

Detlef Seese
Christof Weinhardt
Frank Schlottmann
(Editors)

Handbook on Information Technology in Finance

 Springer

TABLE OF CONTENTS

Preface V

Contributors XXV

PART I. IT SYSTEMS, INFRASTRUCTURE AND APPLICATIONS IN FINANCE

Introduction to Part I..... 3

CHAPTER 1

SOA in the Financial Industry – Technology Impact in Companies’ Practice 9

Heiko Paoli, Carsten Holtmann, Stephan Stathel, Olaf Zeitnitz, Marcel Jakobi

1.1 Introduction 9

1.2 SOA – Different Perspectives 11

1.3 SOA – Technical Details 12

1.3.1 Elements and Layers 12

1.3.2 Comparison with State-of-the-art Distributed
Architecture Alternatives 15

1.4 Value Proposition of SOA..... 17

1.5 Case Study Union Investment 18

1.5.1 Introduction to the Use Case Company 18

1.5.2 SOA Implementation at the Use Case Company 20

1.6 Discussion 23

1.7 Conclusion..... 25

CHAPTER 2

Information Systems and IT Architectures for Securities Trading 29

Feras Dabous, Fethi Rabhi

2.1 Introduction 29

- 2.2 Financial Markets: Introduction and Terminology 30
 - 2.2.1 Introduction to Financial Markets..... 30
 - 2.2.2 Capital Markets Trading Instruments 31
 - 2.2.3 Equity Market 31
 - 2.2.4 Derivatives Market 32
 - 2.2.5 Types of Orders 32
 - 2.2.6 Classifications of Marketplaces 33
- 2.3 Information Systems for Securities Trading..... 34
 - 2.3.1 Securities Trading Information Flow..... 34
 - 2.3.2 Categories of Capital Markets' Information Systems..... 37
- 2.4 Case Studies 39
 - 2.4.1 SMARTS 39
 - 2.4.2 X-STREAM..... 42
- 2.5 IT Integration Architectures and Technologies 44
 - 2.5.1 Transport Level..... 45
 - 2.5.2 Contents (Data) Level..... 46
 - 2.5.3 Business Process Level..... 47
- 2.6 Conclusion..... 49

CHAPTER 3

Product Management Systems in Financial Services Software Architectures 51

Christian Knogler, Michael Linsmaier

- 3.1 The Initial Situation..... 51
- 3.2 Weaknesses in Software Architectures
and Business Processes..... 52
- 3.3 Objectives and Today's Options..... 55
- 3.4 A 'Product Server Based Business Application Architecture' 56
 - 3.4.1 Business Considerations 56
 - 3.4.2 Technical Considerations..... 58
- 3.5 Migrating into a New Architecture..... 60
 - 3.5.1 Blueprint 62
 - 3.5.2 Product Data Analysis 62
 - 3.5.3 Repository..... 62
 - 3.5.4 Consolidated Architecture 64
 - 3.5.5 Innovated Architecture 65
- 3.6 Impacts on Software Development..... 67
- 3.7 Conclusion..... 69

CHAPTER 4

Management of Security Risks – A Controlling Model

for Banking Companies 73

Ulrich Faisst, Oliver Prokein

- 4.1 Introduction 73

4.2	The Risk Management Cycle	74
4.2.1	Identification Phase.....	74
4.2.2	Quantification Phase	77
4.2.3	Controlling Phase.....	79
4.2.4	Monitoring Phase	80
4.3	A Controlling Model for Security Risks.....	82
4.3.1	Assumptions	82
4.3.2	Determining the Optimal Security and Insurance Level... 85	
4.3.3	Constraints and Their Impacts	87
4.4	Conclusion.....	91

CHAPTER 5

Process-Oriented Systems in Corporate Treasuries:

A Case Study from BMW Group.....	95
----------------------------------	----

Christian Ullrich, Jan Henkel

5.1	Introduction	95
5.2	The Technological Environment	97
5.3	Challenges for Corporate Treasuries	101
5.4	Portrait BMW Group.....	104
5.5	Portrait BMW Group Treasury.....	105
5.5.1	Organization and Responsibilities	106
5.5.2	Business Process Design.....	108
5.6	Business Process Support.....	110
5.6.1	Best-of-Breed System Functionalities	111
5.6.2	Decision-Support Functionalities.....	119
5.7	Final Remarks	120

