Contents

1 Introduction 1
1.1 Problem Statement 6
1.2 Summary of the Key Points Analyzed 8
1.3 The Structure of This Book 9
1.4 Methodology 12
References 14

Part I Fundamental Legal, Theoretical and Technical Issues

2 Database Rights in Big Data and the Cloud—Main Legal Considerations 19
2.1 Introduction 19
2.2 On the Legal Issues of Databases 20
2.2.1 International Legal Framework 20
2.2.2 Database Protection in the European Legal Framework: Justification for the Double Scheme of Protection 22
2.2.3 The Necessity for the Legal Protection of Databases in the Cloud 25
2.2.4 Motivations for Introducing the Database Right in the EU 26
2.3 Database Rights: Legal Concepts and Main European Court Decisions 28
2.3.1 "Obtaining" and "Creating" Data and the "Spin-Off Doctrine" in the Eyes of the CJEU 33
2.3.2 Right to Access Information and "Sole Source" Databases 36
2.3.3 Sui Generis Right Term of Protection 38
2.4 Big Data and the Sui Generis Right Dilemma 38

2.5 Database Right and Contract Law 42
2.6 Summary and Interim Remarks 46
References 46

3 Brokers, Clouds and Databases—*The Good, the Bad and the Ugly* 51
3.1 Introduction 51
3.2 Databases: Background and Technical Definition 52
3.2.1 A Few Examples of Databases in the Cloud 54
3.3 Cloud Computing and Brokerage Scenarios 55
3.3.1 Literature Review and Background Considerations 55
3.3.2 The Cloud Metaphor 57
3.3.3 Advantages of Cloud Computing: Main Capabilities . . . 59
3.3.4 Disadvantages of Cloud Computing: Some Related Technical and Legal Issues 63
3.4 Cloud Deployment Models 64
3.4.1 Public Cloud 65
3.4.2 Private Cloud 66
3.4.3 Community Cloud 66
3.4.4 Hybrid Cloud 67
3.5 Cloud Service Models 68
3.5.1 Software as a Service (SaaS) 68
3.5.2 Platform as a Service (PaaS) 69
3.5.3 Infrastructure as a Service (IaaS) 69
3.5.4 Software Infrastructure as a Service (SIaaS) 70
3.6 Cloud Service Brokerage 70
3.7 Summary and Interim Remarks 72
References 73

4 Law and Economics—Five Core Principles in the Cloud 79
4.1 Introduction 79
4.2 Literature Review and Background Considerations: *The Three Schools of Thought* 80
4.2.1 Positive Law and Economics (Chicago-Style) 81
4.2.2 Normative Law and Economics (Yale-Style) 83
4.2.3 Functional School of Law and Economics (Virginia-Style) 84
4.3 Combining the Three Schools of Thought: *Five Core Principles* 84
4.3.1 Reducing Transaction Costs in the Cloud: "Filling the Gaps" in SLAs 85
4.3.2 Turning Technological Negative Externalities into External Benefits: The "Bee Metaphor" 88
4.3.3 "Ownership" Rights of Data as a Commons: Transforming "Tragedy" into "Comedy" 91

4.3.4 Institutional Alternatives: The Foucault Pendulum of "Imperfect Choices in the Cloud" . . . 95
4.3.5 Social Network Analysis (SNA): Cloud Brokers as a Hub . . . 97
4.4 Summary and Interim Remarks . . . 99
References . . . 100

Part II A New Theoretical Framework

5 Plan-Like Architectures . . . 109
5.1 Introduction . . . 109
5.2 Plan Theory: We Are All Planning Agents . . . 110
5.2.1 Shared Agency Theory: From Individual Plans to Joint Plans . . . 112
5.2.2 Laws Are Plans . . . 116
5.2.3 Simple Logic of Planning . . . 117
5.2.4 Exclusionary Reasons . . . 120
5.3 Plan Theory in the Cloud: Plan-Like Architectures . . . 121
5.3.1 Brokers as Main Planners . . . 121
5.3.2 Code and Architecture Design . . . 124
5.3.3 SLAs as Plans . . . 127
5.4 Summary and Interim Remarks . . . 128
References . . . 129

