FRAMEWORK FOR THE AUDIT PROCESS IMPLEMENTATION ON PUBLIC BUILDINGS

KHADIJAH BINTI MD ARIFFIN

A thesis submitted in
fulfilment of the requirement for the award of the
Doctor of Philosophy in Real Estate and Facilities Management

Faculty of Technology Management and Business
Universiti Tun Hussein Onn Malaysia

JULY 2015
ABSTRACT

Audit of public buildings (PBs) is a relatively new phenomenon in the construction industry in Malaysia. Until 2006, there was no such audit conducted on PBs in Malaysia. In 2007, the government, through the Public Works Department (PWD) introduced audit on all buildings owned by the federal government. However, no formal studies have been conducted to explore the processes involved in the audit performed by PWD. An exploratory study was conducted to identify the processes involved in the audit of PBs by PWD. The exploratory study conducted concluded that full phase of audit was not implemented by PWD. Research findings from the exploratory study identified that PWD is the only agency in Malaysia which conducts technical audit on PBs. The finding has stimulated this study to refine research questions; justify a single and holistic case study as a research approach and identify the stakeholders involved in the audit process. A framework for identifying the stakeholders involved and their tasks and expectations which lead to the requirements needed to implement full phase of audit is further developed and applied for the Batu Pahat District Health Clinic (The Clinic Building). Hence, the study aims to investigate other requirements that are needed for full phase of audit being implemented for the Clinic Building by PWD. This study explores the key stakeholders involved, and their level of involvement in the audit process; barriers for full engagement of the audit process; and the stakeholders’ expectations for the audit process that lead to the barriers and issues that arises from the audit process by PWD. This study applies qualitative research methodology with a case study design, and adopts rigorous data collection and analysis. Interviews and focus group were used as the main data collection method in obtaining the right data for the study. The data were then analysed using NVivo 2 as a tool. Research findings from the case study lead to the introduction of a framework for implementing full phase of audit on PBs for PWD. This leads to the identification of additional requirements needed for the full phase of audit on PBs by PWD. It generates new knowledge on the requirements of the full phase of an audit process on PBs in Malaysia.
ABSTRAK
Audit bangunan awam merupakan satu fenomena baru dalam industri pembinaan di Malaysia. Sehingga tahun 2006, tiada audit seumpama dijalankan ke atas bangunan awam di Malaysia. Pada tahun 2007, kerajaan melalui Jabatan Kerja Raya (JKR) telah memperkenalkan audit ke atas semua bangunan milik kerajaan persekutuan. Walau bagaimanapun, tiada kajian formal dijalankan bagi mengkaji proses yang terlibat dalam audit bangunan oleh JKR. Satu kajian rintis telah dijalankan bagi mengenalpasti proses yang terlibat dalam audit ke atas bangunan awam oleh JKR. Kajian rintis tersebut merumuskan bahawa fasa audit tidak dijalankan sepenuhnya oleh JKR. Dapatan kajian dari kajian rintis tersebut mengenalpasti JKR sebagai satu-satunya agensi di Malaysia yang menjalankan audit teknikal ke atas bangunan awam. Dapatan kajian tersebut telah membantu pemurnian soalan-soalan kajian; mewajarkan pemilihan pendekatan kajian kes tunggal dan holistik serta mengenalpasti pihak berkepentingan di dalam proses audit penilaian. Satu rangka kerja bagi mengenalpasti pihak berkepentingan yang terlibat dan tugas serta jangkaan yang membawa kepada keperluan lain bagi melaksanakan fasa penuh audit telah disediakan dan digunakan bagi Klinik Kesihatan Daerah Batu Pahat (Bangunan Klinik). Oleh yang demikian, kajian ini bertujuan untuk mengenalpasti keperluan-keperluan lain yang diperlukan bagi memastikan fasa penuh audit dijalankan ke atas Bangunan Klinik oleh JKR. Kajian ini mengenalpasti pihak berkepentingan yang terlibat; tahap keterlibatan pihak berkepentingan dalam proses audit; halangan penggunaan fasa penuh proses audit; dan jangkaan pihak berkepentingan ke atas proses audit yang membawa kepada halangan dan isu berbangkit dari proses audit oleh JKR. Kajian ini menggunakan metodologi kajian secara kualitatif dengan rekabentuk kajian kes, menggunakan pengumpulan dan analisis data yang padu. Kaedah temubual dan kumpulan fokus digunakan sebagai metod utama pengumpulan data bagi memperolehi data yang bertepatan bagi kajian ini. Data tersebut kemudiannya dianalisis menggunakan NVivo2. Dapatan dari kajian kes membawa kepada pengenalan rangka kerja bagi melaksanakan fasa penuh audit ke atas bangunan awam oleh JKR. Kajian ini mengenalpasti keperluan lain yang diperlukan bagi melaksanakan fasa penuh audit. Ia menjana pengetahuan baru ke atas keperluan bagi fasa penuh proses audit oleh JKR.
# CONTENTS

**DECLARATION** i  
**DEDICATION** iii  
**ACKNOWLEDGEMENTS** iv  
**ABSTRACT** v  
**ABSTRAK** vi  
**CONTENTS** vii  
**LIST OF TABLES** xii  
**LIST OF FIGURES** xiv  
**LIST OF ABBREVIATIONS** xvi  
**LIST OF APPENDICES** xvii  

## CHAPTER 1  INTRODUCTION

1. 1  Research background 1  
1. 2  Problem statement 2  
1. 3  Research aim 4  
1. 4  Research questions 4  
1. 5  Research objectives 5  
1. 6  Significance of the study 5  
1. 6.1  The extension of knowledge 6  
1. 6.2  The importance of property to organisations 6  
1. 6.3  The significance of audit process to the public sector 6  
1. 7  Research methodology 6  
1. 8  Research scope 7  
1. 9  Definitions 7  
1. 9.1  Public buildings (PBs) 7  
1. 10  Thesis structure 8  
1. 11  Summary 9
CHAPTER 2  LITERATURE REVIEW
2. 1  Introduction  10
2. 2  Definition of audit  10
2. 3  Types of audit  11
2.3.1  Financial audit  11
2.3.2  Management audit  11
2.3.3  Performance audit  13
2. 4  Audit process  15
2.4.1  Skills of an auditor  18
2. 5  Reason on the need for audit  19
2.5.1  Governance  20
2.5.2  Quality in construction  20
2. 6  The importance of audit  23
2. 7  Current audit practice on buildings  25
2.7.1  MS ISO and Total Quality Management (TQM)  25
2.7.2  Post-construction evaluation  29
2. 8  Gaps in the literature  34
2. 9  Summary and link  34

CHAPTER 3  RESEARCH DESIGN AND METHODOLOGY
3. 1  Introduction  35
3. 2  Research process  36
3. 3  Research question development  36
3. 4  Research philosophy  37
3. 5  Research approach  40
3. 6  Research design and data collection techniques  42
3.6.1  Research design  43
3.6.2  Data collection techniques  45
3.6.3  Case study  50
3. 7  Selection of case study  52
3. 8  Data collection  52
3.8.1  Data collection methods  53
3. 9  Data analysis  56
3.9.1  Content analysis  56
3. 10  Validation of case study  56
3.10.1  Triangulation of the case study  57
3. 11  Summary and link  59