CHAPTER 6

Streamlining Foreign Exchange Management Operations

with Corporate Financial Portals	123
--	-----

Hong Tuan Kiet Vo, Martin Glaum, Remigiusz Wojciechowski

6.1	Introduction	123
6.2	Challenges of Multinational Financial Management.....	124
6.3	Corporate Financial Portals	125
6.3.1	Key Characteristics of Corporate Portals.....	126
6.3.2	Corporate Financial Portals.....	127
6.4	Bayer's Corporate Foreign Exchange Management with the Corporate Financial Portal.....	128
6.4.1	Corporate Foreign Exchange Management.....	129
6.4.2	Bayer's Foreign Exchange Management Practice	130
6.4.3	Redesigning Foreign Exchange Risk Management with CoFiPot.....	131
6.4.4	Lessons Learned	135
6.5	Conclusion.....	138

CHAPTER 7

Capital Markets in the Gulf: International Access, Electronic Trading and Regulation	141
<i>Peter Gomber, Marco Lutat, Steffen Schubert</i>	
7.1 Introduction	141
7.2 The Evolution of GCC Stock Markets and Its Implications	143
7.3 Requirements of International Investors.....	148
7.4 Systematic Analysis of the Exchanges in the Region.....	151
7.4.1 Bahrain Stock Exchange (BSE).....	151
7.4.2 Tadawul Saudi Stock Market (TSSM).....	154
7.4.3 Kuwait Stock Exchange (KSE).....	155
7.4.4 Muscat Securities Market (MSM)	156
7.4.5 Doha Securities Market (DSM)	157
7.4.6 Dubai Financial Market (DFM).....	158
7.4.7 Abu Dhabi Securities Market (ADSM)	159
7.5 Approaches to Further Open up the Stock Markets to the International Community – The Dubai International Financial Exchange (DIFX) Case.....	160
7.6 Conclusion.....	165
7.7 Appendix	165

CHAPTER 8

Competition of Retail Trading Venues – Online-brokerage and Security Markets in Germany	171
<i>Dennis Kundisch, Carsten Holtmann</i>	
8.1 Introduction	171
8.2 Service Components and Fees in Securities Trading.....	173
8.2.1 Service Components in Securities Trading	173
8.2.2 Access Fees for Participants at German Exchanges	174
8.2.3 Fees for Price Determination Services.....	176
8.2.4 Discussion of Services and Fees	179
8.3 Analysis of the Price Models of Online-brokers	181
8.3.1 Forms of Appearance of Online-brokerage	181
8.3.2 Price Models of Selected Online-brokers	182
8.3.3 Comparison of the Price Models and Discussion	184
8.4 Outlook: Off-exchange-markets as Competitors	187
8.5 Conclusion.....	189

CHAPTER 9

Strategies for a Customer-Oriented Consulting Approach	193
<i>Alexander Schöne</i>	
9.1 Introduction	193
9.2 Qualitative Customer Service Through Application of Portfolio Selection Theory	194

9.2.1	Markowitz' Portfolio Selection Theory	195
9.2.2	Application to Real-World Business	197
9.2.3	Consideration of Existing Assets	199
9.2.4	Illiquid Asset Classes and Transaction Costs	200
9.2.5	Conclusions for Daily Use	201
9.3	Support of Customer-Oriented Consulting Using Modern Consulting Software	202
9.3.1	Architecture of a Customer-Oriented Consulting Software	202
9.3.2	Mobile Consulting as a Result of Customer-Oriented	205
9.4	Conclusion.....	208

