deployment of IT can determine an organization’s growth, direction, structure and sustainability.”

It should be noted that what these authors are saying is not that technology is not important. The authors concur that harnessing of technology for the sake of technology does not hold water. It should however be complemented by other factors employee motivation and skills development for it to positively impact on service quality, economy, efficiency and effectiveness which are the elements being tested by the hypothesis in this research.
2.3 Organizational Performance

Brown (2005:318) says that, “There are several significant limitations to measuring performance in nonprofits. For one, nonprofit status itself limits the accuracy of relying strictly on financial performance indicators. ….. Consequently, there is no easy answer to understanding performance; rather each method provides one perspective on performance. Performance in nonprofit organizations is socially constructed and thus any determination of performance is influenced by whom you ask.”

Defining performance, Shaukat and Zafarullah (2009:37) state that, “Organizational performance is an accumulated end result of organizational process and activity. These are measured by the organization’s working and activity and custom. The organization manages the organizational performance, control and customer value, as it impacts on the reputation of the organization. Common organizational work measures include organizational effectiveness, productivity, efficiency and industry ranking.”

Castel and Galve-Gorriz (2007:43) express that, “There is some degree of theoretical consensus about the existence of a positive relationship between ICT and performance. In particular, some authors argue that the implementation of ICT provides higher productivity, more satisfaction for the customer, more value creation, etc. However, other authors have found null or negative ICT effects on benefits, yield and shared value.”

Phillip and Piotrowicz (2006:8) say “Companies are increasingly using strategic performance measurement systems (SPMS) to implement strategy and drive performance improvements. Strategic performance measurement is a set of casually linked non-financial and financial objectives, performance measures and goals designed to align managers’ actions with a firm’s strategy.”
2.3.1 Agency Theory
Brown (2005:322) state that “In nonprofit organizations, agency theory propositions might be explained by adherence to mission or purpose. Legally nonprofit boards are responsible to ensure that the organization fulfill a duty of obedience, which essentially means that the organization fulfills its public responsibility as reflected in its organizational mission.”

2.3.2 Resource Dependence Theory
Brown (2005:322) states that, “The resource dependence theory suggests that boards function as a resource for organizations. Hillman and Dalziel proposed an integrated perspective that acknowledges limitations in agency theory and that boards function as resource catalysts for organizations by providing key linkages to necessary resources, for instance providing legitimacy, advise and counsel, links to other organizations, and assistance in acquiring resources.

2.3.3 Group/Decision Process Model
Brown (2005:322) further states that “Group/decision process theories are primarily concerned with how information is managed and channeled, how decisions are made, and how group members interact. The rational is that as correct procedures and processes are fulfilled, the board will operate better and as a result will add value to the organization. The association with organizational performance is more tenuous because internal board procedures are more likely to be associated with board performance, and its association to various organizational procedures performance measures has been less consistent. Implicitly and explicitly, decision process models have guided much of the current understanding of nonprofit board performance”.

2.4 Performance Drivers
According to Vaclav, Antonin and Petra (2011:59) “The term performance driver will be henceforth used to mark activities (as repetitive atomic processes) or actions (as one run events) that increase potential to achieve higher level of corporate performance, i.e.
deliver increased outcomes with available resources......... Kaplan describes performance drivers in Balanced Scorecards (BSC) context, where they are commonly used as differentiators: their measures capture the value propositions that the company will attempt to deliver to its targeted customer and market segments....they answer the question ‘What must the company deliver to its customers to achieve high degrees of satisfaction, retention, acquisition, and, eventually, market share?’

The Balanced Scorecard uses strategic and financial measures to assess the outcome of a chosen strategy. It acknowledges the different expectations of various stakeholders and it attempts to use a ‘scorecard’ based on four prime areas of business activity to measure the result of the selected strategy.....Kaplan and Norton were particularly keen to move beyond the normal financial ratio data such as return on capital employed and earnings per share. They claimed that these are essentially functional measures and that what really matters in strategy implementation is the process: Processes have replaced (or are replacing) departments and functions.” They cited three main types of processes that are important namely:

a) **Management** - how the leader runs the organization, how decisions are made and how they are implemented;
b) **Business** - how products are designed, orders fulfilled, customer satisfaction achieved and so on;
c) **Work** - how work is operationalized, purchased, stored, manufactured and so on.

### 2.5 Technology Enablers and Impediments

Organizations often strive to achieve performance excellence through embracing innovation and technology deployment in their internal and external business processes. Matthews, Lewis and Cook (2009:18) state that public sector organizations may achieve positive returns from investment in IT and innovation by:

- delegating roles and responsibilities to encourage innovation;
• implementing performance measures reward outstanding outputs;
• developing public sector financial management systems and practices;
• encouraging client focused services provision; and
• increasing innovative capacity of the people.

To ensure that the above cited factors contribute to successful deployment, and efficient and effective utilization of technology in public service delivery, Matthews, Lewis and Cook (2009) note the need to tackle the following impediments: -

• administrative burdens and delivery pressures;
• short-term budgets and planning horizon;
• poor reward and incentive innovation;
• culture of risk aversion;
• poor skills in change management;
• reluctance to close down failing programmes or organizations;
• technology availability constrained by cultural or organizational acceptance; and
• barriers that arise from within the bureaucracy/organization

2.6 Complementary Assets
Castel and Gorriz (2007:44) state that, “According to the theory of complementarities, we consider that the benefits will be greater if ICT is used together with the adequate organizational resources and capabilities, especially workers’ qualifications, proactive direction and innovative culture, taking advantage of complementarities. Results suggest that firms’ productivity improvements, as a result of the utilization of ICT, are directly related to the complementary resources of the firm...Therefore, firms should keep in mind these complementary elements if they want to obtain improvements in productivity and make the most of ICT. From the perspective of complementarities, part
of the benefit of information technology can be explained by its use with other complementary resources.

Because of the symbiotic relationship between investment in IT and social system of the organizations, some authors have referred organizations that invest in the two as socio-technical. Laudon and Laudon (2010) cite that firms will realize increased returns from investments in IT provide such an investment is accompanied by staff training and development (Table 2.1 refers).

Table 2.1: Complementary Social, Managerial, and Organizational Assets Required to Optimize Returns from Information Technology Investments

| Organizational Assets                                                                 | • Supportive organizational culture that values efficiency and effectiveness.  
|                                                                                      | • Appropriate business model.  
|                                                                                      | • Efficient business processes.  
|                                                                                      | • Decentralized authority.  
|                                                                                      | • Distributed decision making rights.  
|                                                                                      | • Strong IS development team.  
| Managerial Assets                                                                   | • Strong senior management support for technology investment and change.  
|                                                                                      | • Incentives for management innovation.  
|                                                                                      | • Teamwork and collaborative work environments.  
|                                                                                      | • Training programmes to enhance management decision skills.  
|                                                                                      | • Management culture that values flexibility and knowledge based decision making.  
| Social Assets                                                                       | • The Internet and telecommunication infrastructure.  
|                                                                                      | • IT-enriched educational programmes raising labour force computer literacy standards (both government and private sector).  
|                                                                                      | • Laws and regulations creating fair, stable, market environments.  
|                                                                                      | • Technology and service firms in adjacent markets to assist implementation.  

Source: Laudon and Laudon (2010: 27)
Smith, Hunt, Berry and Hunt (2004:8) cite that, “The global economist Sachs, insists that the only way to solve current world economic problems is via an interdisciplinary approach ……… Sachs proposes a rethinking of the nature of the human factor and the global effects of the economic change, precisely because of rapid developments in science and technologies. Without the human element, technology has no point of social reference.”

Smith, Hunt, Berry and Hunt (2004:8) quote Drucker (1954:354) who says, “A combination of technical prowess with human imagination and emotion must coexist to create a paradigm shift for this new economy.”

Smith, Berry, Hunt and Hunt (2004) are not alone, there are four other authors who agree with their perspective, that technology is not an end in itself but rather a means to an end. For technology to bring about wonderful results a lot of things should come into play.

Marcos, Garo, Eduardo and Eduardo (2009:1) say that, “Information and Communication Technologies do not generate efficiency by themselves. To be successful, several organizational strengths (education, and expertise, discipline, process effectiveness, technical infrastructure) must complement them. Technologies that are at a more developed stage such as ERP, SCM and CRM systems, still have very dissimilar, and often disappointing effects. The results are even less auspicious in developing countries as their institutions often lack many of the above mentioned complementary strengths.”

The authors above, Marcos, Garo, Eduardo and Eduardo (2009), and Smith, Berry, Hunt and Hunt (2004) unanimously agree that the harnessing of ICT has positive impact organizational performance as measured by service quality, reduction in transaction costs, efficiency and effectiveness. As such, their views seem to be in sync with the hypothesis advanced by the researcher which were as follows:
H1: The harnessing of ICT has a positive effect on service quality.
H2: The harnessing of ICT has a positive effect on economy (transaction costs).
H3: The harnessing of ICT has a positive effect on service efficiency.
H4: The harnessing of ICT has a positive effect on effectiveness.

It is, however, important to note that the above cited authors are saying that technology does not exist in a social vacuum. The need to factor the human element in the harnessing of ICT is of paramount importance if it is to meaningfully contribute towards organizational performance.

2.7 Overview of Technology and Organizational Performance
Technology is a term that relates to computer applications and systems that are meant to enhance processes of organizations across the public and private sector domains as well as among nonprofit organizations. Over the years, information and communication technology has been embraced by organizations that strive to achieve economy, effectiveness, efficiency, service excellence and competitiveness.

Lynch (2009) submits that technology has since over 20 years ago helped organizations, small and large to achieve competitiveness locally and internationally. Hence is critical to organizational success.

Baltzan and Phillips (2009) submit that although some organizations heavily invest in ICT, application and use of technology is not the alpha and omega organizational success. In this regard the Zimbabwe School Examinations Council is not an exception. Performance enhancement through use of technology will depend on a number of factors including investment in appropriate skills and readiness of the organizational structure and culture to embrace technology.
Kramer, Jenkins and Katz (2007:8) state that, “ICTs are not the entire story. With distressing repetition, the world seems to search for that single silver bullet solution to underdevelopment and poverty. For a while, it seemed ICTs would be next in this category. But ICTs cannot meet development challenges by themselves. As Microsoft has pointed out, in order to realize their potential, these technologies must be part of a mix of sound government policies, enhanced workforce skills, and infrastructure investment- a recipe of interdependent ingredients which promotes initiative and innovation.” It is however important to take into account that in order realize the optimum benefits, ICTs require consistent, accessible and affordable power and network connection as well as supportive regulatory and policy frameworks. Arguably, the human factor should also be seriously considered if increased return on investments in ICTs have to be optimized.

Equally, it is vital for the concerned organization to establish the need for embracing technology. In other words before introducing technology, an organization should identify and define its needs first. This is critical as it will enable the organization to come up with technologies that are relevant to the organization’s needs and that are not only aligned with the organization’s strategic goals but also with its products and services.

There is need to ensure that countries and/or organizations’ human capital is skills ready to embrace technology. Manuhwa (n.d.) posits that in the case of Zimbabwe effort should be made to devote the necessary resources to scientific and technological research and development to induce innovation among people and ensure that they introduce new developments into their productive activities. Manuhwa further notes that efforts should also be made to develop the ability to use new knowledge and skills to meet changing needs. There is also need to invest in human capital development to close the skills gap.
In the final analysis, embracing of E-Government and ICTs especially in the public service is expected not only to re-invigorate the way the government operates but also enhance service delivery as well as the development and sustenance of a knowledge-based economy. Examples, of countries that have successfully embraced technology and revolutionarize government service delivery include in Asia, Japan, Malaysia, South Korea and Singapore, and in Africa, South Africa, Egypt, Mauritius and Rwanda.

In a nutshell what the authors above seem to be saying is that when an organization takes the initiative to invest in technology, it does not mean that they have finally found a remedy to all their problems. They point rather is that before organizations arrive at optimal performance they should first establish their needs before investing in the required technology. They also advise that there is need for enabling regulatory and policy frameworks that support technology investment.

In addition, the authors seem to be concurring that the alignment of ICT with organizational objectives will result in efficient, effective and quality service delivery and this is in line with what the hypotheses in the research are testing.

2.8 Information and Communication Technology and Efficiency

Nejadirani, Rasouli and Behravesh (2011:224) state that, “Since we live in the era of information and communication, what has attracted the attention of companies and organizations is investment in information technology and efficiency resulting from it. Nowadays, a great amount of saving in resources and reduction in costs of organizations have occurred by using information technology which has increased the efficiency of organizations.”

