
Contents

Preface	xiii
Chapter 1. The Challenges of Building a Network	1
1.1. Construction of a national network	1
1.1.1. Network creation priorities	1
1.1.2. Links with the international community	5
1.2. Security of network operations	5
1.2.1. Security architecture	6
1.2.2. History of security architecture in France	6
1.2.3. Operational security of a network	7
1.2.4. Elements of network security	8
1.3. State communications network	10
1.4. System for connecting network users	11
1.5. The search for regulations and network growth	11
1.5.1. The need for rules in economics	11
1.5.2. Definition of common property	12
1.5.3. The first national accounts	14
1.5.4. Christaller and Lösch's "central place" model	15
1.5.5. Central places and Pareto	16
1.5.6. Practical logistics rules	20
1.5.7. Jipp correlation	21
1.6. Land use planning	23
1.6.1. Cities, regions and territories	23
1.6.2. Telecommunications buildings	24
1.6.3. The search for an optimal model	24

1.7. So-called “network” laws.	26
1.7.1. Metcalfe’s law.	26
1.7.2. Kao’s law.	26
1.7.3. Odlyzko’s law.	26
1.8. Usage metrics for digital technology	27
1.8.1. ICT Development Index	27
1.8.2. Digital barometer	28
1.9. Conclusions.	28
Chapter 2. Network Structure and Architecture	29
2.1. Analog and digital	29
2.1.1. Terminology	29
2.1.2. Historical overview	29
2.1.3. Necessary network equipment	30
2.1.4. Traffic metrics	33
2.2. Distribution network	34
2.2.1. Wholesale and retail markets	34
2.2.2. The different structures of fixed subscriber lines	37
2.2.3. Connections via radio link.	42
2.3. Long-distance connections	49
2.4. Next-generation networks	50
2.4.1. Next-generation network structure	50
2.4.2. Energy supply	52
2.4.3. The relationship between traffic and time.	53
2.5. Internet	53
2.5.1. Types of Internet connection	53
2.5.2. Organization of the Internet	56
2.5.3. Organizations involved	56
2.5.4. Internet addressing and e-mail addresses	59
2.5.5. Connections between IP networks	62
2.5.6. The concept of “Internet governance”	65
2.6. Digital network terminals.	66
2.6.1. Main models used in 2016.	66
2.6.2. Selling or renting a terminal.	67
2.6.3. Bring your own device (BYOD)	68
2.7. Internet applications.	69
2.7.1. The Internet and the Web	69
2.7.2. Mode of operation	70
2.7.3. Voice applications and voice messaging	71

2.7.4. Text messaging	72
2.7.5. Searching for information online	73
2.7.6. Videos	74
2.7.7. Online music	75
2.7.8. Personal data	76
2.7.9. Online purchases	76
2.7.10. Geolocation	76
2.7.11. Social networks	77
2.7.12. The Internet of Things	77
2.7.13. Banking applications	78
2.7.14. Online gaming	79
2.7.15. The Cloud	79
2.8. Overview of network connections	80
2.8.1. Distribution network	80
2.8.2. National network	80
2.8.3. International connections	80
2.8.4. High and very high speeds	81
2.9. Network management staff	81
2.10. Assessments considered by network operators	84
2.10.1. Internet revenues	84
2.10.2. Controlling content	85
2.10.3. Structural weaknesses	85
Chapter 3. Communications Services Regulations	87
3.1. The international regulatory framework	87
3.1.1. Trade agreements between States	87
3.1.2. International financial bodies	91
3.1.3. Technical standardization bodies	92
3.1.4. Globalization and economic growth	96
3.2. The European regulatory framework	97
3.2.1. The European Commission	97
3.2.2. BEREC	97
3.2.3. Standardization of telecommunications and ICT	98
3.3. Main French authorities involved	100
3.3.1. ADLC	100
3.3.2. ARCEP	100
3.3.3. CNIL	100
3.3.4. DGCCRF	101