CHAPTER 10

A Reference Model for Personal Financial Planning..... 209

Oliver Braun, Günter Schmidt

10.1	Introduction	209
10.2	State of the Art	210
10.2.1	Personal Financial Planning.....	210
10.2.2	Systems and Models	212
10.2.3	Reference Models	214
10.2.4	Requirements for a Reference Model for Personal Financial Planning.....	216
10.3	Framework for a Reference Model for Personal Financial Planning.....	218
10.4	Analysis Model.....	220
10.4.1	Dynamic View on the System: Use Cases	220
10.4.2	Structural View on the System: Class Diagrams	221
10.4.3	Use Case Realization: Sequence and Activity Diagrams	222
10.4.4	Example Models	222
10.5	System Architecture	230
10.6	Conclusion and Future Trends.....	233

CHAPTER 11

Internet Payments in Germany..... 239

Malte Krueger, Kay Leibold

11.1	Introduction: The Long Agony of Internet Payments.....	239
11.2	Is There a Market for Innovative Internet Payment Systems?.....	240
11.2.1	Use of Traditional Payment Systems: Internet Payments and the Role of Payment Culture	240
11.2.2	The Role of Technology	242
11.2.3	The Role of Different Business Models.....	244

11.3	Internet Payments in Germany: A View from Consumers and Merchants	247
11.3.1	The Consumers' View	247
11.3.2	The Merchants' View	249
11.4	SEPA	253
11.5	Outlook.....	254
CHAPTER 12		
Grid Computing for Commercial Enterprise Environments		257
<i>Daniel Minoli</i>		
12.1	Introduction	257
12.2	What is Grid Computing and What are the Key Issues?	259
12.3	Potential Applications and Financial Benefits of Grid Computing	268
12.4	Grid Types, Topologies, Components, Layers – A Basic View	271
12.5	Comparison with other Approaches	279
12.6	A Quick View at Grid Computing Standards	283
12.7	A Pragmatic Course of Investigation on Grid Computing	284
CHAPTER 13		
Operational Metrics and Technical Platform for Measuring Bank Process Performance		291
<i>Markus Kress, Dirk Wölfling</i>		
13.1	Introduction	291
13.2	Industrialisation in the 21st Century?	292
13.3	Process Performance Metrics as an Integral Part of Business Performance Metrics	293
13.3.1	Work Processes, Qualitative Criteria and Measuring Process Value.....	294
13.4	Controls for Strategic Alignment and Operational Customer and Resource Management.....	296
13.5	Metrics Used for Input/Output Analysis.....	296
13.6	Output Metrics: Cash Inflows a Function of Output Quality	297
13.7	Cash Outflows a Function of Available Capacity	298
13.8	Time and Volume as Non-financial Metrics of Process Performance	298
13.8.1	Fundamental Input/Output Process Performance Characteristics	299
13.9	Technical Realization	299
13.9.1	Monitoring Challenges	300
13.10	Related Work.....	301
13.11	SOA Based Business Process Performance Monitoring.....	302
13.11.1	Data Warehouse.....	305
13.11.2	Complex Event Processing	305

13.11.3	Measuring “Time”	306
13.11.4	Measuring “Volume”	307
13.11.5	Measurement “Capacity”	307
13.11.6	Measuring “Quality”	308
13.11.7	Measuring “Costs” or “Discounted Cash Flows” (DCF).....	308
13.12	Conclusion.....	308
CHAPTER 14		
	Risk and IT in Insurances	311
	<i>Ute Werner</i>	
14.1	The Landscape of Risks in Insurance Companies	311
14.2	IT’s Function for Risk Identification and Analysis	314
14.2.1	Components of Underwriting Risk	314
14.2.2	Assessing Hazard, Exposure, Vulnerability and Potential Loss.....	316
14.2.3	Information Management – Chances and Challenges	321
14.3	IT as a Tool for Managing the Underwriting Risk.....	324
14.3.1	Disaster Assistance	324
14.3.2	Claims Handling	326
14.3.3	Market Development	327
14.4	Conclusion.....	329
CHAPTER 15		
	Resolving Conceptual Ambiguities in Technology	
	Risk Management.....	333
	<i>Christian Cuske, Tilo Dickopp, Axel Korthaus, Stefan Seedorf</i>	
15.1	New Challenges for IT Management.....	333
15.2	Knowledge Management Applications in Finance.....	334
15.2.1	An Extended Perspective of Operational Risk Management	334
15.2.2	Formal Ontologies as an Enabling Technology	336
15.2.3	The Case for Ontology-based Technology Risk Management	337
15.3	Technology Risk Management Using OntoRisk	338
15.3.1	The Technology Risk Ontology.....	339
15.3.2	The OntoRisk Process Model	343
15.3.3	System Architecture.....	347
15.4	Case Study: Outsourcing in Banking.....	348
15.4.1	Motivation and Influencing Factors.....	348
15.4.2	Trading Environment.....	349
15.4.3	Analysis and Results.....	352
15.5	Conclusion.....	352

