

# Table of Contents

|   |           |
|---|-----------|
| <b>1 IT Auditing: An Overview and Approach .....</b>                | <b>1</b>  |
| 1.1 Evolution in Managements' Perceptions.....                      | 1         |
| 1.2 Evolution in Information Processing Capabilities .....          | 2         |
| 1.3 Exposure to Loss .....  | 3         |
| 1.4 Objectives of IT Auditing.....                                  | 5         |
| 1.5 Internal Controls and IT Audit .....                            | 5         |
| 1.5.1 Various Internal Controls.....                                | 7         |
| 1.6 Growth and Genesis of IT Auditing .....                         | 7         |
| 1.7 IT Audit Approach.....  | 9         |
| 1.7.1 Nature of IT Controls.....                                    | 9         |
| 1.7.2 Controls and Loss.....  | 11        |
| 1.7.3 Internal Controls and Auditing Approach.....                  | 12        |
| 1.8 Steps in an IT Audit.....                                       | 12        |
| 1.9 Audit Decisions .....   | 15        |
| <br>  |           |
| <b>2 Auditing and Complex Business Information Systems .....</b>    | <b>21</b> |
| 2.1 Complex Integrated Accounting Systems.....                      | 22        |
| 2.2 Distributed Data and its Effects on Organisations .....         | 24        |
| 2.2.1 Networks .....  | 25        |
| 2.2.2 Portability and Systems.....                                  | 31        |
| 2.2.3 Integration of Applications .....                             | 32        |
| 2.3 Productivity Aspect of the Technology .....                     | 32        |
| 2.4 Business Process Re-engineering .....                           | 33        |
| 2.5 Intelligent Systems .....                                       | 34        |
| 2.6 Auditors and Changing Technology .....                          | 36        |
| 2.7 Strategic Use of Technology and Audit Implications.....         | 37        |
| 2.8 Internal Controls and Auditing .....                            | 40        |
| <br>  |           |
| <b>3 Generation-X Technologies and IT Auditing.....</b>             | <b>45</b> |
| 3.1 Generation-X Enterprise Technologies .....                      | 46        |
| 3.2 Information Systems Integration: A Challenge .....              | 48        |
| 3.3 Assured Information Emanates from Assured Systems.....          | 51        |
| 3.4 Information Assurance: A Function of Strategic Importance ..... | 53        |
| 3.5 Various Information Assurance and Control Measures .....        | 56        |
| 3.5.1 Web-Level Assurance Measures.....                             | 57        |
| 3.6 Control Objectives and System Assurance .....                   | 58        |

|   |            |
|---|------------|
| 3.6.1 British Standards: BS7799 and BS 7799-2:2002 .....                        | 60         |
| 3.6.2 System Security Engineering Capability Maturity Model:<br>SSE-CMM .....   | 60         |
| <b>4 Complex Information Systems, Auditing Standards and IT Auditors .....</b>  | <b>63</b>  |
| 4.1 The Approach and Objectives .....   | 63         |
| 4.1.1 The Scenario .....  | 65         |
| 4.2 Impact of Technology Complexity on the Auditor .....                        | 65         |
| 4.2.1 Complex Information Technologies and Audit Risks .....                    | 67         |
| 4.2.2 SAS-94 and its Effect on the Audit Process.....                           | 70         |
| <b>5 ERP and Information Integration Issues: Perspective for Auditors .....</b> | <b>75</b>  |
| 5.1 What is Enterprise Resource Planning?.....                                  | 77         |
| 5.2 Implementation Cycle .....  | 79         |
| 5.3 Conceptual Models .....   | 80         |
| 5.3.1 Successes and Disasters .....   | 81         |
| 5.4 Types of Implementation.....  | 82         |
| 5.5 Social Integration.....   | 83         |
| 5.6 Resistance in Social Integration .....                                      | 84         |
| 5.7 Process Integration .....   | 84         |
| 5.7.1 Communications in Process Integration.....                                | 85         |
| 5.7.2 Alignment of Culture in Process Integration.....                          | 86         |
| 5.7.3 Knowledge Integration.....  | 86         |
| 5.7.4 Workflow Integration.....   | 89         |
| 5.7.5 Best Practices in Functional Integration.....                             | 90         |
| 5.7.6 Virtual Integration.....  | 91         |
| 5.8 Auditor and ERP.....  | 92         |
| 5.8.1 ERP Internal Control Procedures .....                                     | 92         |
| <b>6 Technology, Auditing and Cyber-Commerce .....</b>                          | <b>95</b>  |
| 6.1 Technology and Auditing .....   | 96         |
| 6.2 Risk Understanding in e-Commerce for IT Auditor .....                       | 99         |
| 6.3 Information at Risk.....  | 101        |
| 6.4 Controls and Audit Evidences .....  | 105        |
| <b>7 IT Auditing and Security of Information Systems .....</b>                  | <b>107</b> |
| 7.1 Information Security .....  | 108        |
| 7.1.1 Computer Assets .....   | 109        |
| 7.2 Security Controls.....  | 110        |
| 7.3 Security Evaluation and Certification Criteria.....                         | 112        |
| 7.3.1 Networks Security.....  | 113        |
| 7.3.2 OSI Architecture .....  | 115        |
| 7.3.3 Security Mechanisms .....   | 118        |
| 7.3.4 Integrity .....   | 120        |
| 7.3.5 Security Mechanisms Location .....  | 122        |
| 7.4 Future Trends .....   | 123        |

