CONTENTS

1 INTRODUCTION 10

2.1 Information amount (synthetic concept) 17
2.2 Data, information, and knowledge alliance 19
2.3 Real world objects and technology of their recognition 24
2.4 Systems analysis and synthesis 28
2.5 Information technologies 36
2.6 Creation of formats for knowledge management systems 40
2.7 Information power 45

3 DATA ACQUISITION TECHNOLOGY 50

3.1 Physical basis of object identification 51
3. 2 Sampling 54
3. 3 Quantizing and encoding 55
3. 4 Automated data collection systems 60
3.5 Data collection systems classification 62
3.6 Example of a process information system 64
3.6.1 Graphic indication of tram stop time-table 65
3.6.2 Technical data collection devices along route 66
3.6.3 Data flows 67
3.6.4 Data evaluation and data structures 67
3.6.5 Setting automation 69
3.6.6 Associated IS for more precise data evaluation 69
3.6.7 Kolumbus project using GSM communication system 69
3.6.8 Other functions interfered from SIS 70
3.6.9 Data display 70
3.6.10 Extended IS with information transfer into vehicles 70

4 TECHNOLOGY OF FURTHER DATA PROCESSING 72

4.1. Interpretation, Information origin 76
4. 2 Data filtration 78
4. 3 Meta-information systems technology 80
4.4 Data, information, and knowledge within time continuity 81

5 DESIGN TECHNOLOGY OF SYNTACTIC-TYPE INFORMATION SYSTEMS 82

5.1 Database systems 84
5. 2 Operations Over Data Structures 87
5. 3 Spreadsheets 92
5.4 Object oriented database systems 94
5.5 Transaction systems 99
5.6 Data consistence 102

6 CASE TECHNOLOGICAL ENVIRONMENT 103

6.1 Standard Methodology – SSADM Methodology 105
6. 2 Structures of CASE Program Environment 106
6.3 ORACLE 108

7 ARTIFICIAL INTELLIGENCE SYSTEMS TECHNOLOGY 112

7.1 Recognition 113
7.2 Production Systems 114
7.3 Knowledge Representation 116
7. 4 Knowledge Acquisition from Data 118

8 THEORY OF COMPUTER NETWORKS 121

8.1 Description and specification of LAN and WAN networks according to technical criteria 121
8.2 Relations between LAN and WAN 121
8.3 Network types in terms of topology 123

8.3.1 Bus topology ... *123*
8.3.2 Ring topology ... *123*
8.3.3 Star topology ... *124*
8.3.4 Star Ring / Star Shaped / Wired Ring ... *124*
8.3.5 Tree / Distributed Tree ... *124*
8.3.6 Polygonal Structure / Mesh ... *124*
8.4 NETWORK TYPES IN TERMS OF ARCHITECTURE ... 124
8.4.1 Ethernet (IEEE 802.3) Standard ... *124*
8.4.1.1 Cheapernet 10Base-2 or "Thin Ethernet" ... 125
8.4.1.2 UTP 10/100Base-TX (twisted pair) ... 125
8.4.2 ISDN standard networks ... *126*
8.4.2.1 BRI – Basic Rate Interface ... 126
8.4.2.2 PRI – Primary Rate Interface ... 127
8.4.3 Other network architectures ... *128*
8.4.4 Wireless network architectures ... *128*
8.4.4.1 IEEE802.11 standard network ... *128*
8.4.4.2 IEEE802.15 standard networks and Bluetooth ... *129*
8.5 NETWORK PROTOCOLS ... 131
8.6 NETWORK ADAPTORS (CARDS) ... 132
8.6.1 Bus types ... *132*
8.6.1.1 Buses for IBM PC ... 132
8.6.1.2 Buses for Apple Macintosh and PowerMac ... 132
8.6.2 Communication media (network) types ... *133*
8.6.2.1 Communication media for IBM PC ... 133
8.6.2.2 Communication media for Apple Macintosh and PowerMac ... 133
8.6.3 Transmission rate ... *133*
8.7 NETWORK OPERATING SYSTEMS (NOS) ... 133
8.7.1 Peer-to-Peer NOS types ... *133*
8.7.1.1 Windows 95/98 ... 134
8.7.1.2 Windows NT Workstation ... 134
8.7.1.3 Windows 3.11 for Workgroups ... 134
8.7.1.4 Windows 2000, XP, and Vista ... 135
8.7.1.5 Other peer–to–peer NOS types for IBM PC ... 135
8.7.1.6 AppleTalk ... 135
8.7.2 PC and Macintosh platforms interconnection ... *135*
8.7.3 Client–Server NOS types ... *136*
8.7.3.1 Microsoft Windows NT Server systems ... 137
8.7.3.2 Windows Server systems ... 137
8.7.3.3 Novell NetWare ... 138
8.7.3.4 Other Client–Server NOS types ... 139