CHAPTER 4  FINDINGS FROM EXPLORATORY STUDY AT PWD AND NAD
4. 1  Introduction  60
4. 2  Objectives  61
4. 3  Methodology  61
4.3.1 Research propositions 61
4.3.3 Linking data to propositions 62
4.3.4 Criteria for interpreting the findings 62
4.4 Case study background: Organizations involved in audit of PBs in Malaysia 63
4.4.1 National Audit Department 63
4.4.2 Public Works Department 71
4.5 Data analysis and findings 78
4.5.1 Data analysis 78
4.5.2 Findings 99
4.6 A research reflection 100
4.6.1 The different stakeholders who are involved in audit practice on PBs 102
4.6.2 Barriers of audit practice in PBs 102
4.6.3 Stakeholders’ expectations from the audit process in PBs 102
4.6.4 Refining research questions 102
4.6.5 Refining research approach – single case study 103
4.7 Summary and link 103

CHAPTER 5  RESEARCH FRAMEWORK DEVELOPMENT TO INVESTIGATE THE AUDIT PROCESS ON THE CLINIC BUILDING BY PWD
5.1 Introduction 105
5.2 Method and approach 105
5.2.1 Deductive approach – literature surveys and results 107
5.2.2 Inductive approach – exploratory study results 109
5.3 A research framework for investigating the full phase of audit process on the Clinic Building by PWD 111
5.3.1 The different stakeholders involved and their task allocations in the audit process 112
5.3.2 The phases of audit process by PWD 112
5.3.3 The barriers to implement full phase audit by PWD 112
5.3.4 The stakeholders’ expectations from the audit process by PWD 112
5.4 A research framework for case study 113
5.5 Summary and link 117

CHAPTER 6  CASE STUDY OF THE AUDIT PROCESS ON THE CLINIC BUILDING BY PWD
6.1 Introduction 118
6.2 A research framework for identifying the audit process on the Clinic Building by PWD 119
6.2.1 Area of investigation to deduce the other requirements needed for implementing full phase of
6.3 Description of case study: Batu Pahat District Health Clinic (the Clinic Building) 122
6.3.1 Aim of case study 122
6.3.2 The case study background 123
6.3.3 Justification of choosing the Clinic Building 126
6.5 Research analysis and findings 127
6.5.1 Area of investigation 1: Identifying the stakeholders involved and the task allocations for the audit process practiced by PWD on the Clinic Building 127
6.5.2 Area of investigation 2: Identifying the phases of audit process practiced by PWD on the Clinic Building 133
6.5.3 Area of investigation 3: Identifying the barriers to full level of audit practiced by PWD on the Clinic Building 139
6.5.4 Area of investigation 4: Identifying the stakeholders’ expectations of audit practiced by PWD on the Clinic Building 145
6.6 Summary and link 152

CHAPTER 7  CONCLUSION AND RECOMMENDATIONS
7.1 Introduction 153
7.2 Discussion on the research aims and objectives 153
7.3 Summary of research findings 154
7.3.1 Area of investigation 1: Identifying the stakeholders involved and the task allocations for the audit process practiced by PWD on the Clinic Building 155
7.3.2 Area of investigation 2: Identifying the phases of audit process practiced by PWD on the Clinic Building 155
7.3.3 Area of investigation 3: Identifying the barriers to full level of audit practiced by PWD on the Clinic Building 155
7.3.4 Area of investigation 4: Identifying the stakeholders’ expectations of audit practiced by PWD on the Clinic Building 155
7.3.5 Area of investigation 5: Proposing a framework for implementation of a full phase of the audit process on the Clinic Building by PWD 156
7.4 Reflections of research questions 156
7.4.1 RQ1: ‘Who are the stakeholders involved and their task allocation for audit process on the Clinic Building by PWD?’ 156
7.4.2 RQ2: ‘What are the phases of audit implemented by different stakeholders involved in the audit process on the Clinic Building by PWD?’ 158
7.4.3 RQ3 ‘Why are full phase of audit process not implemented on the Clinic Building by PWD?’

