

# Contents

<b>Abstract</b>	<b>xv</b>
<b>Acknowledgements</b>	<b>xix</b>
<b>Chapter 1 Background</b>	<b>1</b>
1.1 Introduction . . . . .	1
1.2 The Book . . . . .	1
1.3 Purpose of the Book . . . . .	2
1.4 'Change management' . . . . .	4
1.5 Target Audiences . . . . .	6
1.6 Definitions . . . . .	6
1.7 Objectives . . . . .	7
1.8 Approach adopted . . . . .	7
<b>Phase One</b>	
<b>Chapter 2 Industry Evolution</b>	<b>11</b>
2.1 Tragedy of the Commons . . . . .	11
2.2 Frustration Gap . . . . .	12
2.3 Publisher and Library dissentions . . . . .	13
2.4 Big Deals . . . . .	15
2.5 The Tipping Point . . . . .	16
2.6 Open Access . . . . .	17
2.7 The Long Tail . . . . .	19
2.8 Disenfranchised Researchers . . . . .	20
2.9 Knowledge Workers and the Thinkforce . . . . .	23
2.10 Emergence of Search Engines . . . . .	24
2.11 Something is Good Enough . . . . .	25
2.12 The new market for research material . . . . .	26
2.13 Overall Trends . . . . .	26
<b>Chapter 3 End User Behaviour</b>	<b>29</b>
3.1 Change in User Behaviour . . . . .	29
3.2 Who are the users? . . . . .	30
3.3 Typology of Users . . . . .	31
3.4 Information Overload . . . . .	32
3.5 Research Studies . . . . .	33

3.5.1	Industry wide Studies . . . . .	33
	Tenopir/King research . . . . .	33
	Collection development . . . . .	34
3.5.2	Library sourced initiatives . . . . .	35
	The eJUSt report on E-Journal Users . . . . .	35
	Faculty Attitudes at Univ California . . . . .	37
3.5.3	Publisher commissioned studies . . . . .	37
	CIBER Studies . . . . .	37
	Elsevier/Mabe research . . . . .	39
3.6	Author versus Reader . . . . .	43
3.7	Digital Natives and the Millennium generation . . . . .	43
3.8	Forecasts . . . . .	44
3.8.1	The Outsell View . . . . .	44
3.9	User perceptions of Value . . . . .	45
<b>Chapter 4 Measuring the Value of Information</b>		<b>47</b>
4.1	Background . . . . .	47
4.1.1	Peer Evaluation . . . . .	47
4.1.2	Citation Analysis . . . . .	47
4.1.3	Document Downloads . . . . .	49
	COUNTER . . . . .	50
	SUSHI . . . . .	51
	Effect of Robots . . . . .	52
	Case Study – The Mesur Project . . . . .	52
4.1.4	Focus Groups and investigating individual usage patterns . . . . .	53
4.1.5	Document Delivery statistics . . . . .	54
4.1.6	Questionnaires . . . . .	55
4.1.7	Triangulation . . . . .	55
4.1.8	Scientometrics . . . . .	55
4.2	Research Assessment Exercises . . . . .	56
4.2.1	The United Kingdom's RAE . . . . .	56
4.2.2	Criticisms of UK's RAE . . . . .	57
4.2.3	UUK report looks at the use of bibliometrics . . . . .	58
4.2.4	Australia's research assessment exercise (RQF) . . . . .	60
4.3	The Future of BiblioMetrics . . . . .	60
<b>Phase Two</b>		
<b>Chapter 5 Electronic Information Industry Structure</b>		<b>65</b>
5.1	How much Information? . . . . .	65
5.2	The Information Industry . . . . .	66
5.3	Corporate Size . . . . .	66
5.4	The Scientific, Technical and Medical Information sector . . . . .	67
5.5	Challenges facing the information industry . . . . .	70
<b>Chapter 6 The Key Players</b>		<b>73</b>
6.1	Industry Overview . . . . .	73
6.1.1	Overall Scholarly Trends . . . . .	73
6.2	Structure of the Journal Publishing System . . . . .	73

