STRATEGY BY PROTOTYPING FRAMEWORK FOR
SMES THROUGH INTEGRATING DESIGN THINKING
AND BALANCED SCORECARD

By
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ABSTRACT

The purpose of this research is to study the integration of two management concepts, Design Thinking (DT) and the Balanced Scorecard (BSC), for business strategy. Through Action Research (AR), DT and BSC were used to assist the selected case company from the ICT industry implement its strategic change agenda over a planning period of three years to achieve new growth by increasing its innovation capability. Seven major AR cycles are reported in this study that covers both the problem solving part and the new knowledge generation part of the research. Each AR cycle consists of the five stages of diagnosis, planning, action, evaluation and learning. The learning from the AR cycles were generalized to develop a framework for strategy development and implementation for SMEs that addresses many of the current issues related to managing strategy for SMEs.

The results show that integrating DT practices with the BSC helped the case company successfully implement its innovation driven growth strategy. The learning through action was rigorously compared and supported with the academic literature. The lessons were generalized to create the DT-BSC Process Framework for business strategy development and implementation. The core concept underlying the proposed framework is ‘strategy by prototyping’ that is presented through a visual template.

The practical knowledge contribution from this research is the development of a process framework that will allow SME owners and managers to create and implement their own innovation driven strategies. The framework integrates some established best practices from business strategy management with the innovative practices of designers into a series of practical and simple steps. The ‘strategy by prototyping’ concept and visual template articulated from the findings of this research may contribute a new paradigm in the field of business strategy.

**Keywords:** action research, business strategy, design thinking, balanced scorecard, SME, prototyping
ABSTRAK

Penyelidikan ini bertujuan mengkaji gabungan dua konsep pengurusan Design Thinking (DT) dan Balanced Scorecard (BSC), untuk strategi perniagaan. Melalui kaedah Action Research (AR), DT dan BSC digunakan untuk membantu syarikat daripada industri ICT yang dikaji melaksanakan agenda perubahan strategiknya selama tempoh perancangan tiga tahun bagi tujuan menjana pertumbuhan dengan meningkatkan daya inovasi syarikat. Tujuh kitaran utama AR dilaporkan dalam kajian ini yang merangkumi bahagian penyelesaian masalah dan bahagian penyelidikan untuk menjana sumbangan ilmu baharu. Setiap kitaran AR terdiri daripada lima peringkat iaitu diagnosis, perancangan, tindakan, penilaian dan pembelajaran. Pembelajaran daripada pengalaman syarikat digunakan untuk membangunkan rangka proses kerja bagi menggubal dan melaksanakan strategi untuk industri kecil dan sederhana (IKS) yang turut menangani isu-isu semasa yang berkaitan pengurusan strategi untuk IKS.

Hasil kajian menunjukkan bahawa syarikat contoh telah berjaya menggabungkan amalan DT dengan BSC untuk melaksanakan strategi pertumbuhan syarikat berasaskan inovasi tersebut. Pembelajaran daripada pengalaman tunggal ini dikuatkuatkan melalui perbandingan yang teliti dengan kajian akademik terkini. Pembelajaran ini kemudian diaplikasikan menjadi rangka kerja DT-BSC untuk menggubal dan melaksana strategi perniagaan. Konsep asas yang menjadi dasar adalah ‘strategi melalui prototaip’ yang diaplikasikan menggunakan kerangka kerja DT-BSC ialah ‘strategi melalui prototaip’ yang diaplikasikan menggunakan kerangka visual.

Sumbangan ilmu berbentuk praktikal daripada penyelidikan ini ialah pembangunan proses rangka kerja yang membantu pemilik dan pengurus IKS menggubal dan melaksana strategi yang didorong inovasi mereka sendiri. Rangka kerja ini menggabungkan beberapa amalan terbaik dari pengurusan strategi perniagaan dengan amalan inovatif para pereka ke dalam satu siri langkah-langkah yang praktikal dan mudah. Konsep ‘strategi melalui prototaip’ yang diungkapkan daripada penemuan penyelidikan ini berpotensi menyumbangkan suatu paradigma baharu dalam bidang ilmu strategi perniagaan.

Kata kunci: action research, pengurusan strategi, design thinking, balanced scorecard, IKS, prototaip
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First and foremost, I am grateful to my Creator for blessing me with the joy of learning and seeking knowledge through reading, lectures, conversations with the learned and, most importantly, recording my experiences. I also thank Him for blessing me with the joy to write and articulate my thoughts and ideas.

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Last but not least, a special thanks to my wife and family for giving me the time and space to complete the demanding task of writing this thesis.

... Allah will raise those who have believed among you and those who were given knowledge, by degrees ... (Al-Quran, 58:11)
TABLE OF CONTENTS

CERTIFICATION OF THESIS WORK ......................................................... ii
PERMISSION TO USE ........................................................................ iv
ABSTRACT ............................................................................................ v
ABSTRAK ............................................................................................... vi
ACKNOWLEDGEMENTS ..................................................................... vii
TABLE OF CONTENTS ....................................................................... viii
LIST OF TABLES ................................................................................ xiii
LIST OF FIGURES ................................................................................ xiv
LIST OF ABBREVIATIONS ................................................................... xvii

CHAPTER ONE - INTRODUCTION ....................................................... 1
  1.1 Journey in Entrepreneurship ....................................................... 2
  1.2 Journey in Strategy Management .............................................. 5
  1.3 The Innovation Challenge ........................................................ 5
  1.4 Problem Statement .................................................................... 7
    1.4.1 Formal Problem Statement ............................................... 10
    1.4.2 Research Questions .......................................................... 11
    1.4.3 Research Objectives .......................................................... 11
    1.4.4 Significance and Relevance of the Research ....................... 12
    1.4.5 Scope of the Study .............................................................. 13
  1.5 Summary of the Research Strategy ............................................. 14
  1.6 Outline of this Thesis ................................................................ 17
  1.7 Research Limitations ............................................................... 18
  1.8 Conclusion ................................................................................. 19