7.4.4 RQ4 ‘What are the different stakeholders’ expectations from the audit process on the Clinic Building by PWD?’

7.4.5 RQ5 ‘How can a full phase of audit process be implemented on the Clinic Building by PWD?’

7.5 Contribution to new knowledge

7.6 Limitations of the study

7.7 Areas for future research

7.7.1 Application of full level of audit

7.7.2 Audit reporting systems

7.8 Overall conclusion

REFERENCES

APPENDIX A

APPENDIX B

APPENDIX C

APPENDIX D

APPENDIX E

APPENDIX F

APPENDIX G

APPENDIX H

APPENDIX I

APPENDIX J
<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Philosophical Assumption for the Study</td>
<td>38</td>
</tr>
<tr>
<td>3.2</td>
<td>Relevant situations for different research approaches</td>
<td>41</td>
</tr>
<tr>
<td>3.3</td>
<td>Information types and methods of obtaining information</td>
<td>47</td>
</tr>
<tr>
<td>3.4</td>
<td>A list of documents obtained from the case study</td>
<td>50</td>
</tr>
<tr>
<td>3.5</td>
<td>The Four Design Tests</td>
<td>57</td>
</tr>
<tr>
<td>3.6</td>
<td>Case study tactics for the Four Design Tests</td>
<td>58</td>
</tr>
<tr>
<td>4.1</td>
<td>Documents reviewed from NAD and PWD</td>
<td>53</td>
</tr>
<tr>
<td>4.2</td>
<td>The number of performance audit conducted on PBs by NAD from year 2003 to 2012</td>
<td>68</td>
</tr>
<tr>
<td>4.3</td>
<td>Barriers in audit practice at NAD and PWD</td>
<td>96</td>
</tr>
<tr>
<td>4.4</td>
<td>The stakeholders’ expectations</td>
<td>99</td>
</tr>
<tr>
<td>5.1</td>
<td>Research framework development approach</td>
<td>111</td>
</tr>
<tr>
<td>5.2</td>
<td>Data collection methods by research questions analysis</td>
<td>114</td>
</tr>
<tr>
<td>5.3</td>
<td>Research framework summary</td>
<td>115</td>
</tr>
<tr>
<td>6.1</td>
<td>Audit findings and recommendations for the Clinic Building</td>
<td>127</td>
</tr>
<tr>
<td>6.2</td>
<td>Stakeholders involved and task allocations in the audit phases implemented on the Clinic Building by PWD</td>
<td>136</td>
</tr>
<tr>
<td>6.3</td>
<td>Total number of defects according to work scope</td>
<td>138</td>
</tr>
<tr>
<td>6.4</td>
<td>Ratings based on number of defects</td>
<td>138</td>
</tr>
<tr>
<td>6.5</td>
<td>Barriers for full phase of audit not implemented on the Clinic Building by PWD</td>
<td>143</td>
</tr>
<tr>
<td>6.6</td>
<td>Stakeholders’ expectations of the audit practiced on PWD at the Clinic Building</td>
<td>148</td>
</tr>
<tr>
<td>7.1</td>
<td>Areas of investigations that lead to answer the research questions</td>
<td>154</td>
</tr>
<tr>
<td>7.2</td>
<td>The phases not implemented in the audit of the Clinic Building</td>
<td>158</td>
</tr>
<tr>
<td>Section</td>
<td>Description</td>
<td>Page</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>------</td>
</tr>
<tr>
<td>7.3</td>
<td>Categorization of stakeholders’ expectations</td>
<td>162</td>
</tr>
<tr>
<td>7.4</td>
<td>Categorization of phases not implemented in the audit of the Clinic Building by PWD</td>
<td>164</td>
</tr>
<tr>
<td>7.5</td>
<td>Deduction of other requirements needed for full phase implementation of the audit process on the Clinic Building by PWD</td>
<td>165</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>The overall research process</td>
<td>36</td>
</tr>
<tr>
<td>3.2</td>
<td>Real world research enquiry to develop research questions</td>
<td>37</td>
</tr>
<tr>
<td>3.3</td>
<td>Positioning research paradigm</td>
<td>38</td>
</tr>
<tr>
<td>3.4</td>
<td>Positioning research paradigm and research approach</td>
<td>40</td>
</tr>
<tr>
<td>3.5</td>
<td>Research Design Model</td>
<td>44</td>
</tr>
<tr>
<td>3.6</td>
<td>Overview of the planning and preparation procedure for interviews</td>
<td>48</td>
</tr>
<tr>
<td>3.7</td>
<td>Basic types of designs for case studies</td>
<td>51</td>
</tr>
<tr>
<td>4.1</td>
<td>Types of audit performed by NAD</td>
<td>64</td>
</tr>
<tr>
<td>4.2</td>
<td>NAD’s organization chart and example of how performance audit for one audit branch at the headquarters is segregated for the year 2005</td>
<td>67</td>
</tr>
<tr>
<td>4.3</td>
<td>The number of performance audit conducted on PBs by NAD from year 2003 to 2012.</td>
<td>69</td>
</tr>
<tr>
<td>4.4</td>
<td>Performance audit process’ flow chart by NAD</td>
<td>70</td>
</tr>
<tr>
<td>4.5</td>
<td>Public Works Department’s organizational chart</td>
<td>72</td>
</tr>
<tr>
<td>4.6</td>
<td>Number of audit conducted by PWD</td>
<td>77</td>
</tr>
<tr>
<td>4.7</td>
<td>Types of audit practiced by PWD</td>
<td>74</td>
</tr>
<tr>
<td>4.8</td>
<td>Audit process on PBs at NAD and PWD</td>
<td>79</td>
</tr>
<tr>
<td>4.9</td>
<td>NAD’s pre-audit process</td>
<td>81</td>
</tr>
<tr>
<td>4.10</td>
<td>During audit process involved in NAD</td>
<td>82</td>
</tr>
<tr>
<td>4.11</td>
<td>Audit reporting process by NAD</td>
<td>83</td>
</tr>
<tr>
<td>4.12</td>
<td>Planning phase of audit on new buildings by PWD</td>
<td>85</td>
</tr>
<tr>
<td>4.13</td>
<td>Pre-audit process by PWD</td>
<td>86</td>
</tr>
<tr>
<td>4.14</td>
<td>During audit phase of on PBs by PWD</td>
<td>88</td>
</tr>
<tr>
<td>4.15</td>
<td>Post-audit process of audit by PWD</td>
<td>90</td>
</tr>
<tr>
<td>4.16</td>
<td>Stakeholders’ involved and tasks allocation for audit on PBs at NAD and PWD</td>
<td>91</td>
</tr>
<tr>
<td>4.17</td>
<td>Stakeholders involved in audit practice on PBs by NAD</td>
<td>92</td>
</tr>
<tr>
<td>4.18</td>
<td>Barriers that causes phases of audit not implemented</td>
<td>94</td>
</tr>
<tr>
<td>4.19</td>
<td>Stakeholders’ expectations of the audit process at NAD and PWD</td>
<td>97</td>
</tr>
<tr>
<td>4.20</td>
<td>Research reflections that link to PWD as the chosen single and holistic case stud</td>
<td>101</td>
</tr>
<tr>
<td>5.1</td>
<td>Research framework development for the full phase of audit on the Clinic Building by PWD</td>
<td>107</td>
</tr>
<tr>
<td>5.2</td>
<td>The level of reporting for audit report on PBs by PWD</td>
<td>110</td>
</tr>
</tbody>
</table>
5.3 A proposed research framework for implementing full phase of audit process on PBs by PWD
6.1 A research framework for implementing full phase of audit process on PBs by PWD
6.2 The Batu Pahat Health District Health Clinic organizational chart
6.3 Stakeholders involved in the audit of PBs by PWD
6.4 Nodes showing the stakeholders involved and task allocations
6.5 Nodes showing the stakeholders involved and task allocations
6.6 Nodes showing stakeholders involved and task allocations
6.7 Nodes showing the stakeholders involved and task allocations for the different stakeholders
6.8 Nodes showing the phases involved in the audit on the Clinic Building by PWD
6.9 Nodes showing the phases involved in the audit on the Clinic Building by PWD
6.10 Nodes showing the phases involved in the audit on the Clinic Building by PWD
6.11 Nodes showing the phases involved in the audit on the Clinic Building by PWD
6.12 Nodes showing the barriers to full level of audit practiced by PWD on the Clinic Building
6.13 Nodes showing the barriers to full level of audit practiced by PWD on the Clinic Building
6.14 Nodes showing the barriers to full level of audit practiced by PWD on the Clinic Building
6.15 Nodes showing the barriers for phases not fully implemented on the audit of the Clinic Building by PWD
6.16 Nodes showing the stakeholders’ expectations of the audit practiced by PWD on the Clinic Building
6.17 Nodes showing the stakeholders’ expectations of the audit practiced by PWD on the Clinic Building
6.18 Node showing the stakeholders’ expectations of the audit practiced by PWD on the Clinic Building
6.19 Node showing the stakeholders’ expectations of the process practiced by PWD on the Clinic Building
7.1 The different stakeholders involved in the audit process of the Clinic Building by PWD
7.2 Deduction of other requirements needed for implementing full phase of audit on the Clinic Building by PWD
## LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AG</td>
<td>AUDITOR GENERAL</td>
</tr>
<tr>
<td>AO</td>
<td>AUTHORITY OFFICER</td>
</tr>
<tr>
<td>APM</td>
<td>AUDIT PLANNING MEMORANDUM</td>
</tr>
<tr>
<td>CAB</td>
<td>CHIEF OF AUDIT BRANCH</td>
</tr>
<tr>
<td>DID</td>
<td>DRAINAGE AND IRRIGATION DEPARTMENT</td>
</tr>
<tr>
<td>HQ</td>
<td>HEADQUARTERS</td>
</tr>
<tr>
<td>IKRAM</td>
<td>INSTITUT KERJA RAYA MALAYSIA SDN. BHD.</td>
</tr>
<tr>
<td>MECD</td>
<td>MINISTRY OF ENTREPRENEUR CO-OPERATIVE AND DEVELOPMENT</td>
</tr>
<tr>
<td>NAD</td>
<td>NATIONAL AUDIT DEPARTMENT</td>
</tr>
<tr>
<td>NAFAM</td>
<td>THE NATIONAL ASSETS AND FACILITIES MANAGEMENT</td>
</tr>
<tr>
<td>PBs</td>
<td>PUBLIC BUILDINGS</td>
</tr>
<tr>
<td>PWD</td>
<td>PUBLIC WORKS DEPARTMENT</td>
</tr>
<tr>
<td>QAS</td>
<td>QUALITY SYSTEM</td>
</tr>
<tr>
<td>SKALA</td>
<td>SISTEM PENGURUSAN PROJEK (PROJECT MANAGEMENT SYSTEM)</td>
</tr>
<tr>
<td>SO</td>
<td>SITE OFFICER</td>
</tr>
<tr>
<td>SOC</td>
<td>SENIOR OFFICERS CONFERENCE</td>
</tr>
<tr>
<td>TI</td>
<td>TREASURY INSTRUCTION</td>
</tr>
<tr>
<td>TQM</td>
<td>TOTAL QUALITY MANAGEMENT</td>
</tr>
</tbody>
</table>
# LIST OF APPENDICES