|  |            |
|--|------------|
| 7.5 Exemplary Case Laws Related to Security Needs and Breaches in USA                  | 124        |
| 7.5.1 Case Laws Related to Data Preservation.....                                      | 124        |
| 7.5.2 Case Laws Pertaining to the Scope of Discovery.....                              | 125        |
| 7.5.3 Case Laws Related to the Records Management .....                                | 131        |
| 7.5.4 Case Laws Pertaining to the Use of Experts .....                                 | 133        |
| 7.5.5 Case Laws Related to the Costs and Allocation .....                              | 134        |
| 7.5.6 Case Laws Related to the Spoliation and Sanctions.....                           | 136        |
| 7.5.7 Case Laws Pertaining to Inadvertent Disclosure.....                              | 139        |
| 7.5.8 Case Laws Related to the Method of Litigation .....                              | 140        |
| 7.5.9 Case Laws Related to Criminal Issues of Security.....                            | 142        |
| 7.5.10 Case Laws Related to the Reliability .....                                      | 142        |
| 7.5.11 E-Sign Statute and Case Laws .....  | 143        |
| 7.5.12 Case Laws on Privacy .....  | 144        |
| 7.6 Kind of Audits Called Security Audits .....  | 145        |
| 7.6.1 Internet/Perimeter Audit.....  | 145        |
| 7.6.2 Website Audit .....  | 145        |
| 7.6.3 Penetration Audit (Ethical Hacking) .....  | 145        |
| 7.6.4 Wireless Audit.....  | 146        |
| 7.6.5 Network Audit.....   | 146        |
| 7.6.6 Security Policies and Procedures Audit .....                                     | 146        |
| 7.6.7 Facilities Audit (Physical).....   | 146        |
| 7.6.8 Business Continuity Plan (BCP) and Disaster Recovery (DR) .....                  | 147        |
| 7.6.9 Regulatory Compliance Audits .....   | 147        |
| 7.7 How Can Security Audit Help the Enterprises? .....                                 | 148        |
| 7.7.1 Protecting the Physical Safety of Your Employees, Vendors,<br>and Visitors ..... | 148        |
| <b>8 Information Technology Governance and COBIT®.....</b>                             | <b>151</b> |
| 8.1 Why Do we Need IT Governance?.....   | 152        |
| 8.2 Introduction to COBIT® .....   | 153        |
| 8.2.1 COBIT and the Reality .....  | 154        |
| <b>9 Database Management Systems and Auditing.....</b>                                 | <b>157</b> |
| 9.1 Concepts of Database Technology for Auditors .....                                 | 157        |
| 9.1.1 Data Independence .....  | 158        |
| 9.1.2 Database Management Systems and its Functions .....                              | 158        |
| 9.1.3 Relational Database Management Systems (RDMS).....                               | 162        |
| 9.1.4 Database Security.....   | 167        |
| 9.1.5 Distributed Database Systems.....  | 174        |
| 9.1.6 Object Data Management Systems .....   | 175        |
| 9.1.7 Relation and Object: A Comparison .....  | 175        |
| 9.1.8 Data Warehouses.....   | 177        |
| 9.2 Operational Systems Compared to Informational Systems .....                        | 178        |

|   |            |
|---|------------|
| <b>10 EAI: Auditors Should Know Potential Risks to Enterprise .....</b> | <b>181</b> |
| 10.1 The Promise of EAI.....  | 184        |
| 10.2 Improvement in Productivity .....                                  | 184        |
| 10.2.1 Data Flow Streamlined.....                                       | 185        |
| 10.3 EAI Reaches Beyond Your Borders .....                              | 185        |
| 10.3.1 Lowered Costs .....  | 186        |
| <b>Bibliography and Further References.....</b>                         | <b>189</b> |
| <b>Glossary of IT Auditing Terms.....</b>                               | <b>209</b> |