CHAPTER TWO - LITERATURE REVIEW ......................................... 20
  2.1 Business Strategy Overview ..................................................... 20
    2.1.1 Working Definition of Strategy ......................................... 24
    2.1.2 Customer Value Proposition ............................................ 27
2.1.3 Resource Based View of Strategy (RBV) ................................................. 29
2.1.4 Competencies and SME Strategy Development ........................................ 36
2.1.5 SME and Strategy Management ............................................................. 38
2.1.6 Strategy Management Must Be Simple for SMEs ...................................... 43
2.2 Balanced Scorecard .................................................................................... 45
  2.2.1 Summary on the Evolution of BSC .......................................................... 45
  2.2.2 Summary of BSC and SFO .................................................................... 47
  2.2.3 BSC Criticisms ....................................................................................... 56
  2.2.4 BSC Criticisms: Problems Related to Implementation Period............... 62
  2.2.5 BSC Criticisms: Problems Related to Measures ...................................... 64
  2.2.6 Use of BSC for SMEs ........................................................................... 65
  2.2.7 BSC Evolution and Adaptation ............................................................... 67
  2.2.8 Integrating BSC With Other Management Tools ..................................... 70
2.3 Design Thinking ......................................................................................... 72
  2.3.1 Innovation not Invention ....................................................................... 72
  2.3.2 Innovation Can and Must Be Managed ................................................... 74
  2.3.3 Definition of Design ............................................................................. 77
  2.3.4 Design: Key Component of Innovation .................................................. 78
  2.3.5 DT Popularity ......................................................................................... 79
  2.3.6 Design Thinking (DT) Defined ............................................................... 80
  2.3.7 Benefits of Design Thinking for Businesses .......................................... 85
  2.3.8 Integrating DT and Other Management Models ..................................... 90
  2.3.9 DT Practices and Tools ......................................................................... 97
  2.3.10 Differentiating Design from DT ............................................................. 104
  2.3.11 DT Criticisms ....................................................................................... 107
  2.3.12 Examples of the Use of DT in SMEs .................................................... 108
2.4 Brief on SMEs and the Malaysian SME Landscape ...................................... 112
  2.4.1 Defining and Understanding SMEs ....................................................... 113
  2.4.2 Malaysian SME Sector ......................................................................... 117
CHAPTER THREE - METHODOLOGY .............................................................. 124

3.1 Research Design .................................................................................. 125
  3.1.1 AR Steps or Stages ........................................................................ 127
  3.1.2 The Action Research Spiral ............................................................... 128
  3.1.3 Developing an AR Guide and Checklist ............................................ 131
3.2 Justification for the Methodology .......................................................... 133
3.3 The Unit of Analysis and Sources of Data .............................................. 136
  3.3.1 Data Analysis ................................................................................ 138
3.4 Procedures Used to Collect Data ............................................................. 139
3.5 Limitations of the AR Method ................................................................. 140
3.6 Ethical Issues ....................................................................................... 142

CHAPTER FOUR - RESULTS AND DISCUSSIONS ..................................... 143

4.1 AR Cycles Related to the Research Problem ......................................... 143
4.2 Results Summary from Cycles 1 Through 4 ......................................... 153
  4.2.1 Detailed Results on the E-Book ‘White Space’ Prototype ............... 154
4.3 Addressing the Research Question in Cycle 5 ...................................... 164
  4.3.1 Cycle 5 Summary Table ................................................................. 164
  4.3.2 Developing the Model Used in Cycle 5 ............................................ 166
4.4 Completing the Research Question in Cycle 6 ..................................... 173
  4.4.1 Cycle 6 Summary Table ................................................................. 173
  4.4.2 DT-BSC Process Framework ......................................................... 174
  4.4.3 DT-BSC Process Framework and the Research Question ............. 191
4.5 The Final AR Cycle ............................................................................. 194
  4.5.1 Cycle 7 Summary Table ................................................................. 194
4.6 Additional Discussion on DT-BSC Process Framework ....................... 196
4.7 Strategy by Prototyping ...................................................................... 203
4.8 Comments Related to the Research Objectives and Other Research Issues .......................................................... 207
4.9 Some Practice Notes on DT .................................................................. 210

2.4.3 Malaysia SME Master Plan ............................................................... 118
4.9.1 DT and Core Competencies ........................................... 210
4.9.2 DT and Costs ................................................................. 213
4.10 Critical Success Factors .................................................. 214

CHAPTER FIVE - CONCLUSIONS AND RECOMMENDATIONS ............... 219

5.1 Introduction ........................................................................ 219
5.2 Conclusions ........................................................................ 219
  5.2.1 Conclusions About the Research Problem ......................... 219
  5.2.2 Conclusions About the Research Question ......................... 222
5.3 Managerial, Policy and Theoretical Contributions ..................... 226
  5.3.1 Contribution to the Limited Studies on the Use of BSC by SMEs .... 226
  5.3.2 Contribution to the Limited Studies on the Use of DT by SMEs ...... 227
  5.3.3 Contribution to Studies on the Use of DT for Business Strategy ...... 228
  5.3.4 Implications for Theory ................................................... 229
  5.3.5 Implications for Policy and Practice ................................... 232
5.4 Limitations ........................................................................ 235
5.5 Reflections on the Methodology .............................................. 236
5.6 Implications for Further Research ........................................... 239
5.7 Final Remarks .................................................................... 240

REFERENCES ........................................................................... 243

APPENDIX A ............................................................................ 276
  A.1.1 The Case Company and the Researcher’s Journey in Entrepreneurship .... 276
  A.2.1 Sample List of Technical Action Research Projects ..................... 278
  A.3.1 Action Research in Brief .................................................... 280
    Origins of AR ....................................................................... 280
    Defining AR ........................................................................ 281
    Types of AR ......................................................................... 284
    Other Characteristics of AR .................................................... 286
    Summary on AR ................................................................... 288
  A.3.2 Kurt Lewin on Action Research ........................................... 289
A.3.3 Seven Part Structure for AR Analysis............................................................. 291