<table>
<thead>
<tr>
<th>APPENDIX</th>
<th>TITLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>INFORMED CONSENT FOR FOCUS GROUP</td>
<td>196</td>
</tr>
<tr>
<td>B</td>
<td>FOCUS GROUP TENTATIVE PROGRAM</td>
<td>198</td>
</tr>
<tr>
<td>C</td>
<td>FOCUS GROUP INVITATION LIST</td>
<td>199</td>
</tr>
<tr>
<td>D</td>
<td>FOCUS GROUP ARRANGEMENTS</td>
<td>200</td>
</tr>
<tr>
<td>E</td>
<td>FOCUS GROUP PICTURES</td>
<td>201</td>
</tr>
<tr>
<td>F</td>
<td>LIST OF INTERVIEWEES</td>
<td>203</td>
</tr>
<tr>
<td>G</td>
<td>LIST OF FOCUS GROUP PARTICIPANTS</td>
<td>204</td>
</tr>
<tr>
<td>H</td>
<td>INTERVIEW GUIDE</td>
<td>205</td>
</tr>
<tr>
<td>I</td>
<td>INTERVIEW GUIDE : CASE STUDY</td>
<td>206</td>
</tr>
<tr>
<td>J</td>
<td>LIST OF PUBLICATIONS</td>
<td>207</td>
</tr>
</tbody>
</table>
CHAPTER 1

INTRODUCTION

1.1 Research background

As Malaysia progressively marches towards industrialisation, the role of the construction industry is greatly enhanced (Wa’el et. al., 2007). The construction industry is one of the most important industries contributing to Malaysian economic growth (Mastura et. al., 2007). The Prime Minister, Datuk Seri Najib Tun Abdul Razak announced a budget of RM230 billion for the first roll-out in the Malaysian Tenth Plan (RMK10) for construction. These include, among others, the construction of 8 hospitals which include specialist hospitals, 197 clinics and additional 50 ‘1Malaysia’ clinics to be executed during the first term of RMK10.

With the rising expectations of the people and economic growth, there is a growing awareness of the need among building owners, professionals and authorities to raise the standard of property management practice. The greater complexity in today’s building facilities also demands a more professional approach to managing and maintaining these physical assets (Chin et. al., 1999). Ayman (2010) claimed that construction investments are sensitive to time and cost escalation. These elements are considered as threats to a project’s success. A building that is properly maintained can boost the building’s life cycle as building structures, materials and services will deteriorate over time (Chew, 2004). Low and Wee (2011) concluded that all buildings would eventually develop defects thus with proper maintenance and the avoidance of human error, the process may be delayed. It is vital to ensure that minimum hiccups and deficiencies arise during the entire process of construction.

In Malaysia, under Treasury Instruction (TI) 182, all non-technical departments of the government are required to refer construction work contracts to
the technical departments for implementation. According to the TI, the technical departments of the government are the Public Works Department (PWD) and the Drainage and Irrigation Department (DID) (Pollapat et. al., 2007). These two departments generally act as the government’s technical advisors for public construction projects. Their major role is to provide services in technical consultancy, project management and maintenance management. PWD was given the responsibility, among others, to develop a monitoring system on the government’s assets through a two day convention on The National Assets and Facilities Management (NAFAM) in August 2007.

1. 2 Problem statement

Audit of public buildings (PBs) is a relatively new phenomenon for the construction industry in Malaysia. Until 2007, there was no such audit conducted on buildings in Malaysia by PWD (PWD, 2009). The government, through PWD introduced audit on buildings in 2007 on all buildings owned by the federal government.

Despite the introduction of audit on PBs by PWD, the number of audit performed each year is significantly low (discussed further in sub-section 4.4.2.1) This is due to the year 2007 having saw numerous catastrophes in Malaysia as one by one of its PBs collapses. In April 2007, it was reported by the local media of the burst pipe that brought down the Ministry of Entrepreneur Co-operative and Development (MECD) hall ceiling. Whereas, less than three weeks before, a burst pipe in the Immigration Department had already caused widespread damage to the department’s building in Putrajaya. Even a month earlier, approximately 1,000 government servants living in three apartment blocks in Precinct 9 in Putrajaya were evacuated following a landslide in the area (New Sunday Times, 29 April 2007).

The local media in one of its reports questioned the quality of PBs in Malaysia, even after 50 years of independence (Utusan Malaysia, 2nd May 2007). Even the National Institute of Occupational Safety and Health (NIOSH) wanted the government departments and agencies apart from the private sectors to perform maintenance efficiently by taking into consideration the safety of their workers. Its Chairman, Tan Sri Lee Lam Thye said that some contractors are too absorbed of
completing a project not considering quality in their work (Berita Harian, 21st May 2007).

In the same month of April 2007, the ceiling of Sultan Abdul Halim Hospital in Sungai Petani, Kedah which was completed in July 2006 had collapsed (Utusan Malaysia, 28th May 2007). This was not the first construction failure in the building as on January the same year, the patients and visitors of the RM468 million worth hospital were shocked with the overflow of sewage in its cafeteria.

After the first two incidents in April, the former Prime Minister, Datuk Seri Abdullah Ahmad Badawi instructed PWD to conduct immediate check up on all government buildings. The MECD Minister, Datuk Seri Mohamed Khaled Nordin, suggested that the scope of maintenance for government buildings and offices should be expanded to cover not only the physical but also all hidden structure (New Straits Times, 30 April 2007). The Chief Secretary, Tan Sri Mohd Sidek Hassan, suggested a special committee to be formed led by the Auditor General to check all other similar premise in Putrajaya. He also informed that the evaluation itself will cost the government another RM22 million and completed in six months (Berita Harian, 10 May 2007).

PWD’s former Minister, Datuk Seri S. Samy Vellu commented that PWD was not solely responsible to the catastrophe as in many cases, PWD officers were not allowed to enter the construction site by the elected contractor by the particular ministries. PWD’s responsibility is only to conduct timely checks on the construction and may not be on-site all the time to ensure quality. Thus it is up to the Ministry to ensure that everything runs smoothly as stipulated in the contract (Berita Harian, 3 May 2007).