CHAPTER 16

Extracting Financial Data from SEC Filings

for US GAAP Accountants 357

Thomas Stümpert

16.1	Introduction	357
16.2	Structure of 10-K and 10-Q Filings.....	359
16.2.1	Structure of Document Elements	359
16.2.2	Embedded Plain Text.....	360
16.2.3	Embedded HTML.....	361
16.2.4	Financial Reports Overview	362
16.3	Information Retrieval Within EASE	363
16.3.1	Information Extraction from Traditional Filings	364
16.3.2	Standard Vector Space Model	365
16.3.3	Extended Vector Space Model.....	367
16.3.4	Extraction of HTML Documents	368
16.4	The Role of XBRL	371
16.5	Empirical Results	371
16.6	Conclusion.....	373

PART II. IT METHODS IN FINANCE

Introduction to Part II 379

CHAPTER 17

Networks in Finance 383

Anna Nagurney

17.1	Introduction	383
17.2	Financial Optimization Problems	385
17.3	General Financial Equilibrium Problems	388
17.3.1	A Multi-Sector, Multi-Instrument Financial Equilibrium Model.....	389
17.3.2	Model with Utility Functions.....	394
17.3.3	Computation of Financial Equilibria.....	395
17.4	Dynamic Financial Networks with Intermediation.....	397
17.4.1	The Demand Market Price Dynamics	400
17.4.2	The Dynamics of the Prices at the Intermediaries	401
17.4.3	Precursors to the Dynamics of the Financial Flows.....	401
17.4.4	Optimizing Behavior of the Source Agents	402
17.4.5	Optimizing Behavior of the Intermediaries	403
17.4.6	The Dynamics of the Financial Flows Between the Source Agents and the Intermediaries.....	404
17.4.7	The Dynamics of the Financial Flows Between the Intermediaries and the Demand Markets	405
17.4.8	The Projected Dynamical System.....	406

17.4.9	A Stationary/Equilibrium Point	406
17.4.10	Variational Inequality Formulation of Financial Equilibrium with Intermediation.....	407
17.4.11	The Discrete-Time Algorithm (Adjustment Process)	408
17.4.12	The Euler Method	408
17.4.13	Numerical Examples.....	410
17.5	The Integration of Social Networks with Financial Networks	412
CHAPTER 18		
Agent-based Simulation for Research in Economics.....		421
<i>Clemens van Dinther</i>		
18.1	Introduction	421
18.2	Simulation in Economics.....	423
18.2.1	Benefits of Simulation	423
18.2.2	Difficulties of Simulation	424
18.3	Agent-based Simulation Approaches	427
18.3.1	Pure Agent-based Simulation: The Bottom-up Approach	427
18.3.2	Monte Carlo Simulation.....	428
18.3.3	Evolutionary Approach.....	430
18.3.4	Reinforcement Learning	432
18.4	Summary	438
CHAPTER 19		
The Heterogeneous Agents Approach to Financial Markets – Development and Milestones.....		443
<i>Jörn Dermietzel</i>		
19.1	Introduction	443
19.2	Fundamental Assumptions in Financial Theory	444
19.2.1	Rationality	444
19.2.2	Efficient Market Hypothesis	445
19.2.3	Representative Agent Theory	445
19.3	Empirical Observations	446
19.4	Evolution of Models	447
19.4.1	Fundamentalists vs. Chartists.....	447
19.4.2	Social Interaction	450
19.4.3	Adaptive Beliefs	452
19.4.4	Artificial Stock Markets.....	454
19.5	Competition of Trading Strategies	456
19.5.1	Friedman Hypothesis Revisited	456
19.5.2	Dominant Strategies.....	457
19.6	Multi-Asset Markets.....	458
19.7	Extensions and Applications	459
19.8	Conclusion and Outlook	459