Perry & Zuber-Skerritt Checklist ........................................................................... 292
A.3.4 OSM Certificate .............................................................................................. 293
A.3.5 Selected Pictures from Cycle 1 ....................................................................... 294
A.3.6 Selected Pictures from Cycle 2 ....................................................................... 297
A.3.7 Selected Pictures from Follow-up to Cycle 3 .................................................. 300
A.3.8 Selected Pictures from Cycle 4 ....................................................................... 301
A.4.1 Strategic Outcomes Annual Results............................................................... 303
A.4.2 e-Book Roadmap ........................................................................................... 304
A.4.3 Sample Customer Co-Creation Activity ......................................................... 305
A.5.1 Organizational Chart ...................................................................................... 306
A.5.2 Project Panels ................................................................................................. 307
APPENDIX B ............................................................................................................ 309
B.1.1 Visuals of Latest Prototypes for 2014 ............................................................. 309
B.1.2 Visuals of Book Titles in Amazon.com .......................................................... 311
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 2.1</td>
<td>Framework on the Common Elements of DT (Hassi &amp; Laakso, 2011)</td>
<td>83</td>
</tr>
<tr>
<td>Table 2.2</td>
<td>Comparing Business and Design Thinking (Liedtka &amp; Ogilvie, 2011)</td>
<td>106</td>
</tr>
<tr>
<td>Table 2.3</td>
<td>SME Categories in Malaysia (<a href="http://www.smecorp.gov.my/v4/node/14">www.smecorp.gov.my/v4/node/14</a>)</td>
<td>118</td>
</tr>
<tr>
<td>Table 3.1</td>
<td>Types of AR (Zuber-Skerritt &amp; Perry, 2002)</td>
<td>126</td>
</tr>
<tr>
<td>Table 4.1</td>
<td>Summary Documentation of Cycle 1</td>
<td>145</td>
</tr>
<tr>
<td>Table 4.2</td>
<td>Summary Documentation of Cycle 2</td>
<td>147</td>
</tr>
<tr>
<td>Table 4.3</td>
<td>Summary Documentation of Cycle 3</td>
<td>148</td>
</tr>
<tr>
<td>Table 4.4</td>
<td>Summary Documentation of Cycle 4</td>
<td>151</td>
</tr>
<tr>
<td>Table 4.5</td>
<td>Timeline for Apple apps</td>
<td>161</td>
</tr>
<tr>
<td>Table 4.6</td>
<td>Summary Documentation of Cycle 5</td>
<td>165</td>
</tr>
<tr>
<td>Table 4.7</td>
<td>Summary Documentation of Cycle 6</td>
<td>173</td>
</tr>
<tr>
<td>Table 4.8</td>
<td>DT-BSC Integration Summary</td>
<td>191</td>
</tr>
<tr>
<td>Table 4.9</td>
<td>DT-BSC Framework Addressing Issues Related to Strategy and SME</td>
<td>192</td>
</tr>
<tr>
<td>Table 4.10</td>
<td>Summary Documentation of Cycle 7</td>
<td>195</td>
</tr>
<tr>
<td>Table 4.11</td>
<td>Addressing the Basic Components of Strategy</td>
<td>198</td>
</tr>
<tr>
<td>Table 4.12</td>
<td>Supporting and Relating the DT-BSC Process Steps to the Literature</td>
<td>199</td>
</tr>
<tr>
<td>Table 4.13</td>
<td>Summary of Related Research Issues</td>
<td>207</td>
</tr>
<tr>
<td>Table A.1</td>
<td>Types of AR and Their Main Characteristics</td>
<td>285</td>
</tr>
<tr>
<td>Table A.2</td>
<td>Selected Financial Data From The Firm</td>
<td>303</td>
</tr>
<tr>
<td>Table A.3</td>
<td>Product Roadmap</td>
<td>304</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1.1</td>
<td>Proposed Research Area</td>
<td>1</td>
</tr>
<tr>
<td>Figure 1.2</td>
<td>Summary of The Firm's Mission, Values, Vision and Older Strategy</td>
<td>4</td>
</tr>
<tr>
<td>Figure 1.3</td>
<td>Firm's Strategy Map 2005</td>
<td>4</td>
</tr>
<tr>
<td>Figure 1.4</td>
<td>5 AR Stages Used in this Research</td>
<td>16</td>
</tr>
<tr>
<td>Figure 1.5</td>
<td>7 Major AR Cycles</td>
<td>17</td>
</tr>
<tr>
<td>Figure 2.1</td>
<td>White Space Concept</td>
<td>22</td>
</tr>
<tr>
<td>Figure 2.2</td>
<td>10 Strategy Schools</td>
<td>22</td>
</tr>
<tr>
<td>Figure 2.3</td>
<td>Researcher Summary of a Working Definition of Strategy</td>
<td>24</td>
</tr>
<tr>
<td>Figure 2.4</td>
<td>Value Gap and Strategy</td>
<td>25</td>
</tr>
<tr>
<td>Figure 2.5</td>
<td>Three Customer Value Propositions</td>
<td>28</td>
</tr>
<tr>
<td>Figure 2.6</td>
<td>Generic Strategies, CVP and Strategy Techniques (Palladium, 2010)</td>
<td>28</td>
</tr>
<tr>
<td>Figure 2.7</td>
<td>Hierarchy of Resources, Capabilities and Competencies</td>
<td>30</td>
</tr>
<tr>
<td>Figure 2.8</td>
<td>Mapping Competencies With Markets</td>
<td>33</td>
</tr>
<tr>
<td>Figure 2.9</td>
<td>Gap in SME Frameworks (Taticchi, Tonelli &amp; Cagnazzo, 2010)</td>
<td>42</td>
</tr>
<tr>
<td>Figure 2.10</td>
<td>BSC From Performance Measurement to Strategy Implementation</td>
<td>46</td>
</tr>
<tr>
<td>Figure 2.11</td>
<td>Purpose and Definition of the BSC (Kaplan &amp; Norton, 1996)</td>
<td>47</td>
</tr>
<tr>
<td>Figure 2.12</td>
<td>Summary of the BSC Framework (Kaplan &amp; Norton, 1996)</td>
<td>48</td>
</tr>
<tr>
<td>Figure 2.13</td>
<td>BSC Cause and Effect Relationship</td>
<td>51</td>
</tr>
<tr>
<td>Figure 2.14</td>
<td>Strategy Map on Managing Customers (Kaplan &amp; Norton, 2004)</td>
<td>52</td>
</tr>
<tr>
<td>Figure 2.15</td>
<td>Summary of BSC Components</td>
<td>54</td>
</tr>
<tr>
<td>Figure 2.16</td>
<td>Adaptations of the Strategy Map (Kaplan &amp; Norton, 2004)</td>
<td>61</td>
</tr>
<tr>
<td>Figure 2.17</td>
<td>Unconventional Strategy Map (Field, 2011)</td>
<td>70</td>
</tr>
<tr>
<td>Figure 2.18</td>
<td>Inventions With No Guarantee of Revenue</td>
<td>73</td>
</tr>
<tr>
<td>Figure 2.19</td>
<td>Design Driven Innovation (Verganti, 2009)</td>
<td>74</td>
</tr>
<tr>
<td>Figure 2.20</td>
<td>Design as Magic? (Liedtka &amp; Ogilvie, p.3)</td>
<td>76</td>
</tr>
<tr>
<td>Figure 2.21</td>
<td>Design as a Manageable Process (Liedtka &amp; Ogilvie, 2011, p. 21)</td>
<td>77</td>
</tr>
<tr>
<td>Figure 2.22</td>
<td>Two Discourses on Design (Hassi &amp; Laakso, 2011)</td>
<td>82</td>
</tr>
<tr>
<td>Figure 2.23</td>
<td>DT for Business Strategy Generates Greatest Value (Fraser, 2007)</td>
<td>88</td>
</tr>
<tr>
<td>Figure 2.24</td>
<td>How Design Creates Value (Borja de Mozota, 2006a)</td>
<td>90</td>
</tr>
<tr>
<td>Figure 2.25</td>
<td>Design Management Staircase (Koostra, 2009)</td>
<td>94</td>
</tr>
<tr>
<td>Figure 2.26</td>
<td>Simple Prototyping With Colored Paper and Tapes</td>
<td>99</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>-----------</td>
<td></td>
</tr>
<tr>
<td>AR</td>
<td>Action Research</td>
<td></td>
</tr>
<tr>
<td>B2B</td>
<td>Business to Business</td>
<td></td>
</tr>
<tr>
<td>B2C</td>
<td>Business to Consumer</td>
<td></td>
</tr>
<tr>
<td>B2G</td>
<td>Business to Government</td>
<td></td>
</tr>
<tr>
<td>BSC</td>
<td>Balanced Scorecard</td>
<td></td>
</tr>
<tr>
<td>CVP</td>
<td>Customer Value Proposition</td>
<td></td>
</tr>
<tr>
<td>DT</td>
<td>Design Thinking</td>
<td></td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communication Technology</td>
<td></td>
</tr>
<tr>
<td>IT</td>
<td>Information Technology</td>
<td></td>
</tr>
<tr>
<td>NPD</td>
<td>New Product Development</td>
<td></td>
</tr>
<tr>
<td>PMP</td>
<td>Project Management Professional</td>
<td></td>
</tr>
<tr>
<td>RBV</td>
<td>Resource Based View</td>
<td></td>
</tr>
<tr>
<td>SFO</td>
<td>Strategy Focused Organization</td>
<td></td>
</tr>
<tr>
<td>SI</td>
<td>Systems Integration</td>
<td></td>
</tr>
<tr>
<td>SME</td>
<td>Small and Medium Enterprise</td>
<td></td>
</tr>
<tr>
<td>VAR</td>
<td>Value Added Reseller</td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER ONE
INTRODUCTION

This thesis follows the style guide that mixes addressing the researcher as a third person and also the first person, especially within an interpretive and narrative paradigm, based on the thesis style guide by (Perry, 1998). The researcher will use the first person only in the notes and observations of the action research cycles in Chapter Three.