Castel and Gorriz (2012:260) say, “According to theoretical and empirical evidence, ICT offer benefits for a wide range of business processes and improves information and knowledge management within the firm, leading to better performance. Firms can manage their processes more efficiently and, as a consequent, they increase their
operational efficiency. Moreover, ICT reduces the coordination costs of the firm because of lower procurement and inventory costs and closer coordination with suppliers.”

According to Nejadirani, Rasouli and Behravesh (2011:226) “During the last half century, modern and successful organizations have increased investment on information technology because they believe that information technology is one of the most important factors affecting changes and upheavals in organizational structure and function. Application of information technology including the Internet, email as well as pervasion of using computers and computer networks, has caused new organizational forms to be developed whose nature is completely different from that of large traditional and bureaucratic organizations. Of the common characteristics of these organizations, utilization of information and communication networks, knowledge based employees, customer orientation and high productivity can be pointed out. Nowadays, with the environment having got complicated and rapidly changing, using information technology to increase efficiency and effectiveness and providing goods and services to customers and citizens quickly and with high quality is very important in organizations.”

Bhardwaj and Singh (2011:1) say, “Information and Communication Technology (ICT) has become a valuable, decisive and critical resource for individuals, communities, enterprises and organizations. ICT has reached at every door step but its potential has not been fully utilized. ITC is a very helpful tool for providing good governance by bringing a sea-change in the working of organizations and institutions. Most of the developing countries now understand the importance of ICT and have been adopting it as a basic tool for good governance. The new ICT mediated good governance is also called e-governance….ICT is an effective tool for integrating and automating various activities of examination system at different administrative levels...”

Nejadirani, Rasouli and Behravesh (2011) and Castel and Gorriz (2012) concur that the use of information technology leads to increased efficiency, cost reduction, savings in
resources and effectiveness. This is in line with what the hypotheses in this research are testing.

2.9 Effects of Applying Information Technology on Efficiency of Organizations

According to Nejadirani, Rasouli and Behravesh (2011: 227) “Information technology reduces operational expenses and increases efficiency of organizations from several aspects.” The broad benefits of introducing information technology in organizations as rightly put across by Nejadirani, Rasouli and Behravesh (2011) may be compressed as follows:

a) Reduced employment costs through the automation of business processes.
b) Improved availability and access to accurate strategic and operational information
c) Reduced production time and waste levels.
d) Improved human resources management and task performance.
e) Improved quality and confidence level of goods and services through reduction of human resource involvement in production.
f) Enhanced planning and control of business process outputs.
g) Improved job development resulting in employee satisfaction.
h) Increased individual and organizational productivity through creating and developing new capabilities in human resources.
i) Enhanced decision-making skills.
j) Improved employee understanding of organizational issues.
k) Minimization decision-making time.
l) Reduced human error in processing organizational data.
m) Improved service feedbacks.

According to Kramer, Jenkins and Kats (2007:6) “ICT has become the foundation of every sector of every economy, everywhere. The reasons for this are, by now, fairly well-
known. Information and communication technologies.” These reasons as advanced by Kramer, Jenkins and Kats (2007) can be summarised as follows:

- reduced business transaction costs and increased productivity;
- improved connectivity resulting in provision of efficient and transparent services; and
- Reduced need and cost of physical travel.

Nejadirani, Rasouli and Behravesh (2011) and Kramer, Jenkins and Kats (2007) are concurring that ICT has become a cornerstone of successful organisations and economies and among the benefits they put across which aspects the hypotheses in this research are testing are reduced costs, quality improvement, service efficiency and effectiveness.

2.10 Overview of E-Government Initiatives in Africa

According to Hennessy et al (2010:50) “The digital divide is very much expressing itself as a bandwidth divide. Parts of South Africa and capital cities elsewhere have much better provision than that across much of the continent. While good broadband connectivity, for example, is now taken for granted in many of the richer countries of the world, and educational software is increasingly being developed to take advantage of this, such access to the internet is rare and expensive in Africa due to dependence on expensive satellite (VSAT) connections. Eastern Africa has no submarine connectivity at present, while some West and Southern African countries benefit from the SAT-2 and SAT-3 cables. Two-way satellite connectivity is now widely used but the costs of using this for educational purposes remain prohibitively high to be a sustainable choice for classroom use or for teacher education in the short-to medium-term...While over the years, the cost of connectivity has reduced, it still remains high as compared to the other to the other parts of the world.”
Dzidonu (2011:4) notes that one of the key sectors that the deployment of ICTs is making a major impact is the public sector, where a number of countries are using these technologies to drive their electronic government (e-government) initiatives.

Sam and Hoshino (2013:139) state that, “As ICT continues to drive innovation, productivity and efficiency gains across industries as well as to improve citizens’ daily lives, The Global Information Technology Report Series produced by the World Economic Forum in partnership with INSEAD and published annually since 2001 has contributed to informing the drivers of ICT performance and the importance of ICT diffusion for overall competitiveness. The Networked Readiness Index (NRI) has provided a broad methodological framework identifies the enabling factors for countries to fully benefit from ICT advances while stressing the joint responsibility of all social actors namely business, individuals, and governments.”

Dzidonu (2011:8) goes on to say that, “African countries which have over the years developed and rolled-out various aspects of their national e-government programmes include: Rwanda, Ghana, Nigeria, South Africa, Gambia, Ethiopia, Uganda, Mozambique, Senegal, Mali, Niger, Benin, Tunisia, Egypt, Mauritius, among others.”

Hennessy, Onguko, Harrison, Ang’ondi, Namalefe, Naseem and Wamakote (2010:50) “ Eastern and Southern African coastal states were reported to have been connected to the SEACOM cables which links to India and Europe in mid 2009. A second cable project EASCS (The Eastern Africa Submarine Cable System) which links between Eastern and Southern Africa but does not itself make a connection outside of the continent is expected to be completed during 2010. The greatest connection capacity currently projected will be that of the WACS (West Africa Cable System) project which is envisaged to be completed by 2011 since its availability in 1996, funded by international organizations, for enhancing the ICT infrastructure in Africa. The key projects related to internet access include United Nations Development Programme’s (UNDP) IT for Development, the World Bank’s World Link, and the International Development
Research Centre (IDRC) Acacia Project. Another project aimed at developing internet connectivity and improvement in national ICT capacity in Africa was the Internet Initiative for Africa (IIA) funded by the UNDP. Nevertheless, access to computers and internet remains a challenge for the African region.”

Dzidonu (2011:5) states that, “E-government implementation can bring about a number of benefits if its implementation is well coordinated, managed and resourced. For example, according to evidence from other parts of the world and some African countries …” As rightly noted by Dzidonu (2005), the implementation of e-government initiatives across Africa could result in the following outcomes:-

- improved productivity, and efficient and effective service delivery to the public;
- reduced operational inefficiencies and transactional costs of government’s administrative activities;
- improved governments responsiveness to citizens and businesses;
- Improved accessibility of services by citizens at national, regional and local levels;
- Provision of information and communication infrastructure that support intra and inter agency communication and information exchange; and
- Ease availability and accessibility in the public domain thereby allowing the participation of the citizenry development processes.

Dzidonu (2011:8) says, “A number of African countries implementing e-government initiatives do face a number of challenges including those that possess barriers to the development and roll-out of their government programmes. This is unlike the case of developed countries whose systems are in an advanced stage of development and hence can be described as “e-government ready”, some of these countries currently face a number of e-government development and implementation challenges.” In summary, the challenges faced by developing countries implementing e-government programmes include:
• Lack of enabling institutional frameworks.
• Redundant organizational systems within government Ministries, Departments and Agencies (MDAs).
• The lack of legislative framework to facilitate e-government initiatives.
• The lack of relevant technical and professional human resources critical for supporting the development and roll out of their e-government systems and services.
• Fragmented approaches to the implementation of e-government programmes.
• Inadequate deployment of ICT infrastructure thereby limiting on-line access to the majority of citizens in most sub-Saharan African countries
• Low levels of ICT penetration levels and access within the public sector
• Inability to provide standard e-government front office services (FoSs) to the citizenry.
• Financial and technological resources constraints leading to piece-meal implementation as and when resources are made available by either central government or the development and cooperating partners.

Given the challenges it is not possible for African countries embarking on e-government programmes to implement a roll-out strategy similar to those being followed by the more advanced and e-government-ready nations.

It is imperative to bear in mind that there are barriers and enablers to implementation of technology. Bromme, Hesse, and Spada (2005:194) said of a barrier; “It comes from psychological research on problem solving and creativity. ....it refers to the gap between an initial and end state. In other words, barriers are challenges which have to be overcome in order to attain a goal.”

Ertmer, Ottenbreit, Leftwich and York (2006:207) say that, “For instance, access to hardware, quality software, the Internet, and technical, administrative, and peer support
might be viewed as extrinsic enablers, whereas personal beliefs, previous success with technology, and self efficacy might be viewed as intrinsic enablers”

Dzidonu (2011), Sam and Hoshino (2013) and Hennessy et al (2010) are just giving a helicopter view of the countries that have invested in ICT, the efforts made across Africa to deploy internet and network connection and the impediments and benefits, for example, efficiency, cost reduction and effectiveness which are the focus for the hypotheses in this research.

2.11 Success Stories of e-Registration in Africa

Nigeria boasts of having implemented e-registration ahead of other countries in Africa. The first electronic registration of candidates took place in November 2004 when 1.1 million candidates were registered. 1.2 million candidates were registered electronically for the May /June 2006 examinations. There are numerous benefits to be realized from the implementation of electronic registration. However, before highlighting the advantages and disadvantages there is need to have an appreciation of the general features of an electronic registration system. Adeyegbe (2006:7) outlines the general features of the e-registration system as follows:

a) Generates a unique form number for individual candidates.

b) Validates various personal details such as names (to allow 25 characters only and ensure that numerals are not used) number of subjects selected and image attachment;

c) Registers candidates in batches into schools within their Local Government Areas but randomly assigns private candidates into centres within their areas;

d) Generates examination numbers for candidates;

e) Selects English language and Mathematics by default for all candidates while other subjects are selected by the candidates;

f) Examination Timetable and syllabus are downloadable;
g) Allows viewing and modification of existing details on the e-entry form for specified number of times before uploading;

h) Denies changes to candidate’s picture once attached to e-form;

i) Displays rules and regulations in addition to an attestation which must be accepted/checked to make registration valid;

j) Regulates entry period;

k) Generates reports for monitoring and planning purposes.

2.11.1 Advantages of e-Marking

Moira (2011:1) states that, “The move towards e-marking has meant some large changes to the long established processes and practices for marking national examinations. Each change has been justified with a business plan and, while there are clear benefits to the awarding benefits to the awarding bodies, the benefits to examiners and candidates have not always been quite so obvious.”

2.11.1.1 The Administrative Effect

According to Moira (2010:1), “Without doubt there are some administration drawbacks to the move towards e-marking, but most of these are only short-term drawbacks, due mostly to the novel nature of the task. In order to e-mark, examiners need to have access to a computer and to a reliable broadband internet connection. They have to learn how to use a new interface while maintaining the same high level of marking reliability. They are exposed to new feedback mechanisms and new rules surrounding the marking and they must become accustomed to working exclusive at a computer screen. On the other hand, a number of administrative burdens have been removed. There is no longer the need to accommodate vast numbers of paper scripts or to be available to receive these scripts from postal services. During the marking period, there is no need to post scripts for sample re-marking or to return them to the awarding board at the end of the marking period. This decreases the time in transit which limits the risk of scripts being lost and at a more superficial level, allows for a less cluttered marking
environment. Furthermore, the collection of marks using an e-marking system eliminates most of the clerical errors associated with paper marked scripts.”

2.12 Conceptual Framework

Omona, Weide and Lubeya (2010:89) say, “A conceptual framework defines a structure within the design that is developed and gives a general presentation based on previously established observation stemming from the reviewed literature.”

Scheuermann and Pedro (2009:77) state that, “The purpose of a conceptual framework should be to provide an orientation for any kind of measurement required in the decision making process. A framework serves as a basis for modeling an appropriate assessment approach and the design of methodologies and instruments. It connects to all aspects of empirical inquiry.”