CHAPTER 20

An Adaptive Model of Asset Price and Wealth Dynamics

in a Market with Heterogeneous Trading Strategies..... 465

Carl Chiarella, Xue-Zhong He

20.1	Introduction	465
20.2	Adaptive Model with Heterogeneous Agents.....	468
20.2.1	Notation	469
20.2.2	Portfolio Optimization Problem of Heterogeneous Agents.....	470
20.2.3	Market Clearing Equilibrium Price – A Growth Model.....	471
20.2.4	Population Distribution Measure	471
20.2.5	Heterogeneous Representative Agents and Wealth Distribution Measure	472
20.2.6	Performance Measure, Population Evolution and Adaptiveness	472
20.2.7	An Adaptive Model	474
20.2.8	Trading Strategies.....	475
20.2.9	Fundamental Traders	475
20.2.10	Momentum Traders	475
20.2.11	Contrarian Traders	476
20.3	An Adaptive Model of Two Types of Agents	477
20.3.1	The Model for Two Types of Agents	477
20.3.2	Wealth Distribution and Profitability of Trading Strategies.....	478
20.3.3	Population Distribution and Herd Behavior.....	478
20.3.4	A Quasi-Homogeneous Model	479
20.4	Wealth Dynamics of Momentum Trading Strategies	481
20.4.1	Case: $(L_1, L_2) = (3, 5)$	481
20.4.2	Other Lag Length Combinations	484
20.5	Wealth Dynamics of Contrarian Trading Strategies.....	486
20.5.1	Case: $(L_1, L_2) = (3, 5)$	487
20.5.2	Other Cases	489
20.6	Conclusion.....	491
20.7	Appendix.....	492
20.7.1	Proof of Proposition 1.....	492
20.7.2	Time Series Plots, Statistics and Autocorrelation Results.....	494

CHAPTER 21

Simulation Methods for Stochastic Differential Equations..... 501

Eckhard Platen

21.1	Stochastic Differential Equations	501
21.2	Approximation of SDEs	502

21.3	Strong and Weak Convergence	503
21.4	Strong Approximation Methods	505
21.5	Weak Approximation Methods	506
21.6	Monte Carlo Simulation for SDEs.....	509
21.7	Variance Reduction	510
CHAPTER 22		
Foundations of Option Pricing.....		515
<i>Peter Buchen</i>		
22.1	Introduction	515
22.2	The PDE and EMM Methods	517
22.2.1	Geometrical Brownian Motion	517
22.2.2	The Black-Scholes pde	518
22.2.3	The Equivalent Martingale Measure.....	519
22.2.4	Effect of Dividends.....	521
22.3	Pricing Simple European Derivatives.....	521
22.3.1	Asset and Bond Binaries.....	522
22.3.2	European Calls and Puts	524
22.4	Dual-Expiry Options	525
22.4.1	Second-order Binaries.....	525
22.4.2	Binary Calls and Puts.....	527
22.4.3	Compound Options.....	528
22.4.4	Chooser Options	529
22.5	Dual Asset Options.....	530
22.5.1	The Exchange Option	531
22.5.2	A Simple ESO.....	532
22.5.3	Other Two Asset Exotics	532
22.6	Barrier Options.....	533
22.6.1	PDE's for Barrier Options	533
22.6.2	Image Solutions for the BS-pde.....	534
22.6.3	The D/O Barrier Option.....	535
22.6.4	Equivalent Payoffs.....	535
22.6.5	Call and Put Barriers.....	536
22.7	Lookback Options	537
22.7.1	Equivalent Payoffs for Lookback Options.....	537
22.7.2	Generic Lookback Options	539
22.7.3	Floating Strike Lookback Options	540
22.8	Summary	540
CHAPTER 23		
Long-Range Dependence, Fractal Processes, and Intra-Daily Data		543
<i>Wei Sun, Svetlozar (Zari) Rachev, Frank Fabozzi</i>		
23.1	Introduction	543
23.2	Stylized Facts of Financial Intra-daily Data	545
23.2.1	Random Durations	545