This is to name a few of the building failures reported in the media. Even though the exact amount of repair was not published to the public, the damages can be estimated as millions or even billions of Ringgit. Thus, it is vital for the government to find a solution on how to reduce these maintenance costs. One way to curb these fatalities in the future is to take preventive action and make considerable amount of supervision during the construction phase of the buildings. Based on the scenario, it is suggested that there is a need to ensure that all PBs and its facilities are in good order, achieved by having a systematic audit practice in place.
However, the exploratory study conducted concluded that despite the systematic audit performed on PBs by both NAD and PWD, a list of barriers were identified. The barriers identified concluded the need for more skilled workers, a more comprehensive audit report as well as the need to enforce the need for immediate rectification works on audit findings. At the same time, the findings also revealed that the full phase of audit process was not performed by PWD.

In view of the above, this research intends to examine the issues of audit on PBs by PWD. The study explores the audit process of PBs and the stakeholders involved in the process. The purpose is to identify the gap and provide suggestions for improvement.

1.3 Research aim

The aim of this research is to propose a framework to implement full phase of audit process on PBs. Thus, this study emphasizes on the processes and stakeholders involved and the stakeholders’ various tasks and expectations from the process.

1.4 Research questions

This study of audit on PBs will allow a list of questions to be asked. It is hoped that the answers to these questions will extend the existing knowledge on audit in general and specifically the audit of PBs in Malaysia.

The research questions are presented by taking into consideration the exploratory study in Chapter 4. This research seeks to answer the following questions:
RQ1 Who are the stakeholders involved and their task allocation for the audit process?
RQ2 What are the phases of audit implemented by the different stakeholders involved in the audit process?
RQ3 Why is full phase of audit process not implemented?
RQ4 What are the different stakeholders’ expectations from the audit process?
RQ5 How can a full phase of the audit process be implemented?

1.5 Research objectives

This study is neither comparing the current audit practice with ideal practice nor does it seeks to test any hypothesis. The intention is merely to study the process of audit on PBs that is being practiced in Malaysia. Thus, parallel to the research questions above, this study seeks to achieve the objectives stated below:

- To identify the stakeholders involved and their task allocation for the audit process.
- To investigate the phase of audit that is implemented by the different stakeholders involved in the audit process.
- To examine the barriers for full phase of the audit process not implemented.
- To evaluate the different stakeholders’ expectations from the audit process.
- To propose a framework for implementation of a full phase of the audit process.

1.6 Significance of the study

The significance of the study can be viewed in three areas as stated below:
1.6.1 The extension of knowledge

Through the research on past literatures, there was no particular study conducted on audit process of PBs in Malaysia. Thus this study contributes to the area of audit process in the context of PBs in Malaysia.

This study is useful as a benchmark for future study of audit on property.

1.6.2 The importance of property to organisations

The government apportioned large amount of capital yearly for physical development. Thus there is a need for effective and efficient management of these properties to extract the best value from them.

This study also contributes to the stakeholders’ expectations who in majority occupy the buildings.

1.6.3 The significance of audit process to the public sector

There is inadequate focus on audit on property in Malaysia. A study on the audit is necessary to identify the current practice and its impact on the relevant stakeholders. Thus the public sector can benefit from the study and use the findings to further improve the practice on audit of buildings in general.

1.7 Research methodology

This research is primarily focused on the audit practice on PBs in Malaysia. It applies an exploratory study to investigate a relatively new area of study where an understanding of the practice is needed (Sekaran, 1992). The exploratory study is on the audit practiced by relevant departments on PBs in Malaysia.

This study is a non-experimental study, thus it makes use of a research design. The main purpose is to help avoid the situation in which the evidence does not address the initial research questions (Yin, 2009).
In the research design, the use of case study is thoroughly described. Case studies are tailor made for exploring the audit process. The purpose of this case study is to determine the audit practice for PBs by PWD in Malaysia. The research design is thoroughly explained in Chapter 3.

This study will employ qualitative method based on the nature of information that needs to be obtained.

1.8 Research scope

This research intends to achieve its objectives by answering the stated research questions. The main question on the audit practiced on PBs in Malaysia can be answered by investigating how PWD conducts audit on PBs.

Secondly, this research intends to examine the audit within the context of PBs. This means, the study will look at various aspects and methods of audit on PBs practiced in Malaysia generally and those applied by PWD specifically.

Thirdly, this study focuses on PBs that are owned by the federal government, state governments, local authorities as well as federal statutory bodies. However, since PWD is the only department practicing audit on buildings in Malaysia, the study is limited to buildings owned by the federal government only as this is the only type of building audited by PWD at the moment.

Finally, this study concentrates on the process of audit on the Batu Pahat District Health Clinic (The Clinic Building) as its case study. The justification of choosing the Clinic Building as the case study is explained further in sub-section 4.6.5 and sub-section 6.3.3.

1.9 Definitions

1.9.1 Public buildings (PBs)

For the purpose of this study, PBs is defined as the buildings that are owned by the federal government, state government and the federal statutory bodies. These buildings are used as operational building which are considered as a basic resource
for the related public organization’s activities. These buildings include office buildings, hospitals, stadiums etc.

1.10 Thesis structure

This study of audit on PBs will be arranged into 7 chapters as follows:

Chapter 1 introduces the subject matter and provides the background to the problem, the study objectives, scope, research questions, significance of the study and methodology.

Chapter 2 examines the various literatures on audit, audit, and other related literature.

Chapter 3 discusses the approaches to the study which is relevant in shaping the philosophical framework of the research study. This would determine the boundaries upon which a logical methodology can then be developed to resolve the issues arising from the study. It consists of the research design and methodology of the study. It also provides a detailed explanation of the approaches adopted, the data required, data sources, data set construction, sample design, the instruments used and the processes by which the data were collected and analyzed. The methodologies outlined in this chapter are commonly used in social science.

Chapter 4 discusses the exploratory studies done on both National Audit Department (NAD) and Public Works Department (PWD). This exploratory study will discuss on the role of the NAD and PWD on audit of PBs in Malaysia. Discussion on the depth and extent of audit will be included.

Chapter 5 discusses the research framework that helps answer the research questions listed in the previous chapter.

Chapter 6 discusses in depth on the case studies selected. This chapter will explore in detail extend to which audit on PBs are practiced by PWD on the case studies.

Chapter 7 concludes the study by reviewing the findings and procedures of the whole study. The conclusions will consider whether the findings answered the research questions, hence achieving the stated objectives of the study.
1.11 Summary

This chapter has outlined the general view of the research and the research objectives. The next chapter discusses on the various literature surrounding the related issues of audit practice in general and in the Malaysian context.
CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter discusses about the various literature related to the study. The main purpose of this chapter is to identify and assess the extent of current knowledge on the audit of PBs. It involves a synthesis of literature from a variety of sources on audit, audit and facilities management audit. The outcome of this chapter is to identify theoretical gaps in the literature and points to the potential research topic and also act as guidance for the adoption of the suitable methodology for the study.

