TABLE OF CONTENTS

ABBREVIATIONS 11

CHAPTER I. BLOCKCHAIN, BUSINESS AND TODAY´S INTERNET. Pablo García Mexía J.D., Ph.D. 15

1. BLOCKCHAIN TODAY 17
2. A TECHNOLOGY WITH MULTIPLE USES 23
3. THE DICHOTOMY PUBLIC BLOCKCHAINS VS. PRIVATE BLOCKCHAINS. ITS IMPORTANCE FOR THIS WORK 25
4. ONE LAST (BUT IMPORTANT) IDEA 28

BIBLIOGRAPHY 30

CHAPTER II. WHAT IS BLOCKCHAIN?. José Morales Barroso, PhD. 33

1. INTRODUCTION 35
2. THE BLOCKCHAIN: ELEMENTS THAT MAKE IT UP. 37
   - 2.1. The P2P Network 39
   - 2.2. The Blockchain 40
   - 2.3. The Distributed Register 41
   - 2.4. The General Ledger 42
   - 2.5. The Clients 42
   - 2.6. Servers or Nodes 43
   - 2.7. Tokens 44

2.8. Access to Data and Permissions 45
3. SAFETY TECHNIQUES APPLIED IN BLOCKCHAIN 47
3.1. Cryptography and Digital Signature 47
3.2. Hash Mechanism 49
3.3. Merkle Root 50
3.4. Consensus Processes 51
3.5. Blockchain Attacks. 55
4. SMART CONTRACTS AND BLOCKCHAIN. 56
4.1 Blockchain Oracles 57
4.2. Smart Contracts based on Blockchain . . . 58
5. APPLICATIONS OF BLOCKCHAIN TECHNOLOGY. 59
5.1. When is Blockchain technology suitable? 59
5.2. The Distributed Trust Model. 61
5.3. Cryptoassets and Financial Services 62
5.4. Distributed Registration and Participatory Processes 63
5.5. Decentralized Energy 64
5.6. Blockchain and the Health Sector 67
5.7. Blockchain in Logistics. 68
5.8. Platforms, Consortia and Blockchain Organizations 70
5.8.1. Bitcoin 71
5.8.2. Ethereum 72
5.8.3. Hyperledger 73
5.8.4. Consortium R3 74
5.8.5. Alastria 74
BIBLIOGRAPHY 74

CHAPTER III. FROM CYBERLAW TO CRYPTOLAW. CRYPTOREGULATION. Pablo García Mexía 77

1. BLOCKCHAIN, A TECHNOLOGICAL ALTERNATIVE TO INTERMEDIATION 79

1.1. The combination of P2P and cryptographic networks. Technological and socio-political background 81
1.2. A new source of digital trust. 84
1.3 Blockchain as a threat to intermediaries (including digital intermediaries) 86
1.4. The limitations of "disintermediation". . . . 88
1.4.1. Permissioned networks, a great alternative for the future in Blockchain 89
1.4.2. The sources of insecurity for cryptographically secure systems 95
1.4.3. The survival of intermediaries . . 98
2. LAW AND CRYPTOLAW 102
2.1. From Lex Informatica to Cryptolaw 104
2.2. Smart contracts or "cryptocontracts", the paradigm of Cryptolaw. 106
2.3. Brief epilogue on private and permissioned networks. 112
3. TOWARD CRYPTOREGULATION. CONDITIONS, PRINCIPLES AND (SOME) RULES. 113
3.1. Cryptoassets in Blockchain. 116
3.1.1. The problems of cryptoassets . . 117
3.1.2. Consequences of the weight and problems of cryptoassets for cryptoregulation 119
3.2. Chronological aspects. The pace of Cryptoregulation 121
3.3. Objective aspects. The Subject-Matters of Cryptoregulation 124
3.3.1. Regulation of cryptoassets. 124
3.3.2. Regulate cryptocontracts? 130
3.3.3. Other cryptoregulatory fields . . 132
3.4. Subjective aspects. The addressees of cryptoregulation. 133

3.5. Methodological aspects. (Cryptographic) code as a governance and regulatory technique 136
3.5.1. "Crypto-governance" or the cryptographic code as a governance technique 136
3.5.2. Cryptoregulation in a strict sense: Cryptographic code as a regulatory technique 139
3.6. Territorial aspects. Cryptoregulation's Jurisdiction 145
4. CONCLUSIONS 148
BIBLIOGRAPHY 152