23.2.2	Distributional Properties of Returns	545
23.2.3	Autocorrelation and Seasonality	546
23.2.4	Clustering.....	546
23.2.5	Long-range Dependence	547
23.3	Computer Implementation in Studying Intra-daily Data	547
23.3.1	Data Transformation	547
23.3.2	Data Cleaning	549
23.4	Research on Intra-Daily Data in Finance.....	550
23.4.1	Studies of Volatility	550
23.4.2	Studies of Liquidity	553
23.4.3	Studies of Market Microstructure	554
23.4.4	Studies of Trade Duration.....	556
23.5	Long-Range Dependence	560
23.5.1	Estimation and Detection of LRD in Time Domain	560
23.5.2	Estimation and Detection of LRD in Frequency Domain.....	564
23.5.3	Econometric Modeling of LRD	566
23.6	Fractal Processes and Long-Range Dependence	569
23.6.1	Specification of the Fractal Processes.....	569
23.6.2	Estimation of Fractal Processes	571
23.6.3	Simulation of Fractal Processes	574
23.6.4	Implications of Fractal Processes.....	575
23.7	Summary	576

CHAPTER 24

Bayesian Applications to the Investment Management Process

Biliana Bagasheva, Svetlozar (Zari) Rachev, John Hsu, Frank Fabozzi

24.1	Introduction	587
24.2	The Single-Period Portfolio Problem	587
24.3	Combining Prior Beliefs and Asset Pricing Models.....	592
24.4	Testing Portfolio Efficiency	596
24.4.1	Tests Involving Posterior Odds Ratios.....	597
24.4.2	Tests Involving Inefficiency Measures	599
24.5	Return Predictability.....	600
24.5.1	The Static Portfolio Problem	601
24.5.2	The Dynamic Portfolio Problem.....	603
24.5.3	Model Uncertainty	604
24.6	Conclusion.....	607

CHAPTER 25

Post-modern Approaches for Portfolio Optimization

Borjana Racheva-Iotova, Stoyan Stoyanov

25.1	Introduction	613
25.2	Risk and Performance Measures Overview.....	614
25.2.1	The Value-at-Risk Measure	616

25.2.2	Coherent Risk Measures	616
25.2.3	The Conditional Value-at-Risk	618
25.2.4	Performance Measures.....	619
25.3	Heavy-tailed and Asymmetric Models for Assets Returns.....	621
25.3.1	One-dimensional Models.....	622
25.3.2	Multivariate Models.....	623
25.4	Strategy Construction Based on CVaR Minimization.....	624
25.4.1	Long-only Active Strategy.....	625
25.4.2	Long-short Strategy	627
25.4.3	Zero-dollar Strategy.....	628
25.4.4	Other Aspects.....	629
25.5	Optimization Example.....	629
25.6	Conclusion.....	633

CHAPTER 26

Applications of Heuristics in Finance.....	635	
<i>Manfred Gilli, Dietmar Maringer, Peter Winker</i>		
26.1	Introduction	635
26.2	Heuristics.....	636
26.2.1	Traditional Numerical vs. Heuristic Methods.....	636
26.2.2	Some Selected Approaches.....	637
26.2.3	Further Methods and Principles	639
26.3	Applications in Finance.....	642
26.3.1	Portfolio Optimization	642
26.3.2	Model Selection and Estimation	648
26.4	Conclusion.....	651