6.3	Market Estimates . . . . .	75
6.3.1	STM Publishers . . . . .	76
6.4	Key Stakeholders . . . . .	78
6.4.1	Publishers and Information Providers . . . . .	78
	Leading Publishers . . . . .	78
	Learned Society Publishers . . . . .	78
	University Presses . . . . .	79
6.4.2	Life Cycle of scholarly communication . . . . .	80
	The Future of the Big Deal . . . . .	82
	Trend towards Open Access . . . . .	82
	Versioning . . . . .	83
	Other Challenges facing Publishing . . . . .	86
	Hybrid Journals and document delivery . . . . .	86
	Refereeing . . . . .	87
	Peer Review in scholarly journals . . . . .	88
	Alternative review procedures . . . . .	89
	Publishers and the 'Valley of Death' . . . . .	89
	The Prisoner's Dilemma . . . . .	90
	Future of Publishing . . . . .	91
6.5	Research Libraries . . . . .	92
	ARL statistics . . . . .	93
	UK university library expenditure . . . . .	93
	Librarian relationship to their customers (users) . . . . .	94
6.5.1	The European Digital Libraries . . . . .	95
6.5.2	The Future of the Librarian . . . . .	96
6.5.3	Understanding the new user . . . . .	98
6.6	Other Stakeholders . . . . .	98
6.6.1	Collaboratories . . . . .	98
6.6.2	Funding Agencies . . . . .	99
6.7	Government involvement . . . . .	100
6.7.1	Case Study . . . . .	100
	Joint Information Services Committee . . . . .	100
6.7.2	National Priorities on toll free or toll paid . . . . .	101
6.7.3	Emerging Competition . . . . .	102
<b>Chapter 7 Publication Formats</b>		<b>103</b>
7.1	Journals and e-Journals . . . . .	103
7.1.1	Multi author articles . . . . .	106
7.1.2	The evolution of the electronic journal . . . . .	107
	Article Readership . . . . .	109
	Concerns about Journals . . . . .	110
	Electronic journal use . . . . .	110
	Purpose of Reading . . . . .	111
	The Value of reading Journals . . . . .	112
	e-Journals in industry . . . . .	113
7.1.3	Future of the Journal . . . . .	114

7.2	Books and e-Books . . . . .	115
7.2.1	The e-Book phenomenon . . . . .	115
	Ebrary results . . . . .	117
	Oxford Scholarship Online . . . . .	117
	e-Books on other platforms . . . . .	118
	A Strategy for Book Digitisation . . . . .	118
7.3	Document Delivery . . . . .	120
7.3.1	The market for article supply . . . . .	120
	InterLibrary Loans . . . . .	122
	Subito analysis of document delivery . . . . .	124
<b>Chapter 8 Legal Developments</b>		<b>127</b>
8.1	Legal Initiatives . . . . .	127
8.1.1	Creative Commons . . . . .	127
8.1.2	Science Commons . . . . .	127
8.1.3	JISC and SURF's Licence to Publish . . . . .	128
8.1.4	Future of Copyright . . . . .	129
	Orphan Works . . . . .	129
<b>Chapter 9 Geographical Trends</b>		<b>131</b>
9.1	Globalisation of Research . . . . .	131
9.2	Movement of global funds for research . . . . .	132
9.2.1	Regional variations . . . . .	132
	Industrial R&D . . . . .	133
	Academic R&D . . . . .	133
9.3	Implications on scholarly publishing . . . . .	134
9.3.1	Worldwide Trends in Article Output . . . . .	135
9.3.2	Trends in Three Major Publishing Regions . . . . .	135
	Europe . . . . .	136
	United Kingdom . . . . .	136
	Asia . . . . .	136
	China . . . . .	137
	Australia . . . . .	138
<b>Chapter 10 Research Disciplines</b>		<b>141</b>
10.1	Sources of Funds for Research . . . . .	141
10.2	Research Trends . . . . .	142
10.3	The changing R&D process in large corporations . . . . .	143
10.3.1	Social Collaboration . . . . .	143
10.4	Behavioural Trends . . . . .	144
10.5	Specific Disciplines . . . . .	147
10.5.1	Physics and Mathematics . . . . .	147
10.5.2	Astronomy . . . . .	148
10.5.3	BioSciences and Medicine . . . . .	149
	United Kingdom . . . . .	149
10.5.4	General Considerations for Biomedicine . . . . .	150
10.6	Case Study . . . . .	151
10.6.1	Case Study – Information Search (Biology) . . . . .	151
10.7	Arts and Humanities . . . . .	152