The researcher has gone through a long journey as an entrepreneur, consultant and trainer in strategy management leading to his recent interest in innovation and design thinking. It has led to this stage of exploring how to combine some new management ideas related to the practice and thought processes of designers with relatively established ideas and tools in strategy management like core competencies, customer value propositions and the balanced scorecard. Of particular interest is how to apply these ideas to medium sized companies that acknowledge their need to formulate and implement some form of strategy in moving forward.

Figure 1.1 shows the research area of interest. Research at the intersection of these management ideas could contribute to new knowledge in terms of practical case studies or even perhaps a simple framework or model. Surely a strict methodological research approach along academic lines would answer some of these general questions.

![Proposed Research Area](image-url)
The contents of the thesis is for internal user only
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252


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272


APPENDIX A

A.1.1 The Case Company and the Researcher’s Journey in Entrepreneurship

The researcher has both an academic and professional background before he became an entrepreneur. He was a Physics lecturer in UKM (www.ukm.edu.my) in the 1980s during which he published a fourth year undergraduate textbook, a few seminar papers and one paper in a refereed international journal. He then joined IBM (www.ibm.com) as a Systems Engineer and won a Systems Engineering Excellence Award after just one year. Then a big question came, “Am I doing well because of IBM or due to my own capabilities?” He then took the challenge to lead a local small IT company of about 20 people and grow its revenue by about three times in two years. Then the next big question came, “Can I be successful on my own?” That led him to start his current company in October 1993.

His experiences and capabilities from IBM and the local company were in selling computer hardware. The early 1990s was the growth period of the PC companies like HP (www.hp.com), Compaq (acquired by HP), Acer (www.acer.com) and IBM. It was also the beginning of the client-server computing era with names like IBM, Compaq, HP, DEC (acquired by HP) and Sun Microsystems (www.sun.com and acquired by Oracle (www.oracle.com) in 2011). The researcher recalls that from the very early stages of The Firm, strategic choices had to be made. Should The Firm focus on the PC or client-server computing domain or both? Should The Firm work with all hardware manufacturers or focus on developing strategic alliances with a selected few? Which customer segments should The Firm focus on; consumers, corporations or government? What value-add can The Firm offer its customers? He experienced that even for a start-up firm, strategic choices need to be made and in his case, the experiences and capabilities of the founder shareholders were the only guide. With limited resources, the urgency to go to market and secure sales that lead to revenue and cash, the safest choices were the products and markets that the founding team was familiar with. The experiences and capabilities of the founder entrepreneur greatly influence the early strategic choices that a start-up company has to make.

The Firm was profitable in the first year mainly due to the experienced team that had good relations with both the customers and suppliers, thus growing revenues and
controlling the costs and cash flows well. Upon reaching the first stable phase of The Firm after about 3 years, longer-term strategic questions about the future of The Firm were raised by the founder managers. As his role moved from operations to management, The Firm looked towards the researcher for guidance and leadership on these strategic matters. That started his journey on business strategy.

Being incorporated in October 1993 with a paid-up capital of RM5 million, eNCoral Digital Solutions Sdn. Bhd. is privately held and funded. Trading of computer hardware was the initial core business. Currently, eNCoral is one of the reputable local SMEs in Malaysia that offers software-based solutions and consulting services to customers who intend to transform themselves into fully functional e-businesses. The focused customers are from the education, health, and banking industries as well as Government ministries and agencies.

Since its establishment in 1983, eNCoral has built strong partnerships with world class global ICT corporations such as Oracle and IBM and has employed successful business processes and methodologies. As a result, eNCoral has achieved numerous awards and recognitions from both corporate sector and Government agencies such as Platinum Partner from Oracle 2009-2013, IBM Premier Business Partner 2012, Enterprise 50 and Industry Excellence Award 2003 from Ministry of International Trade and Industry Malaysia (MITI), among others.
A.2.1 Sample List of Technical Action Research Projects

Sample list of strategy related projects commissioned by the researcher.

- Training and consulting for Tenaga Nasional Berhad Ventures Division and Non-Core Subsidiaries (2000)
- Training and consulting for UMW Toyota Sales Division (2001 and 2002)
- Training and consulting for UMW Toyota Human Resources Division (2004)
- Training for Kuwait Petroleum Company (2002)
- Training, consulting and software implementation for Syarikat Air Terengganu (2002)
- Training and consulting for CIDB Holdings (2005)
- Consulting for MARA (2005)
- Training and Consulting for Malaysian Armed Forces Military Health Service
- Various projects in using BSC as a tool for IT Strategic Planning. (2005 – 2007)
- Strategic planning and corporate scorecard development for UKM (National University of Malaysia). (2010)
- Full ICT plan for new technology park for USM (Science University of Malaysia) (2010)
- Scorecard automation at corporate and faculty level for UTM (Technology University of Malaysia) (2010)
The researcher has two formal certifications related to strategy management from the creators of the BSC. In 2008, while working as a consultant in the Strategic Planning Department at Qatar Telecom, he participated in the Office of Strategy Management Executive Working Group Program as a team member that included other members from more than 20 organizations worldwide. The two-year program covered detailed assignments related to the nine strategy management processes (Kaplan & Norton, 2008). In February 2011, he formally passed the certification examination and earned the distinction of being a Kaplan-Norton Balanced Scorecard Certified Graduate.
A.3.1 Action Research in Brief

Origins of AR

The origins of AR can be traced back to the work of social scientists both in the USA and in Europe in the late 1940s beginning with the original work of (Lewin, 1946). Kurt Lewin is acknowledged as the pioneer of action research (Abraham, Arnold & Oxenberry, 1996; Daniel & Wilson, 2004; Dick, 2002; French, 2009a; Zuber-Skerrit & Farquhar, 2005). In his work, he was constantly looking for the link between practice and knowledge, the link between the improvement of practice and the production of knowledge.

I have no access to the original published articles by Lewin (1946) and mainly referenced these works (Abraham, Arnold & Oxenberry, 1996; Daniel & Wilson, 2004; Dick, 2002; French, 2009a; Zuber-Skerrit & Farquhar, 2005). The work by Daniel and Wilson (2004) which has some relationship with this work, followed the Lewin (1946) five-phase model and I liked its simplicity. A summary of these original ideas is given in Appendix A.3.2 (Abraham, Arnold & Oxenberry, 1996; Zuber-Skerrit & Farquhar, 2005).