Following review of relevant literature on the topic under study, the researcher came up with the conceptual framework for this study as shown in Figure 2.3 below.
2.13 Chapter Summary

The chapter reviewed relevant literature especially with regards to role of ICT to organizational performance and operational efficiency. The reviewed literature confirmed that ICT immensely contributes to organizational service delivery as it aids both the internal and external business processes. The next chapter focuses of the research approaches adopted in undertaking the study.
CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter gives an overview of research design research, research philosophy, research setting, unit of analysis, population sampling and sampling methods. Research instruments used to data gather the data and ethical considerations are also discussed.

3.1 Review of the Research Philosophy

According to Saunders, Lewis and Thornhill (2009:110) “The research philosophy one adopts has to do with assumptions about the way one views the world. These assumptions will underpin your research strategy and the methods you choose as part of that strategy. As business and management researchers need to be aware of the philosophical commitments we make through our choice of research strategy. This has a significant impact not only on what we do but we understand what it is we are investigating.”

There are numerous research philosophies that guide business research namely positivism, phenomenology, epistemology, realism and interpretivism paradigms. The most commonly used are positivism and phenomenology paradigms. The positivism research paradigm is largely quantitative whilst phenomenology is mainly qualitative in nature.

3.1.1 Positivism

Positivism refers to working on objective observable social reality with end products like generalisations similar to those from physical and natural sciences. The positivist philosophy seeks to provide answers to complex situations. To this extent it is deductive in nature (theory is tested by observation). More so, they normally use quantitative data
and employ controls to allow the testing of hypothesis. It employs highly structured data collection procedures to facilitate replication.

Remenyi et al. (1998:32) say “You will prefer ‘working with an observable social reality and that the end product of such research can be law-like generalizations similar to those produced by the physical and natural scientists.’ It is highly likely that a positivist researcher will use a highly structured methodology in order to facilitate replication (Gill and Johnson, 2002). Furthermore, the approach puts a lot of emphasis on quantifiable observations that can be subjected to statistical analysis.”

According to Silverman (2006), the positivism research philosophy could be criticized for being inflexible and its failure to foster a strong understanding of social processes and the discovery of meanings people attach to social phenomena as well as being weak at understanding social processes.

3.1.2 Phenomenology
This is the converse of positivism. It focuses on meanings people attach, for example, to social reality or phenomena. As such research is mainly concerned with context in which events take place. It uses inductive reasoning implying that one has to first collect or gather data before arriving at possible explanations. Objectivity is hardly possible since the social settings are largely subjective.

According to Gill and Johnson (2002), the advantages of phenomenology include among others, its ability to facilitate understanding of how and why, enable the researcher to be alive to changes that may occur during the research process and the provision of useful information to better understand a social phenomenon. It is limited in the sense that it is generally perceived to be less credible as it is difficult not only to remove research bias but also analyze data collected through phenomenological approaches.
3.1.3 Epistemology
Saunders, Lewis and Thornhill (2009) note that “Epistemology concerns what constitutes acceptable knowledge in a field of study. A resource researcher may place more value and authority on the data collected arguing that resources have a separate existence to that of the researcher so the data collected are far less open to bias and more ‘objective’. According to a resource researcher reality is represented by objects that are considered to be ‘real’, such as computers and trucks, .... On the other hand a resource researcher would view the objects studied by the ‘feelings’ researcher as social phenomenon which have no external reality and therefore cannot be measured and modified.”

3.1.4 Realism
Sobh and Perry (2005:1198) state that, “Realism is an increasingly useful worldview for some social scientists.....Its philosophical view is that reality exists independently of the researcher’s mind, that is, there is an external reality. This external reality consists of abstract things that are born of people’s minds but exist independently of any one person, it is largely autonomous, though created by us. A person’s perceptions are a window onto that blurry, external reality. Realism refers to this external reality as consisting of structures that are themselves sets of interrelated objects, and of mechanisms through which these objects interact. Thus realism research is searching towards an understanding of the common reality of an economic system in which many people operate inter-dependently. That is, realists believe that there is a “real” world “out there” to discover. However, that real external world is only imperfectly and probabilistically apprehensible. Realists acknowledge differences between the real world and their particular view of it and try to construct various views of this reality in terms of which ones are relative in time and space.
3.1.5 Interpretivism

According to Mack (2010:7), “The interpretivist paradigm can also be called the “anti positivist” paradigm because it was developed as a reaction to positivism. It is also sometimes referred to as constructivism because it emphasizes the ability of the individual to construct meaning. The interpretivist paradigm was heavily influenced by hermeneutics and phenomenology. Hermeneutics is the study of meaning and interpretation in historical texts. This meaning-making cyclical process is the basis on which the interpretivist paradigm was established…Interpretivism’s main tenet is that research can never be objectively observed for the outside rather it must be observed from inside through the direct experience of the people…Therefore, the role of the scientist in the interpretivist paradigm is to “understand, explain, and demystify social reality through the eyes of different participants. Researchers in this paradigm seek to understand rather than explain.”

3.2 Research Setting

The questionnaire survey was conducted in Harare and the ZIMSEC management and staff at Head Office served as respondents. The study could not be extended to cover ZIMSEC regional offices due to time and resource constraints on the part of the researcher.

3.3 Unit of Analysis

According to Babbie (2005:95) unit of analysis is “what or who is being studied”. The unit of analysis could be either people, groups or organizations being studied as rightly suggested by Babbie (2005). In this research the units of analysis were ZIMSEC management and staff.
3.4 Population Sampling

Babbie (2005) describes a population as the study group from whom the researcher wants to draw conclusions and population sample as the unit of the population from whom a researcher wants to draw conclusions for a defined purpose.

Sampling is the process of selecting units from a population of interest so that by studying the sample we generalize our results back to the population from which they were chosen (Trochin, 2006). The study population comprised top and middle management as well as staff from the ZIMSEC Head Office in Harare.

3.4.1 Study Population

Sekeran, (2001) describes the study population as the entire group of people or things that the researcher wishes to investigate. Saunders also describes a population as a full set of cases from which a sample is taken. The research was conducted in Harare and involved the ZIMSEC Head Office management and staff from all departments, namely, Finance, Human Resources, Operations, Examination Administration, Information and Services, Test Development and Research and Development.

The study population was ZIMSEC employees comprising both management and staff. According to ZIMSEC records, as at March 2013 the institution had an establishment of 379 employees of which 299 were in post and the remaining 80 vacant. The ZIMSEC Head Office in Harare has a total of 195 employees in post which translate 65% of its employee base. As such, views from sampled management and staff at Head Office were assumed to be closer representative of the obtaining situation to the research problem.

Top and middle management were chosen on the account of their assumed knowledge and contribution to policy formulation and strategic decision. Staff as operatives who serve in the frontline of the organization were considered critical to serve as respondents because they use available ICT systems thus were assumed informed of
readiness of ZIMSEC to transform into an ICT driven organization for enhance organizational performance and operational efficiency.

### 3.4.2 Sample Size

Choosing a sample size is important if the study has to produce statistically significant results. This can be achieved by ensuring that the selected sample size is as representative as possible of the study population or sample frame. However, research budget and time constraints have to be taken into account in coming up with the sample size.

In this research, a sample of 100 employees was drawn from 195 in post at ZIMSEC Head Office whose breakdown is given below in Table 3.1.

**Table 3.1: Breakdown of ZIMSEC Respondents**

<table>
<thead>
<tr>
<th>Level</th>
<th>Targeted Number of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Management</td>
<td>3</td>
</tr>
<tr>
<td>Middle Management</td>
<td>20</td>
</tr>
<tr>
<td>Staff</td>
<td>77</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

### 3.4.3 Sampling Method

There are different sampling methods or techniques that may be used when undertaking a research. The two broad categories of sampling are probability and non-probability sampling.

Rubin (2011) defines probability sampling as a random sampling technique where every unit within a population has an equal chance of selection. Weiberg (2005) agrees with
Rubin (2011) when he describes non-probability sampling as a sampling method in which the participants are not randomly selected.

Zikmund and Babin (2007) distinguished probability and non-probability sampling by describing the former as a sampling technique in which every member of the population has a known probability of selection and the latter as a sampling technique in which units of the sample are selected on the basis of personal judgment or convenience. According to Fink (2009) and Fowler (2009), the four basic types of probability sampling are simple random, stratified random, systematic and cluster sampling. Other probability methods are purposive, quota and snowball sampling whilst non-probability sampling techniques among others, are convenience, judgment and quota sampling.

Selection of the sampling technique is determined by several factors including the characteristic features of the population frame and set study objectives. In this research, a single sampling method was used, that is, purposive sampling, to gather data through administration of questionnaires among respondents who were ZIMSEC management and staff.

3.4.3.1 Purposive Sampling
According to Fisher (2004), purposive sampling is used where a researcher intends to obtain access to or from respondents whom he or she thinks is appropriate to the study. In the research, ZIMSEC’s top and middle management as well as staff were deemed appropriate under the circumstances to the research problem.

3.5 Research Instruments
The research was undertaken using primary and secondary sources of data. Under primary data sources, largely quantitative research methods were used to gather the required primary data through the use of questionnaires. Secondary sources were used to gather data. The questionnaires were administered with the assistance of ZIMSEC’s Human Resources Department.
According to Zikmund and Babin, (2007), the researcher needs to take into account, among other considerations, interview cost, informants’ cooperation and incentives to respond. However, other scholars have discouraged incentives on the basis that it may result in reliability of the research being threatened by respondent bias.

Cavana, Delahaye, and Sekaran (2001) submit that a questionnaire survey may be carried out using a number of methods, including face to face, telephone and self administered means.

3.5.1 Questionnaire Survey

Questionnaires were used to gather data from the ZIMSEC management and staff at Head Office in Harare. According to Wegner (1995), a questionnaire is the data collection instrument used to gather data. Wegner (1995) goes further to say that design of a questionnaire is paramount if the researcher has to generate relevant questions and extract data appropriate for the subject under study.

Walliman (2006) asserts that the questionnaire is an instrument comprised of a series of questions that are completed by the respondents. It may be hand delivered or mailed to the respondents. In the study the researcher made use of the structured questionnaire to collect data. All but one set of questions in the questionnaires were closed-ended, meaning the respondents were allowed a limited number of responses hence there was limited room for the respondents to give their own answers as would have been the case had there been provision for open-ended questions (refer Appendix III).

The main advantage of the administered structured questionnaire was that it was relatively easy and inexpensive to administer. Through the use of questionnaire the researcher was able to save time. It also enabled the researcher to organise the questions and receive replies without necessarily engaging all the respondents. As such, the researcher found the method relatively cheap and quick to administer.
No research assistants were used in the survey as the administration of the questionnaire amongst ZIMSEC management and staff was coordinated through the Human Resources Department. The management and staff were randomly selected and asked to fill in the questionnaires by with the assistance of the Human Resources. Effort was made to ensure that respondents were drawn from the different ZIMSEC departments. Consideration was also made to ensure that a fair representation of female and male members of the ZIMSEC employee base at the Head Office participated in the survey.

Management was selected to participate in the survey because of its knowledge of strategic issues affecting ZIMSEC. As such their participation enabled the researcher to reflect on the current policies, systems and procedures and how these could be improved. The staff were involved because as operatives they would arguably be more informed especially in terms the shortcomings of the ZIMSEC’ information technology system and could suggest areas needing improvement.

The major weakness of a structured questionnaire according to Walliman (2006) is that it can only be used when covering a small geographical area and may be costly with regards to finance, labour and time. In the survey, the use of the questionnaire method posed the following challenges to the researcher: -

- Quality control was at times difficult to enforce
- Subject to respondent interpretation and/or bias

The above challenges were overcome through a number of strategies employed by the researcher. These were:-

- Pilot testing of the questionnaire.
- Prior briefing of the Human Resources Manager who coordinated the questionnaire administration.
3.5.1.1 Structure of the Questionnaire

The questionnaire was in six sections, section A (general information) and sections B-F (information sought). By and large, sections B-F constituted the body of the research as they addressed the overall research objectives, whilst section A covered general aspects, including demographic characteristics of the respondents as shown below.

A. Respondents’ Profile

The section was used to profile the general characteristics of the respondents including gender, level within ZIMSEC and length of service.

B. Existing Information and Communication Technologies at ZIMSEC

The section enabled the researcher to establish the state of affairs in terms of types of ICT, readiness to embrace ICTs and prioritization of ICT at ZIMSEC.

C. Impact of Information Technology on Management and Staff Performance

This section comprises questions relevant to and consistent with the research objective number four.

D. Impact of Information Technology on Service Efficiency

The section was meant to extract information relevant to research objectives number two and three.