CHAPTER 27

Kernel Methods in Finance.....	655	
<i>Stephan Chalup, Andreas Mitschele</i>		
27.1	Introduction	655
27.2	Kernelisation	657
27.3	Dimensionality Reduction	658
27.3.1	Classical Methods for Dimensionality Reduction.....	658
27.3.2	Non-linear Dimensionality Reduction	661
27.4	Regression	664
27.5	Classification.....	666
27.6	Kernels and Parameter Selection.....	668
27.7	Survey of Applications in Finance	670
27.7.1	Credit Risk Management	670
27.7.2	Market Risk Management.....	673
27.7.3	Synopsis and Possible Future Application Fields	675
27.8	Overview of Software Tools	678
27.9	Conclusion.....	679

CHAPTER 28

Complexity of Exchange Markets	689
<i>Mao-cheng Cai, Xiaotie Deng</i>	
28.1 Introduction	689
28.2 Definitions and Models	691
28.3 On Complexity of Arbitrage in a General Market Model	694
28.4 Polynomial-Time Solvable Models of Exchange Markets	697
28.5 Arbitrage on Futures Markets.....	699
28.6 The Minimum Number of Operations to Eliminate Arbitrage	702
28.7 Remarks and Discussion.....	703

PART III. FURTHER ASPECTS AND FUTURE TRENDS

Introduction to Part III.....	709
-------------------------------	-----

CHAPTER 29

IT Security: New Requirements, Regulations and Approaches	711
<i>Günter Müller, Stefan Sackmann, Oliver Prokein</i>	
29.1 Introduction	711
29.2 Online Services in the Financial Sector.....	712
29.2.1 Integration of Financial Services	712
29.2.2 Security Risks of Personalized Services	714
29.3 Security beyond Access Control.....	714
29.3.1 Security: Protection Goals	715
29.3.2 Security: Dependability	717
29.4 Security: Policy and Audits	717
29.4.1 Security Policies	718
29.4.2 Logging Services	721
29.5 Regulatory Requirements and Security Risks	722
29.5.1 Data Protection Laws.....	722
29.5.2 Regulatory Requirements	723
29.5.3 Managing Security and Privacy Risks	724
29.6 Conclusion.....	727

CHAPTER 30

Legal Aspects of Internet Banking in Germany.....	731
<i>Gerald Spindler, Einar Recknagel</i>	
30.1 Introduction	731
30.2 Contract Law – Establishing Business Connections, Concluding Contracts, and Consumer Protection.....	732
30.2.1 Establishing the Business Connection	732
30.2.2 Contract Law	732
30.2.3 Terms and Conditions.....	733
30.2.4 Consumer Protection – EU-Legislation and Directives ..	733

30.3	Liability – Duties and Obligations of Bank and Customer.....	736
30.3.1	Phishing and Its Variations – A Case of Identity	736
30.3.2	Legal Situation in Case of Phishing or Pharming	737
30.3.3	Procedural Law and the Burden of Proof.....	746
CHAPTER 31		
Challenges and Trends for Insurance Companies.....		753
<i>Markus Frosch, Joachim Lauterbach, Markus Warg</i>		
31.1	Starting Position	753
31.2	Challenges and Trends	754
31.2.1	Business and IT Strategy in the Balanced Scorecard.....	754
31.2.2	Self-controlling Systems: Management Based on the Contribution Margin	756
31.2.3	Unique Selling Propositions: On Demand Insurance.....	759
31.2.4	Sales and Marketing Support: Access to Primary Data.....	761
31.2.5	Talent Management: Identify, Hire and Develop Talented Staff	765
31.3	Summary and Outlook.....	770
CHAPTER 32		
Added Value and Challenges of Industry-Academic Research Partnerships – The Example of the E-Finance Lab		773
<i>Wolfgang Koenig, Stefan Blumenberg, Sebastian Martin</i>		
32.1	Introduction	773
32.2	Structure of the EFL	773
32.3	Generation and Sharing of Knowledge Between Science and Practice: Research Cycle	775
32.3.1	Problem Definition	776
32.3.2	Operationalization.....	776
32.3.3	Application	777
32.3.4	Analysis	777
32.3.5	Utilization	779
32.4	Added Value and Challenges of the Industry-Academic Research Partnership	783
32.5	Conclusion.....	785
Index		787