Abraham, Arnold and Oxenberry (1996) and Zuber-Skerrit and Farquhar (2005) pointed out to scholars at Tavistock Institute in the United Kingdom that followed up on Lewin’s original work. Some of Lewin’s successors also took up the AR approach particularly looking at the relationship of work groups behaviour and productivity of the American industry. So, there were two strong historical streams to AR that exploited it as a more systematic use of case studies giving more importance to the naturalistic ways of researching data such as participant observation, unstructured and semi-structured interviews, field notes, group discussions, workshops, log books and document analysis. There was still the emphasis given to verification, which was long the hallmark of the scientific method, but now this came from a different direction by researchers seeking ways for the validation of their findings. This gave birth to the idea of triangulation in which data were observed, confirmed by participants and tested by documentary evidence or similar means. The data were replicated by different sources of analysis rather than the duplication of the same set of circumstances (Abraham, Arnold & Oxenberry, 1996).
Zuber-Skerritt and Fletcher (2007) in a historical summary on AR for thesis writing described it as a relatively new methodology that focused on empowerment and change, gathering momentum across contexts and cultures. In addition to the social work of Kurt Lewin and his associates, first in Germany and then in America, and the socio-technical experiments and systems developed at the Tavistock Institute, they also referred to participatory AR and its origins in third world countries, especially in Latin America. After a pause in the late 1950s and 1960s, the literature on AR re-emerged in the late 1960s and has expanded greatly since then, especially in the last two decades when the number of higher degree theses by AR has increased.

Five fundamental features of Lewin’s AR method emerged (Abraham, Arnold & Oxenberry, 1996):

i. AR has to be focused on real problems in organizations and communities.

ii. It involves actually taking action to solve problems or improve the situation.

iii. The action is often repeated through a spiral of steps comprised of planning, action and evaluation.

iv. Researchers should collaborate with members of the community or organizations that are the subject of the research.

v. AR is a scientific process that, in addition to solving the identified problems, can provide insights into new knowledge in the related disciplines.

**Defining AR**

Langer and Thorup (2006) mentioned that Lewin (1946) described AR as “a comparative research on the conditions and effects of various forms of social action and research leading to social action” which uses “a spiral of steps, each of which is composed of a circle of planning, action, and fact-finding about the result of the action”. This definition indicates that AR is a significant methodology for intervention, development and change within communities and groups and that AR is about empowerment of these communities and groups.

Abraham, Arnold, and Oxenberry (1996) stated that Lewin did not actually publish a complete definition of AR. They mentioned this definition of AR which is
often quoted in the literature on the subject: “Action research aims to contribute to both the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework.”

Dick (1993) defined AR as a methodology with the dual aims of action and research; action to bring about change in some community or organization or program, and research to increase understanding on the part of the researcher or the client, or both (and often some wider community). There are in fact AR methods whose main emphasis is on action, with research as a fringe benefit. At the extreme, the ‘research’ may take the form of increased understanding on the part of those most directly involved. For this form of AR the outcomes are change, and learning for those who take part. In other forms, research is the primary focus. The action is then often a by-product. Such approaches typically seek publication to reach a wider audience of researchers. In these, more attention is often given to the design of the research than to other aspects. In both approaches it is possible for action to inform understanding, and understanding to assist action.

In a later work, Dick (2002) suggested that AR is a family of research methodologies that pursue action through change and, concurrently, better understanding through research. This is achieved by cycles of action and critical reflection and in the later cycles, continuously refining methods, data, and interpretation based on the understanding developed in the earlier cycles. It is a process of emergence that changes and develops as understanding increases. It is also an iterative process that evaluates the path of change as it converges towards a better understanding of what is happening. Most importantly, AR yields simultaneous action and research outcomes because it adapts to the situation. AR achieves adequate rigor by repeating the action and reflection cycles. Each cycle integrates theory and practice, understanding and action, and informs the next cycle until the research problem is solved adequately.

Zuber-Skerritt and Fletcher (2007) commented that it was impossible to arrive at a single, true definition of AR, because it depends on many environmental, situational, personal and organizational factors and multiple perspectives. They mentioned a mutually agreed working definition that is reprinted below. AR is occurring in a situation in which:
• people reflect and improve (or develop) their own work and their own situations;
• by tightly interlinking their reflection and action; and
• also making their experience public not only to other participants but also to other persons interested in and concerned about the work and the situation, i.e. their public theories and practices of the work and the situation;
• and if yours is a situation in which there is increasingly:
• data-gathering by participants themselves (or with the help of others) in relation to their own questions;
• participation (in problem-posing and in answering questions) in decision-making;
• power-sharing and the relative suspension of hierarchical ways of working, in a conscious move towards social and industrial democracy;
• collaboration among members of the group as a ‘critical community’;
• self-reflection, self-evaluation and self-management by autonomous and responsible persons and groups;
• progressive (and public) learning by doing and making mistakes in a ‘self-reflective spiral’ of planning, acting, observing, reflective planning, etc.;
• and reflection that supports the idea of the ‘(self)-reflective practitioner’;

Independently, Zuber-Skerritt (1992, p. 2) developed a theoretical framework of effective AR, known as the CRASP model. She made the clear distinction between research that yields theory/information only, and research that yields theory/information as well as improved practice (action, change). The latter is AR.

• Critical (and self-critical) collaborative enquiry by
• Reflective practitioners being
• Accountable and making the results of their enquiry public,
• Self-evaluating their practice and engaged in
• Participative problem-solving and continuing professional development.

Recently similar efforts have sought to define AR. This is a summary of the essence of quality AR: “AR is a participatory, democratic process concerned with developing practical knowledge in the pursuit of worthwhile human purposes,
grounded in a participatory worldview which we believe is emerging at this historical moment. It seeks to bring together action and reflection, theory and practice, in participation with others, in the pursuit of practical solutions to issues of pressing concern to people, and more generally the flourishing of individual persons and their communities” (Reason & Bradbury, 2007, p. 1).

Abraham, Arnold and Oxenberry (1996) developed the word formula below to identify the features specified by some authors as being necessary components of AR. AR = G+P+A+F+C+R; where

- G is the action research group. The group will be members of an organization/community as well as researchers who may be seen as an integral part of the group working in a collaborative manner for change and knowledge development.
- P is the problem to be addressed.
- A stands for action. The group takes positive action in response to the ideas and suggestions generated through questioning and discussion.
- F represents the facilitator.
- C indicates the cyclical nature of action research.
- R represents research/researcher.

Types of AR

There are various types of AR methodologies that might be applicable to different research problems. Zuber-Skerritt and Perry (2002) described three modes of AR as shown in Table A.1. French (2009a) mentioned four types of AR: “experimental, organizational, professionalizing and empowering” and also referred to another four varieties of AR: diagnostic, participant, empirical and experimental.