E. Problems Encountered by ZIMSEC in Harnessing ICT

This was meant to gather information relevant to research.

F. Possible Interventions to Transform ZIMSEC into an ICT Driven Organization

This section was meant to extract information pertaining to measures that could be taken to enable ZIMSEC to full embrace ICT for enhance organizational performance and operational efficiency.
The questionnaire was structured in a manner that would enable the researcher to extract information relevant to the study. The hypotheses which were tested in the study were as follows:

H1: The harnessing of ICT has a positive effect on service quality.
H2: The harnessing of ICT has a positive effect on economy (transaction costs).
H3: The harnessing of ICT has a positive effect on service efficiency.
H4: The harnessing of ICT has a positive effect on effectiveness.

3.5.2 Secondary Data

Wegner (1995) rightly cites that secondary data are data that already existing within or without the organization. The major disadvantage of secondary sources of data is that the data may not be relevant the problem under study. In this study, major secondary sources of data used included records, reports, text books, journals and articles.

3.6 Triangulation

Denscombe (2010:346) cites triangulation “involves the practice of viewing things from more than one perspective.” Denscombe proceeds to cite that triangulation is important as it assists the researcher to achieve accuracy and a picture square appreciation of research data and findings. Thus in other words triangulation is a way of assuring the validity of research results and is aimed at overcoming the weaknesses and biases which can arise from the research.

The different forms of triangulation according to Denscombe (2010:346-348) are:

- Methodological triangulation (between methods)
- Methodological triangulation (within-methods)
- Data triangulation (use of contrasting sources of information)
- Investigator triangulation (use of different researchers)
• Theory triangulation (theoretical position in relation to data)

Whilst triangulation has advantages it also has limitations. Holtzhausen (2001) suggest that triangulation has certain limitations chief of which are:

• The findings are not projectable in a statistical sense. However, the use of qualitative research may overcome this by providing insight into the underlying issues most pertinent to the population under study.
• Constraints especially time and costs may prevent effective use of triangulation as an alternative research approach.

3.7 Data Validity and Reliability

The researcher was conscious of the need to promote the reliability and validity of the research findings. More often than not data validity is questioned based on research approaches and techniques employed including the sampling and data collection methods used in undertaking the research. To this end data validity and reliability are critical to informed decision making hence the need to ensure that research approaches minimize or remove potential inconsistencies (real or perceived).

Reducing the possibility of getting wrong answers means that attention has to be paid to two particular emphasis on research design: validity and reliability. Saunders et. al, (2003) submit that validity is concerned about whether the findings are really what they appear to be whilst reliability relates to the consistency of a set of measurements or of a measuring instrument.

3.7.1 Data Validity

Different forms of validity include criterion, construction and content validity (Carmus and Zeller, 1979). Babbie (2005) submits that validity refers to the degree to which an
empirical measure adequately reflects the real meaning of the concept under consideration.

Babbie (2010) and Rubin and Babbie (2011) submit that validity refers the results that accurately reflect the concept being measured. As such, validity arguably dwells on how accurate the research findings are in representing or portraying the situation or real meaning of the issue or concept being studied.

Cavana, Delahaye, and Sekaran (2001) suggest that the validity of measuring instrument is done by looking at validity tests, including face validity, content validity, criterion validity and construct validity.

Validity can be threatened by using inaccurate or incomplete data and misinterpretations of data. In this study, data validity was enhanced through pilot testing of the questionnaires. This enabled the researcher to revisit the questionnaire and ensure that questions are simplified for better understanding by the informants. Revisiting also enabled the researcher to remove ambiguity, thereby ensuring that the information that is eventually collected is the desired information which is in line with the research objective. Validity was also enhanced by taking the research assistants through the questionnaire and ensuring that, where necessary, questions were fully explained to them

3.7.2 Data Reliability

Rubin and Babbie (2011) assert that reliability is a measure of establishing whether a particular technique, if applied repeatedly to the same object under the same conditions would yield the same results. In other words, reliability refers to the consistency of getting the same results under the same conditions. This is confirmed by Morrow, Jackson, Disch and Mood (2010), who say reliability is the degree to which repeated measurement of the same trait under the same conditions yields same results. Reliability also deals with the credibility of the research findings.
Cavana, Delahaye, and Sekaran (2001) suggest that reliability of measure indicates the extent to which the measure is without bias. Babbie (2005) expresses that reliability is a fundamental issue in social research and deals with whether a particular technique, applied repeatedly to same object, will yield same result each time. Reliability may be affected by a number of factors, including sampling errors, researcher and respondent biases.

In this research, reliability was enhanced through pretesting of questionnaires and detailed briefing and of the Human Resources personnel who assisted in the administration of the questionnaire. In addition, respondents triangulation and secondary sources of data were employed to validity of data.

3.8 Ethical Considerations

According to Collis and Hussey (2003), it is easy to think of ethics being important in the natural science, such as medicine, but even in the social sciences, it is difficult to conduct research without running into ethical arguments. The foregoing points to the view that ethical considerations are critical, hence the need to embrace them when undertaking any research work.

Zikmund and Babin (2007) and Babbie (2005) concur that the rights and obligations of researcher, subjects/participants and clients must be observed in any form of research. More critically to the participants is the need for informed consent (individual is made to understand what the researcher wants him/her to do and consents to the research study) and safeguard anonymity and confidentiality (information involved in research will not be shared with others), the right to be informed, as well as right to privacy, protection from harm, objectivity, misrepresentation, deception and/or dissemination of faulty conclusions.

The researcher endeavoured to follow ethical guidelines by ensuring that confidentiality and anonymity of participants was maintained throughout the study process. In addition,
the participants were not requested to disclose their identity during the data collection stage.

Other measures employed by the researcher to safeguard ethical research principles and ensure that the rights of the research participants/informants were not violated were as follows: -

- The research sought permission from ZIMSEC to undertake the research (see Appendix I and II).

- Respondents were not given incentives to guarantee their involvement in the research.

3.9 Research Limitations

The following were encountered during the course of the study that may render some of the accuracy of some of the findings questionable: -

- Due to time and financial resource constraints the research was limited in scope as the sample was drawn from ZIMSEC Head Office in Harare. As such, management and staff from regional offices could not be involved in the survey.

- ZIMSEC’s major clients, for example, schools, students and parents were not included in the sample.

Equally, critical stakeholders like the Ministry of Education, Sport, Arts and Culture, research and tertiary institutions, suppliers and the development and cooperating partners, for example, the United Nations International Children Education Fund (UNICEF) were not drawn in the sample to give their opinions on how they perceived the extent to which ZIMSEC has embraced ICT to enhance its service delivery over the study period. Opinions from the cited institutions and groups of other potential
informants could have broadened the sample size and helped the researcher in validating claims and opinions from a limited and small sample drawn from ZIMSEC’s Head Office.

3.10 Data Analysis and Presentation
In the study, the researcher was aided to analyze data from the survey through use of the Statistical Package for Social Sciences (SPSS). Presentation of research findings in the form of tables, graphs and charts was made possible through the use of the Microsoft Excel spreadsheet.

3.11 Chapter Summary
The chapter discussed the research philosophies or theoretical underpinnings, sampling methods, sample size, research instruments, data validity and reliability and research limitations. The adopted research approach was quantitative research method.

The next chapter (Chapter Four) analyses and presents findings of the study.
CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.0 Introduction

The chapter gives an outline of the research findings. The presentation, analysis and interpretation of the research results are also covered in this chapter. The research topic read as follows: An assessment of the extent to which the Zimbabwe Schools Examination Council has embraced technology to enhance performance: (January 2009 to June 2013).

The specific research objectives were:

a. To identify the information and communication technologies in the Zimbabwe School Examinations Council over the period covered by the study.
b. To assess the impact of information technology on service quality.
c. To assess the impact of information technology on economy.
d. To assess the impact of information technology on efficiency.
e. To assess the impact of information technology on effectiveness.
f. To make any necessary recommendations in light of the study findings.

The research hypotheses were:

H1: The harnessing of ICT has a positive effect on service quality.
H2: The harnessing of ICT has a positive effect on economy (transaction costs).
H3: The harnessing of ICT has a positive effect on service efficiency.
H4: The harnessing of ICT has a positive effect on effectiveness.
4.1 Overall Response Rate
The researcher was helped to administer the questionnaire across the three categories by the Human Resources Manager. A total of 100 questionnaires were administered at ZIMSEC Head Office in Harare with key informants being in three broad categories namely top management, middle management, and staff. The response rate for the questionnaire survey was 72% as shown in the Table 4.1 below. This was a very good response rate and is in line with Michalos and Poff (2012:201) who say, “For most studies, Babbie (1986) advised that a response rate of at least 50% is adequate for analysis and reporting, a response rate of 60% is good, and 70% or more is very good.”

Table 4.1: Overall Response Rate

<table>
<thead>
<tr>
<th>Level with ZIMSEC</th>
<th>Administered Questionnaires</th>
<th>Returned Questionnaires</th>
<th>Response Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Management</td>
<td>3</td>
<td>2</td>
<td>66.7%</td>
</tr>
<tr>
<td>Middle Management</td>
<td>20</td>
<td>13</td>
<td>65.0%</td>
</tr>
<tr>
<td>Staff</td>
<td>77</td>
<td>57</td>
<td>74.0%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>72</td>
<td>72.0%</td>
</tr>
</tbody>
</table>

4.2 Research Findings and Analysis

The questionnaire was structured into six sections, A to F. Information sought from Sections A-F were the respondents’ profiles, the ICTs in use, impact of the harnessing of ICTs on management and staff performance, problems and challenges for harnessing ICTs and possible interventions for enhanced harnessing of ICTs at ZIMSEC respectively (see Appendix III). By and large, Section A-F where structured taking into account research problem, research objectives and/or research questions.
4.2.1 Respondents Profiling

4.2.1.1 Distribution of Respondents by Level within ZIMSEC Structure

The informants were drawn from three levels at ZIMSEC Head Office namely, top management (2.8%), middle management (13%) and staff (79.2%) (refer Figure 4.1 below).

![Bar chart showing distribution of respondents by level within ZIMSEC](image)

<table>
<thead>
<tr>
<th>Level</th>
<th>Percent</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Management</td>
<td>2.8</td>
<td>2</td>
</tr>
<tr>
<td>Middle Management</td>
<td>13.0</td>
<td>13</td>
</tr>
<tr>
<td>Staff</td>
<td>79.2</td>
<td>57</td>
</tr>
</tbody>
</table>

Figure 4.1: Distribution of Respondents by Level Within ZIMSEC

4.2.1.2 Distribution of Respondents by Departments

The respondents were drawn from ZIMSEC’s eight departments and/units namely finance, examinations administration, human resources, marketing, operations, information services, test development and research and development. The examinations administration (37.5%), human resources (18.1%), finance (15.3%) and information services (12.5%) accounted for the greater proportion of informants of more than 10% each (see Figure 4.2).
4.2.1.3 Distribution of Respondents by Gender

As shown in Figure 4.3 below 33% of the respondents were female while 67% were male.

![Figure 4.3: Distribution of Respondents by Gender](image)

4.2.1.4 Distribution of Respondents by Length of Service

According to the SPSS and Microsoft Excel outputs, all the 72 respondents who participated in the survey where from ZIMSEC Head Office. Those under 1 year of service accounted for 11.1%, 1 year to 3 years (20.8%), over 3 years to 5 years and over 5 years to 10 years (16.7% respectively), and over 10 years (34.7%) as shown in Table 4.2 below.
Table 4.2: Distribution of Respondents by Length of Service

<table>
<thead>
<tr>
<th>Length of Service</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 1 Year</td>
<td>8</td>
<td>11.1</td>
</tr>
<tr>
<td>1-3 Years</td>
<td>15</td>
<td>20.8</td>
</tr>
<tr>
<td>Over 3-5 Years</td>
<td>12</td>
<td>16.7</td>
</tr>
<tr>
<td>Over 5 Years-10 Years</td>
<td>12</td>
<td>16.7</td>
</tr>
<tr>
<td>Over 10 Years</td>
<td>25</td>
<td>34.7</td>
</tr>
<tr>
<td>Total</td>
<td>72</td>
<td>100.0</td>
</tr>
</tbody>
</table>

4.2.2 Existing Information and Communication Technologies at ZIMSEC

In order to get an appreciation of ICTs in use at ZIMSEC respondents were asked to provide details pertaining to the current situation. The information sought included the existing information management systems, extent of readiness to embrace ICT, prioritization of ICT, networks, communication systems with clients and forms of Enterprise Resource Planning (ERP) used across the departments. Findings on ICTs in use at ZIMSEC are shown and discussed below.