2.2 Definition of audit

Audit is defined as ‘the systematic critical analysis of quality, procedures, use of resources and the resulting outcome of an activity’ (Davies et. al., 1996). Shaw (1989), however, defined audit in three stages. The first stage is to define expectations, the second is to compare these with observed reality, and the third is to bring about appropriate change in practice.

Although audit was originally confined to only financial basis, modern auditing has widened the area of audit operations (Batra, 1997).
2.3 Types of audit

There are several types of audit; namely financial, management and performance audit. This is further discussed in the next section.

2.3.1 Financial audit

Farrugia & Baldacchino (2005) defined financial audit as examining companies’ financial statements and to express opinions thereon. Whereas Fa (1997) defines financial audit to audit of revenues and expenditures of a company. Fa (1997) further discussed that financial audit are based on financial activities and further classified in funds audit, materials audit, assets audit, product cost audit, operation and sales audit, profits audit, tax audit and accounting statements audit. In the context of the government of Malaysia, financial audit involves the department to check the accounting related documents of a ministry or department to ensure public monies are spent as effectively, efficiently and economically. It is also to check on fraud or other related misconduct related to finance.

2.3.2 Management audit

Peecher, Shwartz & Solomon (2007) agree that auditing approaches have evolved in response to the changes in society’s information needs, regulations, business organization’s value-creation processes, and available accounting and audit technologies. The changes in audit approaches simultaneously influenced and have been influenced by the conceptions of the audit.

Parker (1986) defines management audit as an evaluation of management and the organization’s functioning and performance with respect to economy, efficiency and effectiveness of operating areas, activities and results. Whilst Batra (1997) outlines that management audit emphasis more towards examining the internal system so as to evaluate the efficiency of the organization as a whole. This is being done as thoroughly as possible so that certain areas of weakness may be identified, that those areas of weakness may be pointed out to the management and suggestions
may be offered to accelerate the process of management development. The modern concept used for this purpose is management audit, which ascertains the soundness of management – both in its external relationships with the outside world and its internal efficiency. It is an investigation into the smoothness of the organization from the highest level to the lowest (Batra, 1997).

Management audit cares for managerial decisions and policies which determine the future of a business enterprise. The performance of managerial personnel is tested in order to ascertain to what extent the decisions and policies have been successful in achieving the objectives of a business. Thus the management audit is a total examination of an organization or a part of it; it includes a check on the effectiveness of managers, their compliance with company or professional standards, the reliability of management data, the quality of the performance of duties, and recommendations for improvement in public sector enterprises (Batra, 1997). In Malaysia, management audit is performed by the National Audit Department (NAD) on all government ministries, departments and agencies.

Batra (1997) laid out the important areas of the organization to be examined by the management auditors, which are:

- Suitability of the objective of the organization;
- Currently standing in the market;
- Adequacy of return on capital;
- Relationship with the shareholders and the investing public;
- Ratio of operating returns on sale;
- Management and staff relationship;
- Relevance and effectiveness of board of directors, top management and middle management;
- Financial policies and control;
- Efficiency of production;
- Sales promotion and economy of distribution;
- Functions governing the effectiveness of control.

Thus, management audit investigates almost every aspect of management and offers its own suggestions for improved efficiency of the business or its increased profitability. In some of the larger organizations, however, an efficiency audit may
also be conducted to judge the adequacy of return on capital invested and to recommend the possibilities of further growth.

2.3.3 Performance audit

Performance audit is an activity aimed at helping enterprises raise economic efficiency, generally called ‘operational audit’ or ‘management audit’ in some countries. Performance audit is also known as activity audit. This type of audit is to ensure that an activity is executed according to plan and budget. In Malaysia, there are two departments who perform performance audit, i.e. NAD and PWD. This type of audit is further discussed below.

2.3.3.1 Types of performance audit

a) Facilities management audit

Facilities management – ‘the process by which an organization delivers and sustains support services in a quality environment to meet strategic needs’ (Alexander, 2003).

Facilities management (FM) includes a wide range of activities involved in the effective management of built assets (Dilanthi et. al., 2000). FM involves the total management of all services that support the main business of the organization. An active FM in an organization can help early identification of problems with maintenance which result in a reduction of running costs. The facilities management movement can be summarized as a belief in potential to improve processes by which workplaces can be managed to inspire people to give of their best, to support their effectiveness and ultimately to make a positive contribution to economic growth and organizational success (Balch, 1994).

     Historically, estate and property management was a requirement of property owners, mainly landlords and investing institutions; whereas facilities management was a requirement of building operators. The services were provided by estate and property management consultancies or equivalent in-house teams on the one hand, and by in-house office managers on the other, often as an ancillary part of other
activities. The scene has changed and increasingly clients are operators of buildings in both the public and private sector, and their needs are for an integrated service encompassing both strategic estate management advice and operational services and administration (Balch, 1994).

FM has the potential to contribute significantly and it is important to identify and measure the extent that it supports, or can be adapted to, the changing needs of organizations, and contribute to productivity, profitability, service and quality. The need for audit of work performance has existed throughout man’s history. The importance of performance audit of facilities should also be looked as part of a broader perspective of job satisfaction issues and with particular regard the theories of motivation. Performance measurement is really at the heart of good FM practice.

Performance measurement has been described as a process of assessing progress towards achieving pre-determined goals, including information on the efficiency by which resources are transformed into goods and services, the quality of those outputs and outcomes, and the effectiveness of organizational objectives. The measurement of performance is one of the most prominent features of modern life, as it does through politics, economics, business, education and sport (Kincaid, 1994).

The contribution made by FM will be judged by an organization’s stakeholders over a wide range of performance criteria including the hard metrics of finance and economics. FM is seen to be able to contribute to performance of organizations in many ways, including strategy, culture, most importantly, the management of change. Quality, value and the management of risk emerge as significant factors. Thus, the broad management need for performance measurement can be interpreted in an FM context (Dilanthi et. al., 2003).

Within the framework of facilities strategy, which identifies and translates an organization's objectives and requirements into the optimum form to meet current and future FM needs, the organization may seek to maximize the performance of its facilities, balancing business needs with cost. Alexander (1996) identified measurement of performance as one of ‘three essential issues for the effective implementation of a facilities strategy’. There is a wide range of choices in measuring facilities management performance reflecting the varied nature of the
field. Benchmarking, or post-occupancy evaluation could be identified as examples (Kincaid, 1994).

According to Whitaker (1995), a facilities management audit follows an orderly, objective process to compare an organization’s FM resources – staffing, services, physical facilities, and financial performance – to internal expectations and external benchmarks. The FM audit looks at the product developed for customers – whether it is a workstation, office facilities, or a laboratory – and then examines the quality of service that will be provided while delivering that product. The FM audit will give an understanding of every part of its operations to develop a holistic view of the facilities and a strategy for continuous improvement. Whitaker (1995) emphasize that the purpose is not to find fault – the results are more often more positive than negative, more constructive than destructive. It will help to see the big picture and the details about the facilities’ performance, which will help to recognize areas of success and chart a course of improvement. This will promote an attitude of accountability, teamwork, and pride within the facilities group. The evaluation is typically conducted by an in-house FM team, facilities customers, and an independent third party. Much like a tax auditor, an outside consultant provides an objective point of view and is more willing to ask hard questions (Whitaker, 1995). However, in Malaysia, there is no individual private company conducting facilities management audit.