Zuber-Skerritt and Perry (2002) and Dick (2002) have provided detailed descriptions of what constitutes AR and have differentiated the required processes to be followed when AR is used for academic theses. For the purpose of this paper, the model as cited in (Zuber-Skerritt & Perry, 2002) will be used. Table A.1 summarizes the aims of the facilitator’s role and the relationship between the facilitator and the participants in the three different types of AR.
Table A.1

Types of AR and Their Main Characteristics

<table>
<thead>
<tr>
<th>Type of action research</th>
<th>Aims</th>
<th>Facilitator's role</th>
<th>Relationship between facilitator and participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Technical</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Effectiveness/efficiency of professional practice</td>
<td>Outside ‘expert’</td>
<td>Co-option (of practitioners who depend on facilitator)</td>
<td></td>
</tr>
<tr>
<td>- Professional development</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Practical</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- As (1) above</td>
<td>Socratic role, encouraging participation and self-reflection</td>
<td>Co-operation (process consultancy)</td>
<td></td>
</tr>
<tr>
<td>- Practitioner's understanding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Transformation of their consciousness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Emancipatory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- As (2) above</td>
<td>Process moderator (responsibility shared equally by participants)</td>
<td>Collaboration (symmetrical communication)</td>
<td></td>
</tr>
<tr>
<td>- Participants' emancipation from the dictates of tradition, self-deception, coercion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Their critique of bureaucratic systematization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Transformation of the organization and of its system</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Technical AR requires the testing of an intervention based on a pre-developed and specified theoretical framework. The intent of the research is to question whether the selected intervention can be applied in a practical setting. The researcher acts as an outside expert who will assist in the implementation of the intervention. Perry and Zuber-Skerritt (1991, p. 77) suggested that the aims of technical AR should be the effectiveness/efficiency of educational practice and professional development. The researcher has used the BSC/SFO frameworks (Kaplan & Norton, 1996, 2000) in many technical AR projects (Appendix A.2.1).

Practical AR requires the researcher and practitioner to join together to determine the potential problems, underlying causes, and possible solutions or interventions. The aims of practical AR include not only those for technical AR, but require more understanding and a transformation of consciousness of the practitioner.

Emancipatory AR requires the involvement of all participants equally with no hierarchy existing between the researcher and the practitioners. The researcher tries to reduce the gap between the actual problems identified by the practitioner and the theory used to explain and resolve the problems. The researcher facilitates the
discussion with the practitioners, so as to identify potential underlying problems and assumptions and thus making the researcher a collaborative member of the group. In addition to the requirements for technical and practical AR, emancipatory AR requires that the aims must include the participant’s emancipation from the dictates of tradition and self-deception. Within the context of emancipatory AR, there is still a consideration of how much participation is appropriate for the process to be truly emancipatory.

**Other Characteristics of AR**

There is much debate in the literature as to what distinguishes AR from other research methods (Dick, 2000; Kemmis & McTaggart, 1988). Most definitions of AR focus upon the themes of empowerment of participants, i.e. collaboration through participation, acquisition of knowledge, and social change. These are important values underlying AR that are also frequently observed in business practice. The equally common phrases of systematic inquiry, critical reflection, and strategic action are more appropriately specific to AR. AR differs from everyday practice in that it is a systematic and deliberate process where it is vitally important to plan, act, observe, and reflect with more care, with a more systematic approach, and with more rigor than would be evident in a normal day-to-day business practice environment:

AR fundamentally rejects the concept of a two-stage process in which research is carried out first by researchers and then in a separate second stage practitioners apply the knowledge generated from the research. Instead, the two processes of research and action are integrated.

In addition to the characteristics of AR that have already been described, French (2009a) mentioned six further attributes that distinguish AR from other more traditional forms of research.

- **Collaboration** is the interaction between the researcher or research team and the practitioner or group of practitioners. The practitioners have knowledge of the field or workplace from an internal perspective, especially with regard to the history and culture of the workplace. The researcher is an outsider who has expertise in theory, consulting, and research. The collaboration between the two parties can vary from periodic to continuous collaboration throughout the study, and the nature
of the collaboration is a determinant of whether the research process is technical, practical or emancipatory. However, other writers suggest that the researcher may not be an outside expert and should be considered as part of the team, working from within to formalize the research with and for the practitioners. In order for the collaboration to be emancipatory, the researcher must become part of the team. Collaboration has also been discussed by other writers with the use of alternative terms like ‘participation’ (Dick, 2002) and ‘process management’ (Bawden & Zuber-Skerritt, 2002).

- **Problem-solving.** The problem is determined as one of the early tasks of a group assembled by the researcher. A variety of data collection methods observation, interviews, and questionnaires can be used to identify the problem.

- **Change in practice.** The knowledge and understanding developed from the AR process should not only be of theoretical importance but also lead to practical work improvements directly related to the problem or issues that were identified.

- **Theory development.** A fundamental objective of AR is that the results achieved through the research process are utilized by the researcher to develop new theories or expand existing theories. The learning that is gathered during the AR process and the critical reflection and data analysis, creates a developed, tested, and critically examined idea or theory related to the body of knowledge related to the problem.

- **Publication of results.** The theories and solutions that are produced from the AR process should be made public to the other participants and those in the wider community who may have an interest in that work setting or situation.

- **Power.** In technical AR it is the idea that is the source of power for the action and since the idea often resides with the facilitator, it is the facilitator who controls the power in the project. In emancipatory AR, power is located in the group and not with individuals. It is suggested that the researcher is like a moderator of the process, who collaborates and shares responsibility with the other participants.
**Summary on AR**

In general AR is a family of methodologies that jointly pursues action (or change) and research (understanding or learning) at the same time. As defined, AR generally seeks to be a virtuous spiral of action and of research. As Figure 3.1 shows, each cycle involves diagnosis, planning, action, evaluation and learning. In the later cycles, AR continuously refines the methods, data and interpretation in the light of the evidence and understanding developed in the earlier cycles (Figure 3.2).

AR generally involves a ‘look, think, act’ process. It is, therefore, intended to foster a deeper understanding of a given situation, starting with conceptualizing and specifying the problem and moving through several actions, reflections, refinements and evaluations. It also makes us think about the contexts we are working in, how they affect our judgments and our interpretations on which those judgments are based. The spiral process repeats itself until the desired improvements to practice are achieved.

In general, action research:

- is an evolving process that takes shape as with increasing understanding of the problems and solutions related to the change agenda;

- is an iterative process that converges towards a better understanding of practice and change, where the body of knowledge is added to and built on in attempts to do better with constraints in resources. As a note, DT is also an iterative process;

- is pragmatic in terms of action and of research, relying on data and information from what actually happens. As a note, DT also promotes learning from what actually happens;

- is participative and collaborative because change is usually easier to achieve when those affected by the change are involved in the doing. DT is also collaborative;

- is reflective with careful thought being given to the evidence based from other studies, whatever methodology they used, and to the evidence from what is happening in reality;

- is ‘evidence based’ building on formal research from literature review, other studies and the evidence collated from the real world being faced;
often blends qualitative and quantitative research and action as neither form of research alone will provide all the answers to the research problem.

AR has the potential to generate genuine and sustained improvements in practice because it can offer:

- better ownership of action and of analysis;
- pragmatic insight into real life issues, constraints and solutions; new opportunities to reflect on and assess work;
- scope and structure to explore and test new ideas, methods, and materials;
- positive and constructive opportunities to share feedback with peers and colleagues;
- a basis for formulating and acting on the evidence and analysis;
- a potential to contribute to new knowledge when the practical learning is cross-referenced with academic literature.