4.2.2.1 Perception of Existing Information Management System in Use at ZIMSEC

The greater percentage of the respondents (54.2%) felt that ZIMSEC uses a combination of manual and computerized information management systems in its business processes whilst 29.2% and 16.7% felt that ZIMSEC’s business processes are computerized and manual respectively (Figure 4.4 refers). The divergent views on the type of information systems could be attributed to the varied nature of work of informants, for example, those from IT and registry.
The above finding points to the need for ZIMSEC to do more than just investing in ICTs. As rightly confirmed by Haag and Cummings (2010) having technology for the sake of technology is not the only answer to an organization that seeks to improve its performance. Organizations need to go beyond simply investing in ICT by ensuring that they deploy the right technology that best meet their business processes. Arguably, organizations would also need to ensure that management and staff have the requisite ICT skills to aid utilization of the ICT for efficient and effective service delivery.

4.2.2.2 Perception of the Readiness of ZIMSEC to Transform into ICT Driven Organization

Pertaining to readiness of ZIMSEC to transform itself into an ICT driven organization, 11.1% of the respondents rated the degree of readiness low on a scale low through to high. The greater percentage (66.7%) of the respondents rated ZIMSEC ICT readiness medium whilst the balance of 22.2% rated the readiness high (see Table 4.3 below). Overall, 78.8% of informants who rated ZIMSEC ICT readiness medium and low meaning there is room for ZIMSEC to enhance its business processes through the harnessing of ICT.
Table 4.3: Perception of ZIMSEC's Readiness to Transform into an ICT Driven Organization

<table>
<thead>
<tr>
<th>Rating</th>
<th>Frequency</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>16</td>
<td>22.2</td>
</tr>
<tr>
<td>Medium</td>
<td>48</td>
<td>66.7</td>
</tr>
<tr>
<td>Low</td>
<td>8</td>
<td>11.1</td>
</tr>
<tr>
<td>Total</td>
<td>72</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The perception that ZIMSEC has not fully transformed into an ICT driven organization was maintained even after the distribution of respondents by level within ZIMSEC was crosstabulated ICT driven readiness as shown in Table 4.4 below. The cross tabulation reflected that most of the respondents felt that ZIMSEC is not quite ready as up to 78% rated the ICT readiness from medium to low.

Meanwhile, the tests for association indicate the p-value $P = 0.506$ (or 50.6%) for the Pearson Chi-Square test as shown in Table 4.5 below. This informs that there is no statistically significant association between respondents' level within ZIMSEC and their perception of its readiness to transform into an ICT driven organization. Thus, all levels adjudged ZIMSEC not quite ready to move towards being ICT driven in its business processes. A very small p-value of closer to 0% would be required to show a significant association.

Table 4.4: Distribution of Respondents by Level within ZIMSEC vs ICT Readiness Cross Tabulation

<table>
<thead>
<tr>
<th>ICT Readiness</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level within ZIMSEC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top Management</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Middle Management</td>
<td>3</td>
<td>7</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>Staff</td>
<td>13</td>
<td>39</td>
<td>5</td>
<td>57</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>48</td>
<td>8</td>
<td>72</td>
</tr>
</tbody>
</table>

71
Table 4.5: Chi-Square Tests

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>3.316</td>
<td>4</td>
<td>.506</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>3.581</td>
<td>4</td>
<td>.466</td>
</tr>
<tr>
<td>Linear-by-Linear</td>
<td>.645</td>
<td>1</td>
<td>.422</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td></td>
<td>72</td>
<td></td>
</tr>
</tbody>
</table>

a. 5 cells (55.6%) have expected count less than 5. The minimum expected count is .22.

Equally, when the distribution of respondents by departments was cross tabulated with the ICT readiness the perception that ZIMSEC was not quite ready was maintained as shown in Table 4.6 below. The tests for association indicate the p-value $P = 0.545$ or 54.5% for the Pearson Chi-Square test for association according to Table 4.7 and the SPSS output. This also shows us that there is no statistically significant association between respondents’ departments and their perception of ZIMSEC’s readiness to embrace ICT.

Table 4.6: Distribution of Respondents by Department vs ICT Readiness

<table>
<thead>
<tr>
<th>Department</th>
<th>ICT Readiness</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>Finance</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Exams Administration</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td>Human Resources</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Marketing</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Operations</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Information Services</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Test Development</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>R &amp; D</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>48</td>
</tr>
</tbody>
</table>
Table 4.7: Chi-Square Tests 2

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>12.767*</td>
<td>14</td>
<td>.545</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>15.356</td>
<td>14</td>
<td>.354</td>
</tr>
<tr>
<td>Linear-by-Linear</td>
<td>.725</td>
<td>1</td>
<td>.394</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>72</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The extent to which ZIMSEC was ready to embrace ICT was considered when the length of service with ZIMSEC was cross tabulated with ICT readiness. The respondents maintained the perception that ZIMSEC was not quite ready to embrace ICT at the time of the study regardless of respondents’ length of service within the organization. The tests for association indicate the p-value $P = 0.525$ or 52.5% for the Pearson Chi-Square test for association according to Table 4.8. The SPSS output thus shows that there is no statistically significant association between the length of service and the respondents’ perception of ZIMSEC’s ICT readiness.

Table 4.8: Distribution of Respondents by Length of Service vs ICT Readiness Cross Tabulation

<table>
<thead>
<tr>
<th>Length of Service</th>
<th>ICT readiness</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>Under 1 Year</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>1-3 Years</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Over 3-5 Years</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Over 5 Years-10 Years</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Over 10 Years</td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>48</td>
</tr>
</tbody>
</table>
### Table 4.9: Chi-Square Tests 3

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>7.110</td>
<td>8</td>
<td>.525</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>7.096</td>
<td>8</td>
<td>.526</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>1.204</td>
<td>1</td>
<td>.273</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>72</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*a. 9 cells (60.0%) have expected count less than 5. The minimum expected count is .89.*

#### 4.2.2.3 Perception of the Prioritization of ICT at ZIMSEC

The perception that ZIMSEC has not fully prioritized was confirmed after the distribution of respondents by level within ZIMSEC was cross tabulated ICT prioritization as shown in Table 4.10 below. The cross tabulation suggest that most of the respondents felt that ZIMSEC has not quite prioritized ICT because slightly more than half of the informants rated ICT prioritization as fairly and lowly prioritized.

Meanwhile, the tests for association indicate the p-value $P = 0.601$ (or 60.1%) for the Pearson Chi-Square test as shown in Table 4.11 below. This suggests that there is no statistically significant association between respondents' level within ZIMSEC and their perception of prioritization of ICT with ZIMSEC.

### Table 4.10: Distribution of Respondents by Level within ZIMSEC vs ICT Prioritization Cross Tabulation

<table>
<thead>
<tr>
<th>Level within ZIMSEC</th>
<th>ICT Prioritation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Highly prioritized</td>
<td>Prioritized</td>
</tr>
<tr>
<td>Top Management</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Middle Management</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Staff</td>
<td>7</td>
<td>18</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9</strong></td>
<td><strong>22</strong></td>
</tr>
</tbody>
</table>
Table 4.11: Chi-Square Tests 4

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>6.412²</td>
<td>8</td>
<td>.601</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>6.740</td>
<td>8</td>
<td>.565</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>.100</td>
<td>1</td>
<td>.751</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>72</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. 10 cells (66.7%) have expected count less than 5. The minimum expected count is .11.

When the distribution of respondents by departments was cross tabulated with ICT prioritization the perception that ZIMSEC did not quite prioritize ICT at the time of the study was maintained as shown in Table 4.12 below. The tests for association indicate the p-value \( P = 0.728 \) or 72.8% for the Pearson Chi-Square test for association according to Table 4.13 and the SPSS output. This also shows us that there is no statistically significant association between respondents’ departments and their perception of ZIMSEC’s prioritization of ICT.

Table 4.12: Distribution of Respondents by Department vs ICT Prioritization

<table>
<thead>
<tr>
<th>Department</th>
<th>Highly prioritized</th>
<th>Prioritized</th>
<th>Fairly prioritized</th>
<th>Lowly prioritized</th>
<th>Not sure</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finance</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>Exams</td>
<td>2</td>
<td>8</td>
<td>10</td>
<td>4</td>
<td>3</td>
<td>27</td>
</tr>
<tr>
<td>Administration</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>Human Resources</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Marketing</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Operations</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Information Services</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Test Development</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>R &amp; D</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9</strong></td>
<td><strong>22</strong></td>
<td><strong>29</strong></td>
<td><strong>8</strong></td>
<td><strong>4</strong></td>
<td><strong>72</strong></td>
</tr>
</tbody>
</table>

75
Table 4.13: Chi-Square Tests 5

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>23.105*</td>
<td>28</td>
<td>.728</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>23.205</td>
<td>28</td>
<td>.723</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>.252</td>
<td>1</td>
<td>.616</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>72</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. 37 cells (92.5%) have expected count less than 5. The minimum expected count is .06.

The extent to which ICT was being prioritized was also considered when the length of service with ZIMSEC was crosstabulated with ICT prioritization. The cross tabulation maintained the perception that ZIMSEC did not quite prioritize ICT at the time of the study regardless of respondents’ length of service within the organization. The tests for association indicate the p-value $P = 0.094$ or 9.4% for the Pearson Chi-Square test for association according to Table 4.14. Thus, SPSS output shows that there is no statistically significant association between the length of service and the respondents’ perception of ZIMSEC’s prioritization of ICT.

Table 4.14: Distribution of Respondents by Length of Service vs ICT Prioritization Cross Tabulation

<table>
<thead>
<tr>
<th>Length of Service</th>
<th>ICT Prioritization</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Highly prioritized</td>
<td>Prioritized</td>
</tr>
<tr>
<td>Under 1 Year</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>1-3 Years</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Over 3-5 Years</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Over 5 Years-10</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 10 Years</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>9</td>
<td>22</td>
</tr>
</tbody>
</table>
Table 4.15: Chi-Square Tests 6

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>23.807a</td>
<td>16</td>
<td>.094</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>27.806</td>
<td>16</td>
<td>.033</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>2.814</td>
<td>1</td>
<td>.093</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>72</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. 22 cells (88.0%) have expected count less than 5. The minimum expected count is .44.

4.2.2.4 Perception of the Contribution of ICT to Enhanced Organizational Performance

Concerning contribution of ICT to organizational performance, the greater number of respondents on a scale very important to unimportant indicated that ICT is very important in aiding service quality, customer relationship management, organizational performance tracking, knowledge management, organizational learning and growth and innovation and change as shown in Table 4.16 below.

The above is in line with Castel and Gorriz (2012) who advanced the view that deployment of ICT has benefits for a wide range of business processes to firms including enhanced information and knowledge management resulting in better performance as measured by operational efficiency, external communication and B2B relationship management.
Table 4.16: Perception of the Contribution of ICT to Enhanced Organizational Performance

<table>
<thead>
<tr>
<th>Factor</th>
<th>Very Important</th>
<th>Important</th>
<th>Somewhat Important</th>
<th>Not Very Important</th>
<th>Unimportant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service quality</td>
<td>57</td>
<td>31</td>
<td>11</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Customer relationship</td>
<td>40</td>
<td>43</td>
<td>13</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B2B relationship management</td>
<td>25</td>
<td>57</td>
<td>13</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Business processes</td>
<td>22</td>
<td>53</td>
<td>15</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>enhancement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transaction costs</td>
<td>28</td>
<td>39</td>
<td>21</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>reduction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizational performance</td>
<td>33</td>
<td>29</td>
<td>25</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>tracking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge management</td>
<td>29</td>
<td>53</td>
<td>11</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Organizational learning and</td>
<td>29</td>
<td>48</td>
<td>18</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>growth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovation and Change</td>
<td>28</td>
<td>50</td>
<td>15</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

The above points to the need for ZIMSEC to prioritize ICT especially in its endeavour to deliver services to perceived clients who according to the research were among others, parents, students and schools (refer Figure 4.5 below).
4.2.2.5 Rating of Networks Currently in Use at ZIMSEC

Figure 4.6 below shows that 63.9% of the respondents suggested they predominantly operate a Local Area Network (LAN) at ZIMSEC whilst 23.6% felt ZIMSEC operate on a Wide Area Network (WAN) whilst 12.5% expressed that ZIMSEC operates on a combination of LAN and WAN. The findings suggested the need for ZIMSEC to embrace and implement a WAN to enhance communication between departments at head office and in regions.
4.2.2.6 Perceived Means of Communication with Internal and External Clients

The findings reveal that ZIMSEC uses an array of means to communicate with internal clients who predominantly are employees from the various departments. According to the research, 31.9% of the respondents expressed that fixed and mobile telecommunication was the commonly used means for communicating with internal clients. Meanwhile, 30.6%, 16.7% and 11.1% of the respondents indicated that email, social media and the ZIMSEC website respectively where commonly used when communicating internally (see Figure 4.7).
With respect to communication with external clients, 29.2% of the informants felt that the predominant means for communicating with external clients is the website, followed print media (27.8%), fixed and mobile communication (23.6%), email (12.5%), Television and Radio (5.6%) and other 1.4%. (Figure 4.8 refers).