2.4 Audit process

Whitaker (1995) laid out a four month audit process and emphasized that the process used to conduct a facilities management audit is as important as the result. Shaw (1989) however outlines the audit process as:

- The identification of elements of care for examining and setting questions, issues for exploration, standard setting or review criteria;
- The choice and application of methods to appraise care, including rigorous analysis of data; and
- The feedbacks of results to effect direct service improvements.
Reid and Ashelby (2002) outline the audit process as below:

- Audit teams hold preliminary audit meetings to determine the scope, nature and extent of inquiries. The inquiries involve scrutiny of information and documentations and may include observations of organizational procedures.
- An audit strategy is agreed with auditees prior to the commencement of audit.
- Staff to fully cooperate with the auditor during the audit in order to enable them to observe and make enquiries about any policy or practice as necessary.
- An audit report is prepared by the audit team after the audit. The report identifies issue which require further consideration.
- Those audited are expected to comment on how the report influenced by their activity, and on specific action taken, or recommendations for action.

In the research, Whitaker (1995) also laid out the rules of thumb for a successful FM Audit:

- Assemble a cross-functional and hierarchical audit team.
- Customer opinion is the benchmark.
- Including an ‘accountant’ type on the audit team can help.
- An independent, third party can help with interviewing and focus group skills.
- Pay attention to the interviewing and focus group skills.
- Study a broad variety of comparisons.
- Remember the big picture.
- Use consistent information.
- Depict comparisons graphically.
- Stay objective.
- Do not jump into conclusions.
- Be creative.
- Tell all the staff and customers on everything learnt.

On top of these basic rules, Whitaker (1995) outlined six information resources areas in examining facilities performance which includes customer
satisfaction, facilities facts, financial facts, organization and resources, change data and benchmarks/research.

These information resources will give the general ideas of the types of questions that need to be asked to gain the necessary information for a successful audit.

However, Calder (1997) argued that the scope of an audit program depends on the project requirements and the client’s reporting needs. The program may include: (a) quality system audits against a reference standard (such as ISO 9001) to verify that each required quality element has been addressed; and/or, (b) compliance audits against contract specifications to verify compliance, which is practiced by PWD. Calder (1997) added that a compliance audit tests is an audit against the project requirements (e.g. concrete strength) within the existing quality system.

Calder (1997) further outlined the requirements for an effective audit as follows:

- **Defines audit procedures.** The audit process, including the contractor’s responsibilities, must be defined in the bidding documents so that the contractors will know what is expected of them. It is also necessary to define the roles and responsibilities of the audit team and the procedures to be followed in conducting audits, resolving non-conformance issues and performing follow-up audits.

- **Trained and knowledgeable auditors.** In addition to the experience requirements that contract administrators must possess, auditors must be trained and knowledgeable in the audit techniques of planning, organizing, examining, questioning, evaluating and reporting. Auditor training is available from numerous certified auditor training agencies and from auditors experienced in the relevant fields of construction. Auditors also require good interpersonal skill and tact in dealing with contentious issues.

- **Auditor/contractor cooperation.** It is essential to meeting project requirements that the need for cooperation between the auditors and contractor staff to be emphasized. Auditors must have open access to all
contractor facilities, documents and personnel, with the exception to be agreed upon restricted areas. The contractor should also be responsible for and capable of ensuring a reasonable follow-up program with the auditor when verification or rectification of deficiencies is required. The role of senior client staff in supporting their auditing staff also should not be overlooked.

- Efficient information retrieval. In order to be able to report on the level of compliance and to follow-up on outstanding non-conformance, it is necessary to have an efficient means of retrieving records and manipulating data. This is done most capably and easily with off-the-shelf database software (Calder, 1997).

### 2.4.1 Skills of an auditor

Holzke (2011) outlined the essential audit skills in order to successfully prepare and perform audit. The four main skills are planning skills, communication skills, auditing skills as well as reporting skills.

The planning skill requires the auditor to outline the purpose of audit as well as establishing the scope of audit. At the same time, this skill requires the auditor to prepare the audit well which includes the preparing the audit schedule.

The communication skills includes the use of jargon free language and involving the right people during the audit as well as creating the right audit atmosphere and managing audit meetings.

Reid and Ashelby (2002) agreed a selective of criteria of an auditor which includes:

- Being systematic and thorough
- Being independent and impartial
- Being rigorous but not aggressive or confrontational
- Having appropriate background knowledge and experience
- Having a commitment to quality enhancement
- Being a good listener
- Being patient and courteous
• Paying attention to detail without being pedantic
• Having the ability to identify good and bad practice
• Having regard for a gender balance.

Reid and Ashelby (2002) also added that an auditor can be of an academic managers, lecturers, professional support staff and administrative area managers. The process of audit starts with the selection of audit team members. These audit team members are trained for the particular tasks selected.

The auditing skill outlined by Holzke (2011) includes the skill of assessing documents and evidences. At the same time, the interviewing and corroborative enquiry skills as well as the sampling approached chosen were highlighted. The auditors are also required to have the skill to identify exceptions and deficiencies confronted during the audit.

The reporting skills requirement for an auditor includes establishing documentation standards apart from creating work papers which are used as audit evidence. These evidence lead to the next skill needed i.e. compiling the audit report. This report includes the comments received from the management. The auditor is also need to have the skills to add recommendations in the audit report for improvements.

2.5 **Reason on the need for audit**

Taking into consideration of the above arguments, in order to effectively prolong the building lifespan, an improved initial design, optimum construction workmanship quality to translate and deliver design details, and a regular maintenance program (Christian & Pandeya, 1997) is essential and thereby enhances the maintainability of buildings. Thus support the need for audit on buildings as discussed below.
2.5.1 Governance

The term ‘governance’ is closely related to the need of audit. Governance describes the processes and systems by which an organisation or society operates (Winch, 2001). An effective audit reporting is seen as a way to improve governance in a company (Rezaee, Olie & Minmier, 2003). Governance helps to outline and understand the relationships between all the internal and external stakeholders of a project (Patel & Robinson, 2010). The three key elements of governance identified, i.e. organisation, management and policies and frameworks, ultimately ensures that a project has a clear direction that is coherent with the objectives of the organisation. Thus minimizes delay in construction and over budget in public sectors’ construction projects (Patel & Robinson, 2010). Apart from time and cost factor, issues in construction include the level of building quality.

2.5.2 Quality in construction

This issue of quality has undoubtedly taken on a new sense of urgency and importance since there are many faulty PBs were reported. In 2007 itself, more than five catastrophes were reported in the media. Thus, it is important that we look at the quality issues in construction.

Quality of construction is defined as the effective achievement of agreed goals between the client and the main contractor (Fan, 1995). Atkins (1994) defined quality in construction as the conformance of requirements of clients. The responsibility for promoting good quality construction in Malaysia rests with the Construction Industry Development Board (CIDB) (emphasis on private projects).