9. INTERNET – COMMERCIAL AND PRIVATE PHENOMENON ... 140

9.1 INTERNET HISTORY IN BRIEF ... 140
9.2 INTERNET IN THE BUSINESS SPHERE ... 140
9.2.1 Internet – direct and indirect spheres of business ... *141*
9.2.2 Internet support services ... *141*
9.2.2.1 Technical support ... 142
9.2.2.2 Additional services ... 142
9.2.2.3 Data protection and authorized access to own data ... 143
9.2.3 Internet and commercial activity support ... *143*
9.2.3.1 Internet and promotion and advertising distribution ... 143
9.2.3.2 Registration of web pages ... 145
9.2.4 Internet – enterprise means ... *145*
9.3 INTERNET, INTRANET, AND EXTRANET ... 145

10. INTERNET AND NEW ECONOMY ... 147

10.1 INITIATION OF NEW ECONOMY ... 147
10.2 ELEMENTS OF NEW ECONOMY THEORY ... 147
10.3 NEW ECONOMY AND ITS PRINCIPLES ... 148
10.3.1 Principle of falling revenues ... *148*
10.3.2 Principle of exponential growth and fall ... *149*
10.3.3 Impacts of new economy ... *149*
10.4 VIRTUAL ORGANIZATIONS ... 151

10.4.1 Institutional criterion ... *151*
10.4.2 Functional criterion ... *151*
10.4.3 Definition of virtual organization and its strategies ... *151*

11. INFORMATION, METHODOLOGIES, AND INFORMATION SYSTEMS ... 153

11.1 IS METHODOLOGY ... 153
11.1.1 BSP Methodology (Business System Planning) ... *153*
11.1.2 PQM Methodology (Process Quality Management) ... *154*
11.2 SYSTEM INTEGRATION ... 154
11.2.1 Open IS/IT architectures ... *154*
11.2.2 Individualization of IS tasks ... *155*
11.2.3 System integration in cooperating subjects ... *156*
11.2.4 Function of system integrator ... *156*
11.2.5 Characteristics of information strategies for information systems control ... *157*
11.2.6 Period of IS solution: ... *158*
11.2.7 IS resolvers: ... *158*
11.2.8 IST conceptual model: ... *158*
11.2.9 Processes of IS creation ... *159*
11.3 INFORMATION SYSTEMS AND MACROINFORMATICS ... 160
11.3.1 ICT global trends and macroinformatics ... *160*
11.3.1.1 Period of mainframe and minicomputer systems ... 160
11.3.1.2 Period of open systems ... 160
11.3.1.3 Period of information highway (according to Bill Gates) ... 160
11.3.1.4 Period of information society ... 160
11.3.2 ICT convergence representing basic factor of global enterprise informatics ... *160*
11.3.2.1 Interconnection and coexistence of heterogeneous network platforms and their transformation into homogeneous communication infrastructure ... 161
11.3.2.2 Development of integrated terminal devices integrating standard devices functions (television and telephone technology and personal computer) ... 161
11.3.2.3 Information infrastructure globalization and origination of integrated services ... 161
11.3.2.4 Services consolidation within the information chain frame ... 162
11.3.2.5 Information transmission on global basis and sharing completed by knowledge creation ... 162
11.3.3 Global informatics and information society ... *162*
11.3.3.1 Enterprise information systems within the scope of cooperative network ... 163
11.3.3.2 Knowledge management ... 163

12. ELECTRONIC BANKING A DIGITAL PAYMENTS ... 165

12.1 PAYMENT SYSTEMS APPLIED ON THE INTERNET ... 165
12.1.1 Basic properties of payment systems ... *165*
12.1.2 Classification of markets for payment systems ... *166*
12.1.3 Key factors limiting IPS ... *166*
12.1.4 Payment procedures used on the Internet ... *166*
12.1.5 Payment systems using electronic money ... *167*
12.2 ELECTRONIC MONEY SYSTEMS ... 167
12.2.1 Electronic money systems DigiCash and NetCash ... *167*
12.2.2 Credit cards system ... *168*
12.2.3 Electronic cheques system ... *168*
12.2.4 Security of transactions with electronic money ... *169*
12.2.4.1 Symmetrical and asymmetrical cryptography ... 169
12.2.4.2 Digital signature ... 170
12.2.4.3 Digital certificate ... 170
12.2.4.4 Blind digital subscription ... 170
12.2.5 Payments within the SET system scope ... *170*
12.3 ELECTRONIC BANKING IN THE CZECH REPUBLIC ... 171
12.3.1 Competitive rivalry ... *172*
12.3.2 Homebanking ... *172*
12.3.3 Telebanking ... *172*
12.3.4 Internet banking ... *173*