Other means for communicating with both internal and external clients according to the research include memos and courier services. Internally, there is scope for increasing use of social media and externally ZIMSEC could increase communication with external clients through the aid of email.
4.2.2.7 Enterprise Resource Planning Systems Currently Being Used by ZIMSEC

In terms of Enterprise Resource Planning (ERP) systems applicable at ZIMSEC, the predominant system in use at during the period of the survey was Oracle (88%), followed by Microsoft NAV (7%), Pastel (4%) and other (1%), (refer Figure 4.9 below).

Figure 4.9: Perceived ERP in use at ZIMSEC

In order to improve the business processes which ride on the existing ERP systems, 47.2% informants expressed the need upgrade the existing, 37.5% suggested the need for integrating the existing systems, 11.1% noted the need to link systems with mobile applications whilst the balance of 4.2% suggested the need to invest in other systems completely, for example SAP (refer Figure 4.10 below).

Figure 4.10: Means for Enhancing Existing ERP Systems at ZIMSEC
4.2.3 Impact of Information Technology on Management and Staff Performance

In this section informants were asked of their perception of the appreciation of IT skills. Respondents were also asked to rate on Likert Scale the effect of ICT on ZIMSEC management and staff performance. The results on pertaining to the perceived staff IT appreciation and impact of ITC on management and staff performance are shown below.

4.2.3.1 Staff Appreciation of the Application of IT in ZIMSEC’s Business Processes

As shown in Figure 4.11 below 79% of the respondents indicated that they had the requisite ICT appreciation and the remaining 21% indicated that they did not have the necessary ICT skills. With 21% of informants expressing the lack of requisite ICT for application in business processes, the need for capacity building if ZIMSEC has to be an ICT driven organization should not be overemphasized.

![Figure 4.11: Staff Appreciation of ICT Skills](image)

4.2.3.2 Perception of the Application of IT in ZIMSEC’s Business Processes

On a scale strongly agree to disagree, a total of 60% of the informants agreed that ZIMSEC has to date embraced the necessary ICT to enhance its business processes, 23% somewhat agreed, 14% strongly agreed and the remaining 3% disagreed as shown in Figure 4.12 below.
The picture painted above scenario is however contrary to opinions expressed by the respondents when they were asked to rate the effect of enhancing ZIMSEC’s ICT to organizational performance and operational efficiency in item 4.2.4.2 below. The views expressed by respondents point to the need for further improvements and investments in ICT. This gives the impression that ZIMSEC’s ICT in its current form has constraints in aiding the organization to optimize its organizational performance and operational efficiency as measured in factor including service quality, business process enhancement, reduction of transaction costs and innovation and change among other factors hence the need for increased expenditure on ICT. As put across by Laudon and Laudon (2010) service industries cannot operate without information systems as they anchor business in the 21st Century. Baltzan and Phillips (2009) caution organizations to regularly measure the payoff of ICT investments especially their impact on business performance and the overall business value gained and not just to spend large sums on ICT.
4.2.4 Impact of Information Technology on Service Efficiency

4.2.4.1 Perception of the Effect of Harnessing ICT to ZIMSEC’s Organizational Performance and Operational Efficiency

The greater proportion of the respondents (80.6%) expressed that information technology has the potential to enhance ZIMSEC’s organizational performance and operational efficiency whilst the remaining 19.4% felt otherwise as shown in the Table 4.17 below.

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>58</td>
<td>80.6</td>
<td>80.6</td>
<td>80.6</td>
</tr>
<tr>
<td>No</td>
<td>14</td>
<td>19.4</td>
<td>19.4</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>72</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.17: Impact of Enhanced ICT on Efficiency and Cost Reduction

4.2.4.2 Perception of the Potential Impact of Enhanced Harnessing of ICT on ZIMSEC’s Business Processes

The greater number of respondents on a scale strongly agreed to strongly disagree indicated they agreed to the assertion that enhanced harnessing of ICT has the potential to improve ZIMSEC’s business processes (see Table 4.18 below). This suggests ZIMSEC needs to improve its current stock of ICT systems through among other interventions the upgrading and integration of existing systems. ZIMSEC may however, borrow a leaf from Laudon and Laudon (2010) who argue that information systems are socio-technical systems as they require substantial human capacity development to make them work properly. As such, the need to address the human factor through skills training and systematic organizational change are worthy considering if ZIMSEC has to attain improved performance through ICT.

To this extent enhanced ICT systems would greatly aid ZIMSEC’s organizational performance and operational efficiency with respect to factors including service quality provision, business process enhancement and reduction in business transaction costs.
Table 4.18: Potential Impact of Enhanced Harnessing of ICT in ZIMSEC’s Business Processes

<table>
<thead>
<tr>
<th>Factor</th>
<th>Strongly Agree</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service quality</td>
<td>29</td>
<td>28</td>
<td>37</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Customer relationship management</td>
<td>17</td>
<td>33</td>
<td>40</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>B2B relationship management</td>
<td>8</td>
<td>22</td>
<td>38</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Business processes enhancement</td>
<td>26</td>
<td>28</td>
<td>40</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Transaction costs reduction</td>
<td>20</td>
<td>30</td>
<td>39</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Organizational performance</td>
<td>15</td>
<td>28</td>
<td>42</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Knowledge management</td>
<td>17</td>
<td>24</td>
<td>46</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>Organizational learning and</td>
<td>24</td>
<td>24</td>
<td>39</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>growth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovation and change</td>
<td>19</td>
<td>25</td>
<td>45</td>
<td>7</td>
<td>4</td>
</tr>
</tbody>
</table>

4.2.5 Problems Hampering the Harnessing of Information Technology at ZIMSEC

This section comprises questions relevant to and consistent with the research objective number five. To extract the necessary information informants were asked to rank given challenges in the on a scale of 1-5, 1 being the lowest possible score and 5 being the highest possible score.

The cited challenges were inadequate budgetary constraints, inadequate technology, lack of ICT skills amongst staff, high turnover of critical mass of ICT experts and poor alignment of ICT policy to the corporate strategy.

According to Figure 14.13 below, all the factors, that is, inadequate budgetary constraints, inadequate technology, lack of ICT skills amongst staff, high turnover of critical mass of ICT personnel, poor implementation of ICT policy, and poor
alignment of ICT policy to the corporate strategy attracted a mean score of above 2.5 implying they fairly impact on ZIMSEC’s ability to fully embrace ICT in its business processes. Factors which are internal to the organization, for example, lack of ICT skills amongst staff, high turnover of critical mass of ICT personnel, poor implementation of ICT policy, and poor alignment of ICT policy to the corporate strategy could be attended within the short term whilst inadequate budgetary constraints and inadequate technology staff are dependent on external factors in the main improved budgetary allocation through grants from either central government and development and cooperating partners. Improved funding from ZIMSEC’s own resources would also help to meet its funding requirements for transformation into an ICT driven organization.

![Figure 4.13: Perceived Problems in Harnessing ICT at ZIMSEC](image)

**Table 4.2: Average Rating**

<table>
<thead>
<tr>
<th>Problem</th>
<th>Average Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inadequate budgetary constraints</td>
<td>2.81</td>
</tr>
<tr>
<td>Inadequate new technology</td>
<td>2.81</td>
</tr>
<tr>
<td>Lack of ICT skills amongst staff</td>
<td>2.83</td>
</tr>
<tr>
<td>High turnover of critical mass of ICT personnel</td>
<td>2.81</td>
</tr>
<tr>
<td>Poor implementation of ICT Policy</td>
<td>2.74</td>
</tr>
<tr>
<td>Poor alignment of ICT policy</td>
<td>2.68</td>
</tr>
</tbody>
</table>

**Figure 4.13: Perceived Problems in Harnessing ICT at ZIMSEC**

### 4.2.6 Possible Interventions for Enhanced Harnessing and Utilization of Information Technology in ZIMSEC’s Business Processes

The section was meant to extract information relevant to research objective number five. It examined the effect of ICT on ZIMSEC’s transaction costs as well as the enhancement of ICT systems in the main, database management, customer relationship management (CRM), knowledge management (KM), USSD and SMS and online systems on operational efficiency.
4.2.6.1 Effect of Enhanced Harnessing and Utilization of IT on ZIMSEC’s Transaction Costs and Operational Efficiency

Pertaining to enhanced harnessing of ICT to reduce transaction costs, 81% of the informants indicated that enhanced ICT would contribute towards reduction in ZIMSEC’s transaction costs (refer Figure 4.14). The remaining 19% expressed the opposite suggesting there are other factors apart from enhanced ICT harnessing that could contribute towards reduction in ZIMSEC’s transaction costs. A reflection on the one but only open ended question which was included in the questionnaire suggests that factors such as recruitment of quality staff, networking and upgrading of regional centres and consolidation of courier services could somewhat contribute to reduced transaction costs and enhanced operational efficiency.

The foregoing is in line with Kramer, Jenkins and Kats (2007) who expressed that ICT has nowadays become critical to organizations that seek to achieve increased productivity, reduced transaction costs, and improved efficiency, transparency and accuracy in their business processes.

Figure 4.14: Effect of Enhanced harnessing of ICT on Transaction Costs and Operational Efficiency

88
4.2.6.2 Information and Communication Technology Systems for Enhancing ZIMSEC’s Operational Efficiency and Service Delivery

Concerning which information and communication technology systems, a greater percentage of 37.5% of the informants indicated that enhanced database management system has the potential to improve ZIMSEC’s operational efficiency and service delivery. This may be attributed to the fact that ZIMSEC stores a lot of records historical and current which need to kept in accurate form for example students pass records hence the expressed need for enhanced database management system. With respect to KM and online systems, (22.2% each) of the informants cited that enhanced KM and online systems would help to improve ZIMSEC’s operational efficiency and service delivery. The remaining 18.1% were of the view that CRM enhancement has the potential to contribute towards improved service delivery.

Whilst no informant selected USSD and SMS as a means for enhancing service delivery, the use of USSD and SMS platforms by financial institutions, for example Banc ABC, Ecobank and ZB Bank, mobile service providers, for example, Econet and retailers, for example Topics of recent from the experience of the researcher, has arguably gone a long way in providing readily accessible services to consumers, hence may be worthy exploring business processing solutions by ZIMSEC.

Figure 4.15: Perceived Impact of Enhanced ICT Systems to ZIMSEC’s Service Delivery

89
4.2.6.3 Possible Means of Harnessing ICT by ZIMSEC for Improved Service Delivery

According to Table 14.18, all the selected means of harnessing ICT to realize improved service delivery by ZIMSEC including upgrading of existing ICT infrastructure, development of integrated information management system (IMS), and embracing new technologies attracted mean score rating by informants of more than 3.00. This implies that the informants considered the entire range of factors are critical and worthy considering in ZIMSEC’s quest to transform into an ICT driven organization.

Table 4.19: Possible Means of Harnessing ICT to Realize Improved Service Delivery at ZIMSEC

<table>
<thead>
<tr>
<th>Factor</th>
<th>Mean Score</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upgrade existing ICT infrastructure</td>
<td>3.28</td>
<td>2.513</td>
</tr>
<tr>
<td>Develop an integrated IMS</td>
<td>3.08</td>
<td>1.711</td>
</tr>
<tr>
<td>Attraction and retention of requisite ICT skills</td>
<td>3.17</td>
<td>2.254</td>
</tr>
<tr>
<td>Training and multi-skilling of staff</td>
<td>3.11</td>
<td>2.269</td>
</tr>
<tr>
<td>Development and implementation of internal ICT policy</td>
<td>3.10</td>
<td>1.920</td>
</tr>
<tr>
<td>Alignment of ICT policy to the corporate strategy</td>
<td>3.00</td>
<td>1.944</td>
</tr>
<tr>
<td>Embracing new technologies and investment in ICT</td>
<td>3.33</td>
<td>2.028</td>
</tr>
</tbody>
</table>
4.3 Hypothesis Testing

4.3.1 Harnessing of ICT has a Positive Impact on Service Quality

The statistically significant chi-square statistic (p=0.018<0.05) indicates that harnessing ICT has a positive effect on service quality (see Table 20). However, the pseudo $R^2$ values (Nagelkerke = 8%) indicates that harnessing ICT has a relatively small impact on service quality (refer Table 21 below). The researcher rejects the null hypothesis that harnessing ICT has no positive effect on service quality.