Rwelamila (1995) defined quality in construction as the measure of the fitness of the building and its parts to fulfill the purpose defined in the brief or “conformance to established requirements”. By avoiding dealing with indications of special merit, excellence, or degree of satisfaction, this definition provides a basis for measurement, i.e. the purpose defined in the brief is either satisfied or not satisfied. This is because a building project is completed as a result of a combination of many events and interactions, planned or unplanned, over the life
of a facilities, with changing participants and processes in a constantly changing environment (Sanvido et al., 1992).

Quality management is a critical component in the successful management of construction projects which involves all aspects of a project and must be an integral component project management (Abdul-Rahman, 1997). A quality construction is directly related to time, cost and vice-versa. A poor quality managed project can result in extra cost and time extensions. A poor time and cost controlled project can affect the conformance of requirement, which is the quality (Abdul-Rahman, 1997).

Quality expectations in construction include:

- Good and practical design and layout which are functional and yet aesthetic;
- Buildings which are defect-free during the briefing, design, tender; construction, commissioning and maintenance stages;
- Good workmanship by contractors and sub-contractors;
- Value for money for both the customers and end-users;
- A pollution-free environment;
- Buildings which are well maintained and free of the “sick building syndrome”;
- Roofs, toilets, windows and walls that do not leak;
- Paints and plaster without premature cracks or algae growth;
- Tiles and concrete that remain in place and perform their functions reliably and safely (Tay, 1994).

Construction audit provides a start for owners, engineers, and contractors to not only improve the level of quality in the projects, but also to improve the productivity of the construction industry. By ‘doing it right the first time’, they provide the opportunity for more infrastructure to be built with the same amount of money – this benefit the construction industry and the economy as a whole (Doug, 1997).

The idea of construction audit is practiced in Japan as post-construction evaluation. Any public work is subject to potential audit by the Board of Audit (Yuzo, 1994). Organizations responsible for the implementation of projects use their internal inspector system to investigate projects that have failed technically
to discover what lessons may be learned from such failures. However, it was indicated that the internal inspector system is not sufficiently adequate to function effectively in the overall evaluation process. As a result, none of the public works projects implemented in Japan are subjected to full post-construction evaluation (Yuzo, 1994).

Many studies highlighted the difficulties faced in understanding and interpreting quality in construction. Each study has its own contributions to make within its respective terms of reference, but the meaning of quality in the construction industry appears to encompass far wider implications. Quality in a single building operation or component seems to be readily assessed, described, explained, judged and generalized. However, quality does not seem capable of being defined meaningfully for building projects as single entities over time. It is even more difficult to quantify quality elements (Low et. al., 1994).

Abdul-Rahman (1997) conducted a study on the issues of quality cost in construction. It was concluded in the study that 90 percent of the respondents agreed that ‘client and his representative have the biggest impact on determining the quality of a project’.

Another quality problem which arises from construction is delayed in the completion of a project. Identification and quantification of claims for costs and delays which are frequently encountered in construction works will be easier provided that the program is implemented successfully (Mittelsdorf, 1992). Wa’el et. al. (2007) studied the significant factors causing delay of building construction projects in Malaysia. The study was driven by the need for mass-produced quality housing that is affordable to all Malaysians.

Late supervision and slow decision making was ranked third of top ten factors causing delay in construction projects (Wael. et. al., 2007). Prior to that, Alaghbari (2007) mentioned numerous reasons causing delay in construction. Contractors, consultants, owners and external factors were identified to contribute to the delay of construction projects. The general factors causing delay is closely related to the quality management of the project. Thus, it is important for quality to be managed in tandem with the construction process to reduce failure and increase customer’s satisfaction.
Another argument in construction quality is the influence of workload instability on quality in the construction industry (Low et. al., 1996). Most quality promotion and improvement programs targeted at construction can be observed to move between the construction industry with the appropriate actions taken by related government agencies or professional/trade associations and construction firms respectively. Quality problems in construction were only looked on at specific problems related to the site, building structures, production, financing and end-users. However, if quality problems can be identified and resolved so readily, poor quality standards would have been eliminated completely in the industry. This is not to suggest that the efforts taken individually to resolve the specific quality problems identified are irrelevant. This structural problem is related to the uncertain demand for construction or workload instability (Low et. al., 1996). Like all other business, construction firms can only continue to exist on a regular and consistent stream of projects. The need to maintain a stable volume of work is still crucial for long-term survival and is essential even though they may want to either gradually or rapidly expand their workload over time. The need to attain a stable and minimal level of workload will remain a high priority for all construction firms. More importantly, a steady and stable workload for construction firms would allow them to plan ahead and utilize their resources more effectively. With a stable workload in hand, construction firms should then be able to attain a peace of mind to delivering good quality works. Low et. al. (1996) argued that while construction demand may be an important factor affecting the delivery of good quality standards by firms, this link is hardly recognized at all. This is not the least unexpected since construction demand at the national level is tied closely to the economic performance of a country which cannot be influenced by any one individual or government agency.

2.6 The importance of audit

The construction industry is one of the most important industries in the world’s economy. The role of the construction industry has increased since the independence of Malaysia in 1957. The former Prime Minister, Datuk Seri Abdullah Ahmad Badawi announced a budget of RM15 billion for the first roll-out in the Malaysian
Ninth Plan (RMK9) for construction. These include, among others, the construction of 450 primary and secondary schools throughout Malaysia. As Malaysia progresses in development, the role of the building industry is greatly enhanced, with the idea of transforming the expectations and needs of people into reality (Wa’el et. al., 2007). With the rising expectations of the people and economic growth, there is a growing awareness of the need among building owners, professionals and the authorities to raise the standard of property management practice. The greater complexity in today’s building facilities also demands a more professional approach to managing and maintaining these physical assets (Lawrence Chin et. al., 1999).

Audit is a cyclical process; the feedback of results should lead to the identification of new areas of inquiry. Shaw (1989) argues that in practice the stages outlined, particularly the third stage i.e. feedback of result that affect service improvement, is not always completed.

In Malaysia, the agency responsible for advising the government on the construction of PBs is the Public Works Department (PWD). PWD was established in 1872 and was placed under the Ministry of Public Works (then known as the Ministry of Public Works, Post and Telecoms) in 1956. PWD has many semi-professionals and professionals in engineering, architecture and quantity surveying (QS) discipline (Abdul-Rashid et. al. 2004). PWD is the largest construction project-based organization in Malaysia to-date. Its function is to plan, design and construct infrastructure projects such as roads, water supply, government buildings, airports, ports, jetties and related engineering products. On top of that, PWD maintain roads and government buildings apart from providing technical advice to the Government on federal, state and district levels.

PWD has a significant amount of in-house quantity surveyors (QS) expertise. However, the department regularly engages independent consultants to undertake some or all of the QS functions on projects. Outsourcing relieves work pressure as PWD is constrained from employing more technical staffs (Abdul-Rashid et. al. 2004). Three most frequently outsourced services are preparing work progress evaluation, evaluating work variations and completing final accounts. Among the reasons for outsourcing were to achieve best practice and to enhance cost discipline and control of manager’s skills, to improve service quality and
REFERENCES


Malaysia Tenth Plan (RMK10) published.


