#### **CONTENTS**

#### About the author xi

#### Introduction 1

## 1 Why is information security necessary? 9

The nature of information security threats 10

Information insecurity 12

Impacts of information security threats 13

Cybercrime 14

Cyberwar 16

Advanced persistent threat 17

Future risks 17

Legislation 20

Benefi ts of an information security management system 22

## 2 The Corporate Governance Code, the FRC Risk Guidance and Sarbanes-Oxley 23

The Combined Code 23

The Turnbull Report 24

The Corporate Governance Code 25

Sarbanes-Oxley 29

Enterprise risk management 31

Regulatory compliance 33

IT governance 34

#### 3 ISO27001 37

Benefits of certification 37

The history of ISO27001 and ISO27002 38

The ISO/IEC 27000 series of standards 40

Use of the standard 41

ISO/IEC 27002 42

Continual improvement, Plan–Do–Check–Act, and process approach 43

Structured approach to implementation 44 Management system integration 47 Documentation 48 Continual improvement and metrics 53

## 4 Organizing information security 55

Internal organization 56
Management review 58
The information security manager 59
The cross-functional management forum 61
The ISO27001 project group 62
Specialist information security advice 68
Segregation of duties 70
Contact with special interest groups 71
Contact with authorities 73
Information security in project management 73
Independent review of information security 74
Summary 75

## 5 Information security policy and scope 77

Context of the organization 77 Information security policy 78 A policy statement 85 Costs and the monitoring of progress 86

## 6 The risk assessment and Statement of Applicability 89

Establishing security requirements 89
Risks, impacts and risk management 89
Cyber Essentials 99
Selection of controls and Statement of Applicability 106
Statement of Applicability Example 108
Gap analysis 109
Risk assessment tools 110
Risk treatment plan 111
Measures of effectiveness 112

#### 7 Mobile devices 115

Mobile devices and teleworking 115 Teleworking 118

## 8 Human resources security 121

Job descriptions and competency requirements 121 Screening 123 Terms and conditions of employment 126 During employment 128 Disciplinary process 134

Termination or change of employment 135

#### 9 Asset management 139

Asset owners 139
Inventory 140
Acceptable use of assets 143
Information classification 144
Unified classification markings 146
Government classification markings 148
Information lifecycle 149
Information labelling and handling 150
Non-disclosure agreements and trusted partners 155

### 10 Media handling 157

Physical media in transit 159

#### 11 Access control 161

Hackers 161
Hacker techniques 162
System configuration 166
Access control policy 167
Network Access Control 169

## 12 User access management 179

User access provisioning 184

## 13 System and application access control 191

Secure log-on procedures 192
Password management system 193
Use of privileged utility programs 194
Access control to program source code 195

#### **14** Cryptography 197

Encryption 198
Public key infrastructure 199
Digital signatures 200
Non-repudiation services 201
Key management 202

## 15 Physical and environmental security 205

Secure areas 205 Delivery and loading areas 214

## 16 Equipment security 217

Equipment siting and protection 217
Supporting utilities 220
Cabling security 222
Equipment maintenance 223
Removal of assets 224
Security of equipment and assets off-premises 224
Secure disposal or reuse of equipment 225
Clear desk and clear screen policy 227

## 17 Operations security 229

Documented operating procedures 229 Change management 231 Separation of development, testing and operational environments 233 Back-up 234

## 18 Controls against malicious software (malware) 239

Viruses, worms, Trojans and rootkits 239 Spyware 241 Anti-malware software 241 Hoax messages and Ransomware 243 Phishing and pharming 244 Anti-malware controls 245 Airborne viruses 248 Technical vulnerability management 250 Information Systems Audits 252

## 19 Communications management 253

Network security management 253

## 20 Exchanges of information 259

Information transfer policies and procedures 259
Agreements on information transfers 262
E-mail and social media 263
Security risks in e-mail 264
Spam 266
Misuse of the internet 267
Internet acceptable use policy 269
Social media 271

## 21 System acquisition, development and maintenance 273

Security requirements analysis and specification 273
Securing application services on public networks 274
E-commerce issues 275
Security technologies 278
Server security 281
Server virtualization 282
Protecting application services transactions 283

## 22 Development and support processes 285

Secure development policy 285
Secure systems engineering principles 289
Secure development environment 289
Security and acceptance testing 290

## **23 Supplier relationships** 295

Information security policy for supplier relationships 295 Addressing security within supplier agreements 297 ICT supply chain 299 Monitoring and review of supplier services 301 Managing changes to supplier services 302

# 24 Monitoring and information security incident management 305

Logging and monitoring 305

Information security events and incidents 310

Incident management – responsibilities and procedures 310

Reporting information security events 313

Reporting software malfunctions 316

Assessment of and decision on information security events 318

Response to information security incidents 318

Legal admissibility 321

# 25 Business and information security continuity management 323

ISO22301 323

The business continuity management process 324

Business continuity and risk assessment 325

Developing and implementing continuity plans 327

Business continuity planning framework 328

Testing, maintaining and reassessing business continuity plans 332

Information security continuity 335

## **26 Compliance** 339

Identification of applicable legislation 340

Intellectual property rights 353

Protection of organizational records 358

Privacy and protection of personally identifiable information 359

Regulation of cryptographic controls 361

Compliance with security policies and standards 361

Information systems audit considerations 364

#### 27 The ISO27001 audit 365

Selection of auditors 365 Initial audit 367 Preparation for audit 368 Terminology 371

Appendix 1: Useful websites 373

Appendix 2: Further reading 379

Index 395