Table 4.20: Hypothesis 1 Model Fitting Information

<table>
<thead>
<tr>
<th>Model</th>
<th>$-2$ Log Likelihood</th>
<th>Chi-Square</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept Only</td>
<td>29.445</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final</td>
<td>23.816</td>
<td>5.629</td>
<td>1</td>
<td>.018</td>
</tr>
</tbody>
</table>

Source: SPSS Output

Table 4.21: Pseudo R-Square 1

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cox and Snell</td>
<td>.075</td>
</tr>
<tr>
<td>Nagelkerke</td>
<td>.081</td>
</tr>
<tr>
<td>McFadden</td>
<td>.030</td>
</tr>
</tbody>
</table>

Link function: Logit.

Table 4.22: Parameter Estimates 1

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>Std. Error</th>
<th>Wald</th>
<th>Df</th>
<th>Sig.</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower Bound</td>
</tr>
<tr>
<td>Threshold [Q17i = 1]</td>
<td>.629</td>
<td>.692</td>
<td>.828</td>
<td>1</td>
<td>.363</td>
<td>-.726</td>
</tr>
<tr>
<td>[Q17i = 2]</td>
<td>1.850</td>
<td>.718</td>
<td>6.646</td>
<td>1</td>
<td>.010</td>
<td>.443</td>
</tr>
<tr>
<td>[Q17i = 3]</td>
<td>4.551</td>
<td>.936</td>
<td>23.645</td>
<td>1</td>
<td>.000</td>
<td>2.716</td>
</tr>
<tr>
<td>[Q17i = 4]</td>
<td>5.299</td>
<td>1.068</td>
<td>24.604</td>
<td>1</td>
<td>.000</td>
<td>3.205</td>
</tr>
<tr>
<td>Location Q16</td>
<td>1.294</td>
<td>.555</td>
<td>5.435</td>
<td>1</td>
<td>.020</td>
<td>.206</td>
</tr>
</tbody>
</table>

Link function: Logit.
4.3.2 Harnessing of ICT has a Positive Impact on Economy

Like in service provision the test results (p=0.03<0.05) indicate that harnessing ICT has a positive effect on reduction of transaction costs (see Table 23) but with a little impact as indicated by the small R² value of 6% from the results (Table 24 refers).

The researcher rejects the null hypothesis that harnessing ICT has no positive effect on economy (transaction costs).

<table>
<thead>
<tr>
<th>Model</th>
<th>-2 Log Likelihood</th>
<th>Chi-Square</th>
<th>Df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept Only</td>
<td>31.234</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final</td>
<td>26.741</td>
<td>4.493</td>
<td>1</td>
<td>.034</td>
</tr>
</tbody>
</table>

Source: SPSS Output

Table 4.24: Pseudo R-Square 2

<table>
<thead>
<tr>
<th></th>
<th>Cox and Snell</th>
<th>Nagelkerke</th>
<th>McFadden</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.060</td>
<td>.064</td>
<td>.022</td>
</tr>
</tbody>
</table>

Link function: Logit.

Table 4.25: Parameter Estimates 2

<table>
<thead>
<tr>
<th>Threshold</th>
<th>Estimate</th>
<th>Std. Error</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Q17v = 1]</td>
<td>-.140</td>
<td>.683</td>
<td>.042</td>
<td>1</td>
<td>.838</td>
<td>-1.478 - 1.198</td>
</tr>
<tr>
<td>[Q17v = 2]</td>
<td>1.279</td>
<td>.686</td>
<td>3.469</td>
<td>1</td>
<td>.063</td>
<td>-.067 - 2.624</td>
</tr>
<tr>
<td>[Q17v = 3]</td>
<td>3.241</td>
<td>.793</td>
<td>16.717</td>
<td>1</td>
<td>.000</td>
<td>1.687 - 4.794</td>
</tr>
<tr>
<td>[Q17v = 4]</td>
<td>4.271</td>
<td>.897</td>
<td>22.681</td>
<td>1</td>
<td>.000</td>
<td>2.513 - 6.028</td>
</tr>
<tr>
<td>Location</td>
<td>Q16</td>
<td>1.080</td>
<td>.534</td>
<td>4.097</td>
<td>1</td>
<td>.043 - .034</td>
</tr>
</tbody>
</table>
4.3.3 Harnessing of ICT has a Positive Impact on Efficiency

Based on the above omnibus tests of coefficients from the binary logistic regression the p value 0.194 (>0.05) (see Table: 4.26) indicate that harnessing ICT efficiency at ZIMSEC has had no effect on operational service.

The researcher fails to reject the null hypothesis that harnessing ICT has no positive effect on operational service efficiency.

Table 4.26: Hypothesis 3 Omnibus Tests of Model Coefficients

<table>
<thead>
<tr>
<th></th>
<th>Chi-square</th>
<th>Df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block</td>
<td>1.685</td>
<td>1</td>
<td>.194</td>
</tr>
<tr>
<td>Model</td>
<td>1.685</td>
<td>1</td>
<td>.194</td>
</tr>
</tbody>
</table>

Source: SPSS Output

Table 4.27: Omnibus Tests of Model Coefficients

<table>
<thead>
<tr>
<th></th>
<th>Chi-square</th>
<th>Df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block</td>
<td>1.685</td>
<td>1</td>
<td>.194</td>
</tr>
<tr>
<td>Model</td>
<td>1.685</td>
<td>1</td>
<td>.194</td>
</tr>
</tbody>
</table>

Table 4.28: Model Summary

<table>
<thead>
<tr>
<th>Step</th>
<th>-2 Log likelihood</th>
<th>Cox &amp; Snell R Square</th>
<th>Nagelkerke R Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>69.250a</td>
<td>.023</td>
<td>.037</td>
</tr>
</tbody>
</table>

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

4.3.4 Harnessing of ICT has a Positive Impact on Effectiveness

Since p=0.415>0.05 from above table form ordinal regression (see Table 29), it means that harnessing ICT has had no significant a positive effect on effectiveness at ZIMSEC as measured by contribution to enhanced performance by management and staff. The
pseudo R2 value (Nagelkerke = 1%) also bears evidence that harnessing ICT has no impact on service effectiveness (Table 30 refers).

The researcher rejects the null hypothesis that harnessing ICT has no positive effect on effectiveness.

Table 4.29: Hypothesis 4 - Model Fitting Information

<table>
<thead>
<tr>
<th>Model</th>
<th>-2 Log Likelihood</th>
<th>Chi-Square</th>
<th>Df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept Only</td>
<td>23.195</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final</td>
<td>22.529</td>
<td>.666</td>
<td>1</td>
<td>.415</td>
</tr>
</tbody>
</table>

Source: SPSS Output

Table 4.30: Pseudo R-Square 3

<table>
<thead>
<tr>
<th></th>
<th>Cox and Snell</th>
<th>Nagelkerke</th>
<th>McFadden</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.009</td>
<td>.011</td>
<td>.005</td>
</tr>
</tbody>
</table>

Link function: Logit

Table 4.31: Parameter Estimates 3

<table>
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<tr>
<th></th>
<th>Estimate</th>
<th>Std. Error</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower Bound</td>
</tr>
<tr>
<td>Threshold</td>
<td>[Q15 = 1]</td>
<td>-1.257</td>
<td>.768</td>
<td>2.679</td>
<td>1</td>
<td>.102</td>
</tr>
<tr>
<td></td>
<td>[Q15 = 2]</td>
<td>.058</td>
<td>.741</td>
<td>.006</td>
<td>1</td>
<td>.937</td>
</tr>
<tr>
<td></td>
<td>[Q15 = 3]</td>
<td>4.142</td>
<td>1.037</td>
<td>15.941</td>
<td>1</td>
<td>.000</td>
</tr>
<tr>
<td>Location</td>
<td>Q16</td>
<td>.472</td>
<td>.584</td>
<td>.654</td>
<td>1</td>
<td>.419</td>
</tr>
</tbody>
</table>

Link function: Logit.
4.4 Chapter Summary

The chapter outlined the results and/or findings of the research. The analysis and interpretation of the findings formed the basis of conclusions that were arrived at by the researcher.

The following chapter broadly lays out the conclusions and recommendations of the research. Areas for further study are also highlighted in the chapter.
CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

The chapter presents the research conclusions and recommendations based on findings and analysis of the study. Areas for further research are also highlighted in the chapter.

5.1 Research Conclusions

The broad aim of the research was to assess the impact of technology on performance in the ZIMSEC. In the main, study the objectives were to identify the information and communication technologies embraced by the Zimbabwe School Examination Council, assess the impact of information and communication technology on the service quality, to assess the impact of information and communication technology on economy, to assess the impact of information and communication technology on efficiency, to assess the impact of information and communication technology on effectiveness and to make any necessary recommendations in light of the study findings.

Generally, the research revealed that ICT is critical to organizational performance and the potential ZIMSEC’s service delivery as measured service quality, economy (transaction costs), efficiency and effectiveness. With specific reference the research objectives the following conclusions were drawn:

5.1.1 Information and communication technologies in ZIMSEC

- ZIMSEC uses a combination of manual and computerized information management systems in its business processes.
- ERP systems that are used in ZIMSEC’s business processes are the SUN, Oracle, Pastel and Microsoft NAV.
• ZIMSEC has both LAN and WAN although the WAN is currently not fully developed.
• Media used by ZIMSEC to communicate with internal and external clients, stakeholders and suppliers include website, email, fixed and mobile phone, social media, and print and electronic media.

5.1.2 Impact of Information Technology Service Quality

• ICT has the potential to enhance management and staff performance and organizational performance and service quality there-off.
• However service quality is being hampered by lack of adequate investment in ICT infrastructure and employee ICT skills.

5.1.3 Impact of Information Technology on Economy

• The harnessing of ICT has a positive impact on reduction of ZIMSEC’s transaction costs.
• Significant reduction in transaction costs could be realized if systems such as e-marking, e-registration, e-CRM and e-B2B are fully implemented.

5.1.4 Impact of Information Technology on Efficiency

• The harnessing of ICT has a negligible impact on service efficiency.
• ICT is not being fully used in areas critical to organizational performance, especially organizational performance tracking, B2B relation management, organizational learning and growth, and innovation and change.
• If fully embraced information technology could positively contribute towards efficient service provision at ZIMSEC.
5.1.5 Impact of Information Technology on Effectiveness

- The harnessing of ICT has a negligible impact on service effectiveness.
- Inadequate funding limits the harnessing of ICT by ZIMSEC to realize effective service delivery.
- ZIMSEC does not have a critical mass of staff with the requisite ICT skills to realize effective service delivery.

5.2 Declaration on Research Hypothesis

The research findings confirmed that the harnessing of ICT has the positive effect on organizational performance and service delivery as measured by service quality and economy (transaction costs). However, the research failed to establish the positive effect of the harnessing of ICT on ZIMSEC’s service efficiency and effectiveness. This could be attributed to numerous factors in the main the following:

- inadequate funding;
- Limited investment in ICT infrastructure; and
- Lack of critical mass of staff with ICT skills.

5.3 Recommendations

The researcher makes the following recommendations in view of the above the findings and conclusions:

5.3.1 Engage Development and Cooperating Partners

ZIMSEC should develop a business case and approach potential development and cooperating partners for the investment and continuous upgrading of ICT infrastructure.
5.3.2 Develop Staff
ZIMSEC should develop, attract and retain a critical mass of staff with requisite ICT skills.

5.3.3 Prioritize ICT
ZIMSEC should prioritize ICT as an important driver for organizational performance and service delivery.

5.3.4 Embrace ICT
ZIMSEC should fully embrace ICT in order to improve service delivery for the benefit of its clientele in the main schools and students.