3.3.5. CSA	101
3.3.6. AFNOR	101
3.4. 1980s tariff principles	102
3.4.1. Assessment of implementation costs	102
3.4.2. Background to circuit switching	104
3.4.3. Calculation of accounting rates	106
3.4.4. Collection charges	107
3.4.5. Network access and use	108
3.4.6. Practices in 1985	108
3.5. 1990s reform	109
3.6. Tariff principles in force in 2016	110
3.6.1. NGN technology	110
3.6.2. Internet traffic	111
3.6.3. Mobile traffic	112
3.6.4. Current practices in 2015	114
3.6.5. Conclusions	117
3.7. Pricing practices	117
3.7.1. Tariff levels	117
3.7.2. International balance sheet	119
3.7.3. Sales revenue and GDP	122
Chapter 4. Supply and Demand in Communications	125
4.1. Providers and customers	125
4.1.1. Service provisions	125
4.1.2. Satisfaction of needs in communications services	132
4.1.3. The long tail	134
4.1.4. Monopoly, duopoly or competition	135
4.1.5. Billing the data rate	135
4.2. Obligations of network operators	136
4.2.1. Responsibilities of a country's main operator	136
4.2.2. Public service tasks and universal service	137
4.2.3. People with disabilities and under-age children	140
4.2.4. Security of transactions	142
4.2.5. Internet neutrality	143
4.2.6. Respect for personal data	146
4.3. Remote payments	148
4.3.1. Currency and remote payment	148
4.3.2. Electronic trade	149
4.3.3. GAFA and online sales	153

4.3.4. Contactless payment.	154
4.3.5. FinTech	155
4.4. “P2P” exchanges	156
4.4.1. P2P, Blockchain and Bitcoin.	156
4.4.2. Alternative cryptocurrencies	157
4.4.3. Other Blockchain applications.	158
4.4.4. Banks and P2P	160
4.5. Remote computing	162
4.6. Features of the digital economy	164
4.6.1. Key features.	164
4.6.2. Preferred sectors	165
4.6.3. Company organization	165
4.6.4. Digital refusers	167
Chapter 5. The Impact of the Internet on the Economy.	169
5.1. Network operators and the new economic order.	169
5.1.1. Governance and regulations	169
5.1.2. Advertising revenue	175
5.1.3. Taxing the Internet.	176
5.1.4. Difficulties encountered by operators	177
5.1.5. The slowdown of the electronics market.	178
5.1.6. The four faces of hacking.	179
5.2. The Internet’s original provisions	180
5.2.1. Communications packages	180
5.2.2. The press and information	184
5.2.3. Adapting professions to digital technology	186
5.2.4. The Internet and society	192
5.3. The new economy	196
5.3.1. Industrial and commercial cycles	196
5.3.2. New economic paradigm	199
5.3.3. The typical actors in the digital economy	201
5.3.4. Factors for success provided by NGN	204
5.4. Longevity of network services	205
5.4.1. Political and regulatory variables	205
5.4.2. Technological risks	206
5.4.3. The Moore Conjecture	207
5.4.4. The crisis of the components industry	209
5.5. The Internet and politics.	214
5.5.1. Monetary policy in 2016	214

5.5.2. The Internet, an instrument of capitalism	215
5.5.3. The Internet, an instrument for domination	217
5.5.4. The dangers of the American economy	219
5.5.5. The worries of the West	219
5.6. Experts faced with the future of the Internet	220
5.6.1. The sharing economy	221
5.6.2. The social justification of the Internet	222
5.6.3. An economy of inequalities	223
5.6.4. The ebb and flow of capital	223
5.6.5. A financial catastrophe in the making	224
5.6.6. The economic cycles of electronics	226
5.6.7. Moving toward an economic “third age”	226
5.6.8. The end of the world and the death of the Internet	228
Chapter 6. The Economy and the Future of the Internet	231
6.1. Building a national network	231
6.2. Internet network structures	232
6.3. Network regulations and pricing systems	233
6.4. The issue of supply and demand	233
6.5. The Internet and the economy	234
6.6. An Internet of optimists	236
Appendices	239
Appendix 1. GNP, GNI and GDP	241
Appendix 2. Potential Harmfulness of Radio Waves	245
Appendix 3. ICT and Telecommunications: Sustainable Development	247
Appendix 4. Variation in “Working Day” Telephone Traffic in 1970	249
Appendix 5. Hourly Variation in National Phone Tariffs (1985)	251
Appendix 6. Measuring the Information Society (11 October 2012) – ITU	253

Appendix 7. The Development of SIM Cards	255
Appendix 8. List of Recommendations from ITU-T Study Group 3	257
Appendix 9. The Cost of Capital.	263
Appendix 10. NGN and the Internet in Figures.	265
Appendix 11. Standardization of Mobile Financial Services (Extract – ITU-T, February 2016).	271
Appendix 12. The Internet’s Flaws (Vint Cerf)	273
Bibliography	275
Glossary	281
Index.	287