A.3.2 Kurt Lewin on Action Research

This appendix summarizes in point form some key features of Kurt Lewin’s work on action research.

i. Lewin’s concept of AR

- Conceptually crucial are the ideas of group decision and commitment to improvement.
- Those affected by planned changes have the primary responsibility for deciding on courses of critically informed action that seem most likely to maximize improvement of practice and evaluate the results of strategies tried out in practice.

ii. Thematic Concern

- Action research is participatory, collaborative research that typically arises from the clarification of some concerns generally shared by a group.
- Participants describe their concerns, explore what others think, and probe to find what it might be possible to do.
- In discussion they decide what is feasible to work on, i.e. a group project.
- The group identifies the project’s thematic concern.
iii. AR steps

- Reconnaissance – initial reflection on your situation in light of thematic concern.
- Planning for improvement.
- Enacting the plan and observing how it works.
- Reflection – analyse, synthesize, interpret, explain, draw conclusions.

iv. The Four Moments of AR

- Planning critically informed action to improve what is already happening;
- Acting to implement the plan;
- Observing the effects of critically informed action in the context in which it occurs;
- Reflecting on these effects as a basis for further planning, critically informed action and so on, through a succession of cycles.

v. Types of outcomes from AR. In AR one looks for changes in three different aspects of individual work and the culture of groups:

- Changes in the use of language and discourses – how people actually identify and describe their world and work;
- Changes in activities and practices – what people are actually doing in their work and learning; and
- Changes in social relationships and organization – how people interrelate and how their relationships are structured and organized within the organization.

The AR study conducted in this thesis has three objectives, corresponding to the three characteristics of AR studies originally formulated by Lewin (1946) of action, knowledge production and training:

i. to help The Firm to implement a strategic change agenda to improve their innovation capability by implementing DT practices;

ii. to do so via a method which could be generalized to other SMEs, and to synthesize the participants’ relevant experience of how to use the method successfully; and

iii. to share this knowledge with, and between, the participants, as well as documenting it for other organizations in the form of a thesis.
## A.3.3 Seven Part Structure for AR Analysis

<table>
<thead>
<tr>
<th><strong>Parts for AR analysis</strong></th>
<th><strong>Comments</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Diagram. Diagrammatic representation of the action research cycles</td>
<td>See Figure 3.2.</td>
</tr>
</tbody>
</table>
| 2. The notion. An AR process begins with a notion in the practitioner’s mind that a change in work practice is desirable. The notion is then articulated and used to develop the ‘thematic concern’ and ‘research question’ | - Started with ‘Growth through Innovation Capability’ based on Figure A.6  
- Refined to ‘New growth by increasing the innovation capability of The Firm through the use of DT’ after Cycle 4  
- Research question  
  - Simpler and more action-oriented approach for strategy development and implementation for SMEs? |
| 3. The AR cycles. The AR cycles are enumerated and objectives set for each cycle. As planning is the first element of each of the AR cycles, a set of objectives for each cycle is articulated. The first AR cycle will include the development and articulation of the ‘thematic concern’ (the action element) and the ‘research question’ (the research element) of the project. | - Figure 3.2  
- Cycles 1 to 4 in Table 4.1, 4.2, 4.3 and 4.4  
- Cycle 5 in Table 4.6  
- Cycle 6 in Table 4.7  
- Cycle 7 in Table 4.10 |
| 4. The AR criteria/methodology checklist. An AR criteria/methodology checklist, utilizing the thinking of (Perry & Zuber-Skerritt, 1991, p. 70), is applied at the start of each analysis chapter to confirm that an AR project is occurring. | - Criteria as per checklist below met. |
| 5. The (Dick, 1999) documentation model. | - Each of the AR cycles is described with the use of the same documentation model and format. |
| 6. Other AR characteristics. Conclude with a discussion of how the project demonstrated the six elements: | - Section 5.5 |
|  
- collaboration | - Cycles 1 through 4 |
|  
- problem-solving | - Section 4.1 |
|  
- change in practice | - Newer approach to strategy management in The Firm based on model developed  
- DT practices prevalent  
- Visual communication now common  
- Project canvasses, timelines common as in Appendix A.5.2  
- Innovation agenda continues as in Appendix B |
|  
- theory development | - Discussed in Section 4.3 and Section 5.7 |
|  
- publication of results | - This thesis |
|  
- power | - Section 5.5 |
| 7. Conclusion. A conclusion is provided in response to the ‘action’ outcomes and to provide an answer to the ‘research’ question. | - Chapter Five |
Perry & Zuber-Skerritt Checklist

If yours is a situation in which people reflect and improve (or develop) their own work and their own situations by tightly interlinking their reflection and action and also making their experience public not only to other participants but also to other persons interested in and concerned about the work and the situation, i.e. their (public) theories and practices of the work and the situation; and, if yours is a situation in which there is increasingly

i. data gathering by participants themselves (or with the help of others) in relation to their own questions;

ii. participation (in problem posing and in answering questions) in decision making;

iii. power-sharing and the relative suspension of hierarchical ways of working towards industrial democracy;

iv. collaboration among members of the group as a ‘critical community’: self-reflection, self-evaluation, and self-management by autonomous and responsible persons and groups learning progressively (and publicly) by doing and making mistakes in a ‘self-reflective spiral’ of planning, acting, observing, reflecting, re-planning, etc.

v. reflection, which supports the idea of the ‘(self-)reflective practitioner’;

then yours is a situation in which action research is occurring (Perry & Zuber-Skerritt, 1991, p. 70).
A.3.4 OSM Certificate

Azman Husain

Qatar Telecom

has successfully completed the Office of Strategy Management Executive Working Group Program as a Team Member.

The two-year program covers the nine strategy management processes:

- Strategy Development
- Scorecard Management
- Strategy Reviews
- Organization Alignment
- Strategy Communication

This Certificate of Completion is granted on July 8, 2008.

by

Robert S. Kaplan, Co-Chairman,

Palladium Group, Inc.
A.3.5 Selected Pictures from Cycle 1

Figure A.1
*Collaborative History Notes Using the Timeline Technique*

(Green, yellow and red stickers indicate positive, neutral and negative events respectively.)

Figure A.2
*Sample 2x2 Matrices Used in Cycle 1*
Figure A.3
Voting Done by Other Participants on the Outcome

Figure A.4
Initial List of Projects From Innovation Day 2010
Figure A.5
*Simple Project Plan for One of the Selected Projects*
A.3.6 Selected Pictures from Cycle 2

Figure A.6
*Highlighting the Major Strategic Themes*
Figure A.7
Timeline Output from Cycle 2

Figure A.8
Cascading Overall Revenue Target by Department
Figure A.9
*Project Plan for a New Product*
A.3.7 Selected Pictures from Follow-up to Cycle 3

Another customer showcase event was done after Cycle 3.