5.3.5 Automate Business Processes
ZIMSEC should automate its business processes by fully embracing technologies such as Internet, email, LAN and WAN so as to improve its internal and external business processes. This will enhance its internal and external communication with clients and stakeholders thereby improving service delivery.

5.3.6 Fully Embrace e-Marking and e-Registration
There is need for ZIMSEC to fully embrace systems such as e-marking, e-registration, customer and B2B relationship management in order to enhance organizational effectiveness and efficiency.

5.3.7 Align Business Strategy and IT Policy
Whilst ZIMSEC has a operational business strategy most respondents underscored the need for alignment with the IT Policy. This in the respondents’ view would help ZIMSEC to prioritize ICT as a critical component of its organizational performance agenda.
5.3.8 Implement ICT Policy

Whilst ZIMSEC has an internal IT Policy, the policy has not been wholesomely implemented. Full implementation of the IT policy will help to close gaps in the transformation of ZIMSEC into an ICT driven organization and positive contribution towards organizational performance.

5.4 Contribution to Literature

The hypothesis testing results showed that the harnessing of ICT had the significant positive impact on service quality and economy (transaction costs). This is in line with Nerjardirrani, Rasouli and Behravesh (2011) who say that among other benefits, information technology help to reduce operational expenses and aid human resources of organizations to effectively perform their tasks and responsibilities.

However, contrary to the conceptual framework (Figure 2.3) the results as given in item 4.3 indicated that there was very negligible impact of the harnessing of efficiency and effectiveness. This confirms the assertion by Marcos, Garo, Eduardo and Eduardo (2009) who say information and communication technologies do not necessarily result in efficiency on their own. Rather organizational/complementary strengths (process effectiveness, expertise, education, technical infrastructure, and discipline of the workforce) must compliment the harnessing of ICTs if success is to be realized. They also cite that this is prevalent in developing countries where institutions are often weak on their complementary strengths.

It is however important to note that overall, ICT may not yield the expected return on investment on service quality, economy, efficiency and effectiveness. Flagnagan and Finger (2006) concur with Haag and Cummings (2010) who assert that technology alone is not the total solution to the achievement of strategic business objectives. Instead, organizations need to go beyond the harnessing of information technology if they are to achieve corporate goals by ensuring employees are not only motivated but
have the requisite ICT skills, and are dedicated and committed to organizational performance.

5.5 Areas for Further Research

The research mainly focused on the extent to which ZIMSEC has embraced technology to enhance performance as measured by service quality, economy (transaction costs), efficiency and effectiveness. However, there could be other factors that contribute to performance improvement that were not fully explored which could constitute areas for further study. To this end, suggested areas for further research are as follows:

- Impact of work environment on performance;
- Impact of staff motivation on performance; and
- Impact of staff skills and development on performance.
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50. Moira A. P., (2010). Centre for Education Research and Policy, United Kingdom


80. Zimbabwe Tourism Authority Strategic Plan 2010-2012

81. www.zimsec.co.zw (accessed: 17/05/1)
Appendix I: Letter of Request to Undertake the Study

134 Bajila Close
Westwood, Harare

20 March 2013

The Director
Zimbabwe School Examinations Council

Dear Sir

RE: APPLICATION FOR PERMISSION TO USE YOUR ORGANIZATION FOR PURPOSES OF CARRYING OUT A RESEARCH IN PARTIAL FULFILLMENT OF THE MBA DEGREE

I do hereby apply for permission to use your organization to carry out a research in partial fulfillment of the requirements of the MBA degree programme. My name is Mrs. Elizabeth Machigere and I am a Human Resources Officer based at the Ministry of Education, Sport, Arts and Culture’s Head Office and an MBA student at the University of Zimbabwe’s Graduate School of Management.

I would be grateful if you could allow me to access any materials that could help me answer the question what ZIMSEC is and what its mandate or purpose in life is. My research topic reads as follows:

An assessment of the extent to which the Zimbabwe School Examinations Council (ZIMSEC) has embraced information technology to enhance performance (January 2009 to June 2013).

At the moment could you provide me with the following:

a) The organogram  
b) The strategy document  
c) ICT policy document  
d) Medium Term Plan  
e) The ZIMSEC ACT  
f) Any other document that could help me carry out the research, something that would give me the background information of ZIMSEC.

At a letter stage, I will also be bringing in questionnaire for fill in by ZIMSEC management and staff in line with the dissertation.

I promise to upholds high levels of confidentiality and ethical standards in conducting the research. Attached find my research letter from the Graduate School of Management.

Thank you.

Yours Faithfully

ELIZABETH MACHIGERE
Appendix II. Letter of Approval to Undertake the Study

Zimbabwe School Examinations Council
Examinations Centre, Upper East Road, Mont Claremont
P.O. Box CP 1464, Causeway, Harare, Zimbabwe

21 March 2013

Elizabeth Machigere
134 Bezia Close
Westwood

Dear Madam:

Re: APPLICATION FOR PERMISSION TO USE ZIMSEC ORGANISATIONAL DOCUMENTATION FOR PURPOSES OF CARRYING OUT A RESEARCH IN PARTIAL FULFILMENT OF THE MBA PROGRAMME

Thank you for showing interest to use our organisation (ZIMSEC) to carry out a research in partial fulfillment of the requirements of the MBA degree programme.

The material that you requested to access that could help you in your research programme has been granted on condition that you uphold the highest levels of confidentiality and ethical standards. According to the OFFICIAL SECRETS ACT, 1970 Section 4 and 5, it states that it is an offence to divulge an information, or perform any such act that is preparatory to or in association with anything else that is prejudicial to the interests of the Government of Zimbabwe. You should be aware that should you commit any such offence you will be liable to prosecution.

The following materials have been approved for your use as per your request:

- Zimsec Organogram
- Strategic Document
- ICT Policy Document
- Long and Medium Term Plan
- ZIMSEC Act
- Any other documents necessary for the project.

I hope the above information will assist you in your research project.

Yours faithfully,

[Signature]

ASSISTANT DIRECTOR HUMAN RESOURCES
For DIRECTOR FOR ZIMSEC

[Board Members] Prof. S. Mapfumo (Chairman), Rev. H. Shitemi (Vice-Chairman), Dr. G. Bekking, Dr. M. Dziva, Mr. D. Makusha, Prof. P. M. Majumbira, Prof. E. B. Makusha, Prof. S. Chibaya, Prof. R. Nyaudzi, Prof. D. Chivayo, Prof. J. T. Nyamudzvi, Dr. T. Nyong, L. Kupara, A.C.P. Sibanda, C.D.S. Sibanda, F.M. Shandu (Director)
Appendix III: Questionnaire

Section A: Respondent’s Profile

1. What is your level within ZIMSEC’s organization structure (tick suitable)
   Top Management [ ]  Middle Management [ ]  Staff [ ]

2. Which one is your department within the organisation? (tick suitable)
   Finance [ ]  Administration [ ]  Human Resources [ ]  Marketing [ ]  Operations [ ]
   IT [ ]  Other (Specify) [ ]

3. Gender (tick suitable)
   Male [ ]  Female [ ]

4. For how long have you been with ZIMSEC? (tick suitable)
   Under 1 year [ ]  1-3 years [ ]  Over 3 years – 5 years [ ]  Over 5 years-10 years [ ]
   Over 10 years [ ]

Section B: Existing Information and Communication Technologies at ZIMSEC

5. Score the following on a scale 1-5, 1 being the lowest and 5 the highest score in terms of their application in day to day business processes at ZIMSEC.
   Manual system [ ]  Computerized system [ ]  Manual cum Computerized System [ ]

6. How would you rate the extent to which is ZIMSEC ready to transform itself into an ICT driven? (tick appropriate)
   High [ ]  Medium [ ]  Low [ ]

7. How is the harnessing of ICTs being prioritized by ZIMSEC as a measure for enhancing organizational performance?
   Highly Prioritized [ ]  Prioritized [ ]  Fairly Prioritized [ ]  Lowly Prioritized [ ]  Not Sure [ ]
8. Rank the following factors in terms of their general importance to organizational performance by ticking the suitable response.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Very Important</th>
<th>Important</th>
<th>Somewhat Important</th>
<th>Not Very Important</th>
<th>Unimportant</th>
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<tr>
<td>Service quality</td>
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<tr>
<td>Customer relationship management</td>
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<tr>
<td>B2B relationship management</td>
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<tr>
<td>Business processes enhancement</td>
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<tr>
<td>Transaction costs reduction</td>
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<td>Organisational performance tracking</td>
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<td>Knowledge management</td>
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<tr>
<td>Organizational learning and growth</td>
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<td>Innovation and Change</td>
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</table>

9. Which of the following networks do you have at ZIMSEC? (tick appropriate)

   LAN [ ]   WAN [ ]   LAN cum WAN [ ]

10. Which of the following external clients the main users of the computerized information system?

    Parents [ ]   Students [ ]   Schools [ ]
    Tertiary Institutions [ ]   Regulatory Bodies [ ]   Research Institution [ ]
    Other Examining Bodies [ ]

11. Which of the following information and communication technologies does ZIMSEC use to reach out to the following: (tick applicable technologies)

    a. Internal Clients

    Website [ ]   Email [ ]   SMS [ ]   Social Media [ ] (specify)............
    Fixed and Mobile [ ]   Other (Specify) .......................................................
b. **External Clients**

Website [ ] Email [ ] SMS [ ] Social Media [ ] (specify) .................

Fixed and Mobile [ ] [ ] TV and Radio [ ] Print Media [ ]

Other (Specify) .................................................................................................................................

12. Which of the following Enterprise Resource Planning Systems do you use at ZIMSEC?

   SAP [ ] Microsoft NAV [ ] Oracle [ ] Pastel [ ] Other (Specify) .................

13. What is needed to be done in order to enhance the existing Enterprise Resource Planning Systems?

   Upgrade existing systems [ ] Integrate with other systems [ ]
   Link systems with web applications [ ] Link systems with mobile applications [ ]

   Other (Specify) .................................................................................................................................

**Section C: Impact of information technology on management and staff performance**

14. Would you say you personally have the requisite IT appreciation as it relates to application in your internal and external business processes at ZIMSEC? *(tick appropriate)*

   Yes [ ] No [ ]

15. In your view has the application of information and communication technologies in ZIMSEC’s business processes contributed to enhanced performance by management and staff? *(tick suitable response)*

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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**Section D: Impact of information technology on service efficiency**

16. In your view would you say the harnessing of ICT at ZIMSEC to date has enhanced organizational performance and operational efficiency?

   Yes [ ] No [ ]
17. Rate the extent to which the harnessing of ICT at ZIMSEC has enhanced the organization’s business processes on a scale **Strongly Agree** to **Strongly Disagree** by ticking one suitable response on each of the listed factors

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<tr>
<th>Factor</th>
<th>Strongly Agree</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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<td>Business processes enhancement</td>
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<td>Knowledge management</td>
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<td>Innovation and change</td>
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**Section E: Problems in harnessing IT**

18. Rank the following on a scale of 1-5, 1 being the lowest and 5 the highest score on their possible drawback to the embracing of ICTs at ZIMSEC

- Inadequate budgetary allocation   [  ]
- Inadequate new technology        [  ]
- Lack of ICT skills amongst staff [  ]
- High turnover of critical mass of ICT personnel [  ]
- Poor implementation of ICT Policy [  ]
- Poor alignment of ICT policy and the corporate strategy [  ]
- Other (*Specify*)

113
Section F: Possible Interventions

19. In your view could enhanced harnessing and utilization of information technology to reduce ZIMSEC’s transaction costs and enhance operational efficiency?

Yes [   ] No [   ]

20. If ZIMSEC’s operational efficiency and service delivery were to be enhanced which information and communication technology systems would be required to be implemented?

Database management system [   ]
Customer relation management system [   ]
Knowledge Management Systems [   ]
USSD and SMS [   ]
Online System [   ]

21. How may ZIMSEC harness ICT to improve its service delivery? (Rate each of the possible interventions on a scale of 1-5, 1 being the lowest possible score and 5 the highest)

Upgrade existing ICT infrastructure [   ]
Develop an integrated information management system [   ]
Attraction and retention of requisite ICT skills [   ]
Training and multi-skilling of staff [   ]
Development and implementation of the internal ICT policy [   ]
Alignment of ICT policy to the corporate strategy [   ]
Embracing new technologies and investment in ICT [   ]
Other (Specify) .................................................................................................................................

22. Any other comments regarding how ZIMSEC could embrace ICT to improve service delivery and enhance organizational performance?
...........................................................................................................................................................................