10.8	Other Subjects . . . . .	153
10.8.1	Chemical Biology . . . . .	153
10.8.2	Geosciences . . . . .	153
10.9	Summary . . . . .	154
<b>Phase Three</b>		
<b>Drivers for Change</b>		<b>157</b>
Change can be complex . . . . .		157
<b>Financial and Administrative Drivers</b>		
<b>Chapter 11 Business Models as Driver for Change</b>		<b>161</b>
11.1	Opening up the Market? . . . . .	161
11.1.1	Open Access Initiatives . . . . .	161
11.1.2	Open Access Journals – the Gold Route to open access . . . . .	163
	Gold OA Journals – The Current Situation . . . . .	163
11.1.3	Author self-depositing articles – the Green Route to open access . . . . .	165
	Subject-based E-Print services . . . . .	165
	Institutional-based repositories . . . . .	165
	The DRIVER project . . . . .	167
	Author Participation rates . . . . .	168
	Voluntary or Mandatory? . . . . .	168
11.1.4	Harvesting the open access material . . . . .	170
	Usage of OA . . . . .	170
11.1.5	Open Access projects . . . . .	171
	BioMed Central . . . . .	171
	Hindawi Publishing . . . . .	172
	SCOAP3 – OA publishing of physics journals . . . . .	172
	Case Study – The US IR scene . . . . .	174
11.1.6	Economics supporting open access . . . . .	176
11.1.7	Impact of OA on Publishers . . . . .	177
11.1.8	Trends favouring Open Access . . . . .	178
11.1.9	Implications for Authors . . . . .	181
11.1.10	Implications for Publishers . . . . .	181
11.2	Online Advertising as a new business model . . . . .	182
11.2.1	Online Advertising . . . . .	182
11.2.2	Advertising in the scholarly area . . . . .	182
11.3	Summary . . . . .	184
<b>Chapter 12 Funding Research as a Driver for Change</b>		<b>185</b>
12.1	Political developments . . . . .	185
12.2	Open Access Initiatives . . . . .	186
12.3	Ranking countries by research output . . . . .	187
12.4	National and International government initiatives . . . . .	187
12.4.1	A model for a new electronic publishing paradigm . . . . .	187
12.4.2	European Commission FP7 e-infrastructures . . . . .	188

12.4.3	EU Study of Scientific Publishing (2006)	190
12.4.4	EU open access developments	193
12.4.5	European Research Council	195
12.5	Publisher Initiatives	195
12.5.1	US publishers' PR campaign	195
12.5.2	PRISM – Advocacy programme from the publishers	197
12.5.3	The European PEER Project	198
12.5.4	Publishers' White paper on academic use of journal content	199
12.6	Library Initiatives	200
12.6.1	SPARC	200
12.6.2	SHERPA/ OpenDOAR	201
12.7	Global Research Trends	201
12.8	Research funding as a driver for change	203
12.8.1	Public funded R&D in the UK	203
12.8.2	Structure of Research Funding in the UK	204
12.9	Research assessment	204
12.9.1	A Dangerous Economy (RCUK)	204
12.9.2	The Death of Peer Review (RAE)	205
12.9.3	The 2008 RAE	206
12.10	Other funding agencies	207
12.10.1	JISC in UK	207
12.10.2	MPS and DFG in Germany	207
12.10.3	Charities	208
12.11	Summary	208

## Technological Drivers

<b>Chapter 13</b>	<b>Efficiency Improvements as a Driver for Change</b>	<b>211</b>
13.1	Industry Collaboration to achieve improved efficiency in EP	211
13.1.1	Trade Associations	211
	Publisher Trade Associations	211
	Library Trade Associations	212
13.1.2	Research Information Network (RIN)	213
13.1.3	Publishers Research Consortium	214
13.1.4	Publishing Cooperatives	215
13.2	Changes in Format	217
13.2.1	Markup Languages	217
13.2.2	Metadata	218
13.3	Structural Efficiencies	219
13.3.1	Mergers and Acquisitions	219
13.3.2	Economies of Scale	220
13.3.3	Why is market consolidation taking place in scholarly publishing?	221
13.3.4	Why are the larger publishers able to succeed where small publishers find it difficult?	222
13.4	Standards and Protocols	223
13.4.1	ONIX for Publisher Licences	223