Figure A.10
E-book Portal and Printed Versions of Selected E-book Titles

Figure A.11
Showing One of the Mobile Applications
A.3.8 Selected Pictures from Cycle 4

Figure A.12
Teams Collaborate to Prototype Ideas Into Simple Models

Figure A.13
Converting Ideas From Oracle Related Business Into Prototypes
Figure A.14
*Prototyping Using Lego Serious Play Tools*

Figure A.15
*Documenting the Lego Prototypes With Pictures*

Background shows one of the many project panels in The Firm.
A.4.1 Strategic Outcomes Annual Results

Although the research problem is not about the overall performance of The Firm it is interesting to look at the results of its performance over the planning period from 2010 to 2013. Financial outcome numbers are easily obtainable from The Firm’s accounting system and audited reports. Table A.2 looks at four important measures and presents the results relative to the numbers for the financial year ending March 2010. The numbers for 2013 are unaudited. The numbers also relate to the strategic outcomes shown in Figure 4.18. The detailed results for the portion on B2C are discussed in Section 4.2.1.

Table A.2
Selected Financial Data From The Firm

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013 (Draft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>1.00</td>
<td>1.30</td>
<td>1.48</td>
<td>1.79</td>
</tr>
<tr>
<td>Revenue Per Employee Cost</td>
<td>1.00</td>
<td>1.46</td>
<td>1.79</td>
<td>1.89</td>
</tr>
<tr>
<td>% New revenue</td>
<td>1.00</td>
<td>2.82</td>
<td>4.81</td>
<td>4.28</td>
</tr>
<tr>
<td>Investments</td>
<td>1.00</td>
<td>2.91</td>
<td>3.20</td>
<td>4.29</td>
</tr>
</tbody>
</table>

The revenue for 2013 exceeded the 50M target set in Figure 4.18. The new products, services and solutions that came from the ideas and prototypes mentioned in Figures 4.23, 4.26 and 4.27, contributed to the ‘new revenue’. Section 2.3 mentions ‘percentage of new revenue’ as one of the output measures for innovation. The growth in ‘new revenue’ confirms the success of the innovation element of strategic change agenda. ‘Revenue per employee cost’ is a simple measure of productivity and also shows an improving trend. As shown in Figure 4.23, one of the new areas of business The Firm planned to venture into was portfolio investment in property, quoted stocks, fixed deposits and private equity. The numbers in Table A.2 show the growth in the asset size of the investments. This indicates success in that portion of the strategic change agenda. It is presented here to complete the discussion on results related to the strategic outcomes shown in Figure 4.23.
A.4.2 e-Book Roadmap

Table A.3 summarizes the product roadmap until 2013 for the book titles. The first version is always the PDF version since it is the easiest to produce. The same content is then used to develop an iOS app and sold through the Apple iTunes App Store. Then The Firm negotiates with a book publisher to do a normal printed version of the book.

The Firm has also developed the technical capability to produce an ePub format of the e-books. It allows the incorporation of richer multimedia features compared to the PDF version. The sales of the ePub version of SOP were slow and the effort to extend it to the other titles was put on hold.

In Jun 2013 The Firm started to explore the Amazon Kindle and Apple iBook platforms and plans to sell versions of the e-book titles in these market places.

The e-book market experienced double growth in 2011 and is expected to grow as e-book readers and tablets become more widespread in use (Greenfield, 2012). This is an exciting new business for which the tools to produce the e-books are getting much easier. As such, success factors like the value of the content, author branding and marketing are more important than technical capabilities.

The e-Book business started as an idea generated in Cycle 1 and went through many cycles of prototyping, product launches and updates. The Firm continues to learn and adapt different product development and marketing tactics to build upon the initial idea.

Table A.3
Product Roadmap

<table>
<thead>
<tr>
<th>Title Code</th>
<th>PDF</th>
<th>iOS App</th>
<th>Printed</th>
<th>ePub</th>
<th>Amazon Print</th>
<th>Apple iBook</th>
</tr>
</thead>
<tbody>
<tr>
<td>HKA1</td>
<td>Jan 2013</td>
<td></td>
<td>Sep 2013</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HKA2</td>
<td>Jul 2013</td>
<td>Sep 2013</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TA</td>
<td>Aug 2013</td>
<td></td>
<td>Aug 2013</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BHMC</td>
<td>Apr 2013</td>
<td></td>
<td></td>
<td>Aug 2013</td>
<td>Apr 2014</td>
<td></td>
</tr>
</tbody>
</table>
A.4.3 Sample Customer Co-Creation Activity

The Firm learned and benefited greatly during the half-day event engaging with the customer as reported in AR Cycle 3. Customer co-creation is an important tool of the designers (Liedtka & Ogilvie, 2011). The Firm made a conscious effort to engage the customer in producing the e-books. One approach was to encourage the customers to vote on the design covers for the e-books. This is easily done using the portal development tools and then promoted to the ‘fans’ via Facebook.

Figure A.16 shows an example of voting for the book cover for the title code GWI. The last design was chosen.

![Figure A.16
Voting Activity for Customer Co-creation](image)
A.5.1 Organizational Chart

The Firm has a flat structure with only one layer of management. There are no appointed heads for the various functions shown. The practice is to appoint leaders on a project basis.
A.5.2 Project Panels

The pictures below are taken from the various functions and departments in The Firm. It shows the widespread use of project panels and visual timelines. These allow everyone to know the progress of prototypes and projects in the different departments of The Firm. Simple tools like Post-It notes allow people to input comments and suggestions.
APPENDIX B

B.1.1 Visuals of Latest Prototypes for 2014

The Firm continues with its prototyping approach in developing new products and solutions beyond the strategic planning period from 2010 to 2013. This proves that the DT practices and innovation capability of The Firm are now part of its working style and culture.

The ‘Pre-Hospital Care System’ is a co-creation effort involving The Firm, TM as the telecommunications provider and a major government hospital. The pictures below briefly describe the features and functions of the system.

![Initial Concept Diagram]

![Visited Hospital Sungai Buloh ED Diagram]

Visit on 5 June 2013
Additional Input
**emMobile Features**

1. Integrates data from CAD system eg: CallCardID, lokasi (lat,long), maklumat Caller, comments (of ProQA) etc via webservice
2. Captures all basic and necessary information that takes place in any incidents, eg: photo of sites, patient situation (ecg, pulse), glasgow coma scale etc
3. Communicates with MECC (at hospital) by sending critical information captured at sites
4. Alerts MECC about location of ambulance & status
5. Allows paramedic to chat with doctor(s) if required
6. Able to view past records of patient or incidents based on location

**emCARE Features**

1. Helps doctor(s) to receive early information about incoming patient’s condition via images/photos
2. Able to trace ambulance of their whereabouts. This allows, early necessary preparation could be done since ambulance arrival time can be estimated via Google maps
3. Able to communicate with paramedic via chat (if required)
4. Integrates with MyHIX data
5. Produces incidents reporting (subject to discussion of what MOH would require)
B.1.2 Visuals of Book Titles in Amazon.com

Appendix A.4.2 shows the roadmap of the e-book project. The following picture is a snapshot from two titles in amazon.com. The current version uses Amazon’s on demand print technology. This is further proof that the initial e-book idea is leading The Firm to newer opportunities and markets.