13. E-COMMERCE (E-BUSINESS) ... 174

13.1 E-COMMERCE AND ELECTRONIC MARKETS ... 176
13.1.1 Electronic shopping channels with single resources ... *177*

13.2 EDI – PRIMARY MEANS OF E-COMMERCE 177
13.2.1 EDI definition 177
13.2.1.1. EDI and electronic commerce 178
13.2.1.2 EDI and information technology 179
13.2.2 Purposes of EDI introduction 179
13.2.3 EDI services in the Czech Republic 180
13.2.4 Information systems of EDI Ready standard 180
13.2.5 Future of EDI 180
13.3 BUSINESS MODELS OF ELECTRONIC DEALING 180
13.3.1 Electronic shop (E-shop) 180
13.3.2 Electronic auction (E-auction) 181
13.3.3 Electronic business centre (E-byzcenter) 181
13.3.4 Third party marketplace 181
13.3.5 Virtual communities 182
13.3.6 Value chain service providers 182
13.3.7 Value chain integrator 182
13.3.8 Collaboration platform coordinator 182
13.3.9 Information brokerage and other services 182
13.4 B2B, B2C, C2A, A2A TYPE E-COMMERCE MODELS 183
13.4.1 B2B – Business To Business model (wholesale) 183
13.4.2 B2C – Business To Customer model (e-shop for customers) 184
13.4.3 C2C – Customer To Customer model (electronic auctions) 186
13.4.4 C2B – Customer To Business model 187
13.4.5 B2A – Business To Administration model 187
13.4.6. C2A – Customer To Administration model 187
13.4.7 A2B – Administration To Business model 187
13.4.8 A2C – Administration To Customer model 187
13.4.9 A2A – Administration To Administration model 187
13.4.10 B2E – Business To Employee model 188
13.4.11 G2B / B2G – Government To Business model 188

14. E-MARKETING 189

14.1 RELATIONSHIP OF MARKETING AND THE INTERNET 189
14.2 INTERNET AND "4 P" COMPONENTS (*PLACE, PROMOTION, PRODUCT & PRICE*) 189
14.2.1 Place 189
14.2.2 Promotion 189
14.2.3 Product 190
14.2.4 Price 190
14.3. COMMUNICATION STRATEGY AND ON-LINE MARKETING 190
14.3.1 Definition of the Internet in its function of communication strategy tool 191
14.3.2 Blunders of marketing and WWW presentations 192
14.4 Communication Internet strategy 192

15. EXPERT LAYERS OVER COMMON INTERNET/INTRANET INTERFACE 193

15.1 RECOGNITION AND DEFINITION OF EXPERT LAYERS OF INTERNET/INTRANET INTERFACE 193
15.2 SECURITY LAYER OF INTERNET/ INTRANET INTERFACE 194
15.2.1 Packet filter 194
15.2.2 Firewall on connection level 194
15.2.3 Application firewall 195
15.2.4 Dynamic packet filters 196
15.2 5 Combined firewall 196
15.3 EXPERT ENVIRONMENT ON INTERNET/INTRANET INTERFACE 200
15.3.1 Expert systems as a layer on a common interface of business models 200
15.3.2 The General Business Plan Expert System – GBP 200
15.3.3 The Strategic Market Planner Expert System – SMARTPLAN 203
15.3.4 The Marketing Audit Model Expert System – MAUD 204
15.3.5 The Mergers And Acquisition Model Expert System – MAC 205
15.3.6 The Cash Management Tool Expert System – CASHMAN 205

16 SEMANTIC WEB 206

16.1 Essence of semantic web 206
16.2 History of formal languages and web ontology 206
16.3 Characteristics of semantic web 206
16.4 Metadata, RDF technology and classification schemes 207
16.5 Terminological ontologies 208
16.5.1 Metadata format of RSS standard 208

REFERENCES 209