13.4.2	ACAP (Automated Content Access Protocol) . . . . .	224
13.4.3	Refereeing . . . . .	225
	Nature's open peer review . . . . .	225
13.5	New Technical Offerings . . . . .	225
	13.5.1 Current Awareness and Alerting . . . . .	225
	13.5.2 Publishing a semantic journal . . . . .	226
	13.5.3 Publishing in virtual reality . . . . .	226
13.6	Summary . . . . .	228
<b>Chapter 14</b>	<b>Technology as a Driver for Change</b>	<b>229</b>
14.1	Background . . . . .	229
14.2	Past impact of Technology . . . . .	229
14.3	The technological infrastructure . . . . .	230
	14.3.1 Digital Resource Management (DRM) . . . . .	231
	14.3.2 Athens . . . . .	231
	14.3.3 Shibboleth . . . . .	232
	14.3.4 UK Access Management Federation . . . . .	233
	14.3.5 OpenID . . . . .	233
14.4	Technology and Standards . . . . .	234
	14.4.1 Digital Object Identifier (DOI) . . . . .	234
	Concerns . . . . .	234
	14.4.2 CrossRef . . . . .	235
	14.4.3 Other Identifiers . . . . .	236
14.5	New Products and Services . . . . .	236
14.6	Other Technical applications . . . . .	237
	14.6.1 The "Cloud" . . . . .	238
14.7	Three predictions on scholarly communication technology . . . . .	239
<b>Chapter 15</b>	<b>Data and Datasets as a Driver for Change</b>	<b>243</b>
15.1	Background . . . . .	243
15.2	Main data centres . . . . .	243
15.3	The Data Challenge . . . . .	244
15.4	Standards and Procedures . . . . .	246
	15.4.1 Data Management Systems . . . . .	246
	15.4.2 Metadata of Data . . . . .	246
	15.4.3 Data Webs . . . . .	247
15.5	The Researcher's wishes . . . . .	247
15.6	Reproducible Results . . . . .	249
15.7	Integration between Data and Text . . . . .	249
15.8	Business Model for Data . . . . .	249
	15.8.1 NSF funds for data compilations . . . . .	250
	15.8.2 Google and Datasets . . . . .	251
15.9	Impact of data on Libraries . . . . .	251
	15.9.1 Data Curation . . . . .	252
15.10	Impact of data on Publishers . . . . .	252
15.11	Impact on other institutions . . . . .	253
	15.11.1 Research Councils . . . . .	253
15.12	Summary . . . . .	254

<b>Chapter 16 Mining of Text and Data</b>	<b>255</b>
16.1 Background . . . . .	255
16.2 Implications . . . . .	256
16.3 The mechanism of Text Mining . . . . .	256
Information Retrieval (IR) . . . . .	256
Natural Language Processing (NLP) . . . . .	256
Information Extraction (IE) . . . . .	257
Data Mining (DM) . . . . .	257
Visualisation . . . . .	257
16.4 Recent History . . . . .	257
16.5 Challenges facing Text and Data mining . . . . .	258
16.5.1 Structure of database . . . . .	258
16.5.2 Legal and licensing framework . . . . .	259
16.5.3 Legal status of text mining . . . . .	259
16.5.4 Computation by machines . . . . .	260
16.6 Practical Examples . . . . .	260
16.7 Implications in applying text mining . . . . .	261
16.8 The Future . . . . .	261
16.9 Impact on Libraries . . . . .	262
16.10 Impact on Publishers . . . . .	262
<b>Chapter 17 E-science and Cyberinfrastructure as Drivers for Change</b>	<b>263</b>
17.1 Background . . . . .	263
17.2 The e-Science Challenge . . . . .	263
17.3 Visions for e-Science . . . . .	264
17.4 Overall context of e-Science . . . . .	264
17.4.1 Public Engagement . . . . .	265
17.5 Future role of e-Science . . . . .	265
<b>Chapter 18 Workflow Processes and Virtual Research Environments</b>	<b>267</b>
18.1 Integration into Work Flow Process . . . . .	267
18.2 The research process . . . . .	268
18.3 Examples of a work bench approach . . . . .	268
18.3.1 Virtual Research Environments (VRE) . . . . .	269
18.4 Summary . . . . .	270
<b>Chapter 19 The Semantic Web as a Driver for Change</b>	<b>271</b>
19.1 The Challenge of the Semantic Web . . . . .	271
19.2 Critiques . . . . .	271
19.3 Web Science Research Initiative . . . . .	272
19.4 Examples of Semantic Web in scholarly publishing . . . . .	272
19.4.1 Knowlets . . . . .	273
19.5 Implications of Semantic Web for EP . . . . .	274
<b>Chapter 20 Mobile Devices as Driver for Change</b>	<b>275</b>
20.1 Background . . . . .	275
20.2 The wireless economy . . . . .	275
20.3 Intelligent spectacles? . . . . .	276
20.4 Amazon's 'Kindle' . . . . .	276