6 Plans, Brokers and Trust . . . 133
6.1 Introduction . . . 133
6.2 Literature Review and Background Considerations . . . 135
6.2.1 Attitudes of Trust (and Distrust) Within Plan Theory . . . 138
6.2.2 Different Notions of Trust: A Kaleidoscopic and Critical View . . . 141
6.2.3 Delimiting the Concept of Trust . . . 153
6.3 The Role of Cloud Brokers for Strengthening Mutual Trust . . . 155
6.3.1 The Double Nature of Trust . . . 158
6.3.2 Deferring Accountability to Cloud Brokers . . . 160
6.3.3 Risk, Vulnerability and Threat . . . 161
6.3.4 Trust and Reputation: Beyond Track Records . . . 163
6.3.5 Gaining User's Trust Through Websites and Social Networks . . . 166
6.3.6 Blockchain 2.0: The "Trust Machine" . . . 168
6.4 Trust and Plan-Like Architectures: How It All Fits Together . . . 170
6.5 Summary and Interim Remarks . . . 171
References . . . 172

7 Framing Choice Architectures 183
7.1 Introduction 183
7.2 Literature Review and Background Considerations 185
7.2.1 Two Ways of Thinking: "Fast" and "Slow" 188
7.2.2 Nudge Theory and Cloud Brokerage Architectures 189
7.2.3 Behavioral Market Failures, Different Types of Nudges and Soft Paternalism 194
7.3 Turning Nudges into Simpler and More Effective SLAs 196
7.3.1 Warning Signs for Risk Management in Cloud Brokerage 198
7.3.2 Default Rules and Information Disclosure as Prime Nudges 200
7.4 The Relation Between Plans, Nudges and Choice Architectures 202
7.5 Summary and Interim Remarks 203
References 203

Part III A New Contractual Model

8 New Template for SLAs 211
8.1 Introduction 211
8.2 Background Considerations: SLAs and XML 213
8.3 Empirical Study and Optimized Solutions 215
8.3.1 Database Rights and the "Legal Glocalization" Conundrum 217
8.3.2 Click-Through or Negotiated Terms? A Blended Approach 218
8.3.3 "Ownership" Rights in Consumer Data 221
8.3.4 "Ownership" Rights in Biological Data 225
8.4 A Sui Generis Contractual Framework 232
8.4.1 Automated Framework: The "Dead Man's Switch" 234
8.4.2 XML-Based Description Schema 235
8.4.3 Brokerage Workflow Process 237
8.4.4 Unified Modeling Language and Pseudo-code 240
8.4.5 Legal Questions for the Extraction of the Pseudo-code 242
8.5 Summary and Interim Remarks 254
References 254

9 Towards a Legal Risk Assessment 261
9.1 Introduction 261
9.2 Risk Assessment: Literature Review, Motivation and Justification 263
9.3 Risk Assessment Methodology 267

9.3.1 High Level Analysis of the System 268
9.3.2 Identifying the Assets Involved 268
9.3.3 Identifying the Threats in Each Cloud Deployment Scenario 268
9.4 Embracing Legal Risks and Enhancing Legal Interoperability 269
9.5 Conventional Databases Versus Big Data: Striking the Right Balance 272
9.5.1 Territorial Scope of Protection 273
9.5.2 "Ownership" Rights of New Data Generated by Big Data 274
9.5.3 Lack of International Legal and Contractual Standards 275
9.6 Risk Assessment Techniques and Typical Actors Involved in Brokering WS-Agreements 276
9.6.1 Typical Actors Involved 276
9.6.2 Risk Assessment Techniques 277
9.7 Risk Inventory Design for the Identification of Legal Risks 278
9.8 Different Stages of Risk Assessment in Cloud Brokerage Scenarios (CBS) 280
9.9 Use Case Scenarios: Examples 283
9.9.1 Use Case 1: Cloud Services in Business Transactions 285
9.9.2 Use Case 2: Genetic Research Projects Within Clinical Trials Scenarios 289
9.10 Summary and Interim Remarks 292
References 292

10 Conclusion—Main Findings and Contributions to the Current Knowledge 297
10.1 Theoretical Contribution 297
10.2 Scientific Contribution 298
References 301

Index 303