20.5	Google's Open Handset Alliance . . . . .	277
20.6	Future Developments . . . . .	278
<b>Chapter 21</b>	<b>Archiving and Preservation as Drivers for Change</b>	<b>279</b>
21.1	The Challenge of Archiving and Preservation . . . . .	279
21.2	Preservation and Access . . . . .	279
21.3	Archive requirements . . . . .	281
21.4	International Collaboration . . . . .	282
21.4.1	US-based Task Force on sustainable digital preservation and access . . . . .	282
21.4.2	The European Alliance for Permanent Access . . . . .	283
<b>Social Drivers</b>		
<b>The Google Generation</b>		<b>287</b>
<b>Chapter 22</b>	<b>Findability as a Driver for change</b>	<b>289</b>
22.1	The rise of Search Engines . . . . .	289
22.2	Resource Discovery and Navigation . . . . .	289
22.3	How users find information . . . . .	290
22.4	The Findability Challenge . . . . .	292
22.5	Case Study: The Google mantra . . . . .	293
22.6	Other search engines . . . . .	296
22.7	Impact of search engines on publishers . . . . .	297
22.8	Book digitisation and the Copyright issue . . . . .	298
22.9	What of the Future? . . . . .	299
<b>Chapter 23</b>	<b>Web 2.0 and Social Collaboration as Drivers for Change</b>	<b>301</b>
23.1	Wisdom of the crowds . . . . .	301
23.2	The Challenge of Web 2.0 . . . . .	302
23.3	Critiques of the Web 2.0 movement . . . . .	303
23.4	Case Study – O'Reilly . . . . .	305
23.5	The Web 2.0 business model . . . . .	307
23.5.1	Blogs and Wikis . . . . .	309
23.5.2	Mash-ups . . . . .	309
23.6	Drive towards Consumer-based Collaborative systems . . . . .	309
23.7	Communication . . . . .	311
23.8	Case Study – Wikipedia and online encyclopedias . . . . .	311
23.9	Wikinomics . . . . .	313
23.10	Case Study: InnoCentive . . . . .	315
23.11	Summary . . . . .	317
<b>Chapter 24</b>	<b>Trust</b>	<b>319</b>
24.1	Trust . . . . .	319
24.2	Fraud and Plagiarism . . . . .	321
<b>Chapter 25</b>	<b>Timeline – Emergence of Electronic Publishing</b>	<b>323</b>
25.1	Where we come from . . . . .	323
25.2	Users of scholarly communication . . . . .	324

25.3	The Industry Structure . . . . .	324
25.4	Drivers for Change . . . . .	325
25.5	Separating the Drivers . . . . .	325
25.6	Summary . . . . .	327
<b>Chapter 26</b>	<b>Summary and Recommendations</b>	<b>329</b>
26.1	Planning for Change . . . . .	329
26.2	A vision for Scholarly Communications . . . . .	331
26.2.1	User Behaviour . . . . .	333
26.2.2	Effect of government intervention . . . . .	334
26.2.3	New information service requirements . . . . .	334
26.2.4	Market Trends . . . . .	335
26.2.5	The Information Process . . . . .	335
26.2.6	Business Models . . . . .	336
26.2.7	New Products and Services . . . . .	336
26.2.8	Stakeholders . . . . .	337
26.2.9	Legal issues . . . . .	337
26.3	The future role of the Publisher . . . . .	337
26.4	The future role of Libraries . . . . .	338
26.5	The future role of Intermediaries . . . . .	340
<b>References</b>		<b>341</b>
<b>Figures and Tables</b>		<b>343</b>
<b>Index</b>		<b>345</b>