

Roman Beck

The Network(ed) Economy

The Nature, Adoption and Diffusion of Communication Standards

With forewords by Prof. Dr. Wolfgang König
and Prof. Dr. Rolf I. Wigand

Deutscher Universitäts-Verlag

Table of Contents

Foreword.....	V
Foreword.....	VII
Preface.....	IX
Table of Contents.....	XI
Figures.....	XV
Tables.....	XVII
Equations.....	XIX
Variables and Symbols.....	XXI
Abbreviations.....	XXV
1 Introduction.....	1
1.1 Motivation and Research Questions.....	3
1.2 Structure of the Dissertation.....	9
2 Diffusion and Innovation Theory.....	15
2.1 Business Environment.....	15
2.2 Innovation Theory.....	17
2.2.1 Determinants of Innovations.....	18
2.2.2 Profit resulting from Innovations.....	20
2.2.3 Allocation of Innovation-based Profits.....	22
2.3 Diffusion Theory.....	23
2.3.1 Development of Diffusion Theory.....	24
2.3.2 Pivotal for Diffusion: The Adoption Decision.....	24
2.3.3 Impact of Institutions on the Diffusion Process.....	25
2.4 Diffusion of Public Goods and Infrastructure.....	27
2.4.1 Public Goods: Emergence and Definitions.....	28
2.4.2 Noncontributors, Free-riders and Market Failure.....	29
2.4.3 Standards and Network Goods: Private or Public Goods Category?.....	31
2.5 Infrastructure and Networks as part of Public Goods.....	34
2.6 Diffusion Approaches in the Information Systems Discipline.....	37

2.6.1	Technology Acceptance Model (TAM).....	38
2.6.2	Technology Organization Environment Model (TOE).....	39
3	Network Effect Theory.....	41
3.1	Network Effect Goods.....	41
3.1.1	The Concept of Network Effects.....	45
3.1.2	Direct Network Effects.....	47
3.1.3	Indirect Network Effects.....	48
3.2	The Diffusion of Network Effects Goods.....	49
3.2.1	Standards and Compatibility.....	54
3.2.2	Externalities and Positive Feedback-Effect.....	58
3.2.3	Start-up Problem and Critical Mass.....	61
3.2.4	Bandwagon Effect.....	64
3.2.5	Installed Base, Lock-in and Switching Costs.....	66
3.2.6	Path Dependency.....	70
3.3	Network Externalities: A Source of Market Failure?.....	71
3.4	Diffusion Theory Revisited in the Light of Network Effects.....	73
3.4.1	Prosumers of Network Effect Goods.....	73
3.4.2	Networks as Virtual Infrastructure.....	75
3.4.3	Analogies of Public and Network Goods.....	77
4	Diffusion of E-Business Standards: Empirical Results.....	79
4.1	Research Framework.....	79
4.2	Diffusion of E-Business Standards.....	81
4.2.1	Drivers of and Barriers to E-Business.....	83
4.2.2	Diffusion and Use of E-Business Standards.....	87
4.3	Globalization and Diffusion of E-Business Standards.....	93
4.3.1	Globalization and the Usage of E-Business.....	96
4.3.2	Enterprise Application Strategy and Impact of E-Business.....	98
4.4	Diffusion and Impact of E-Business Standards among SMEs.....	103
4.4.1	Data Sample and Methodological Background.....	104
4.4.2	The Diffusion of E-Business in Three Industry Sectors.....	107
4.4.3	E-Business Readiness among SMEs.....	109
4.4.4	E-Business Drivers and Barriers for SMEs.....	111
4.4.5	The Efficient Use of E-Business among SMEs.....	116

5	Developing E-Business Standards.....	123
5.1	Economics of Communication Standards: Integrating SMEs in EDI Supply Chains.....	124
5.1.1	The EDI Dilemma.....	125
5.1.2	Standardization History and Empirical Evidence from the German Office Supply Retailing Industry.....	130
5.1.2.1	EDI Standardization History.....	130
5.1.2.2	Results from the Retailer Survey.....	131
5.1.2.3	Profitability Analysis of EDI for SMEs.....	133
5.1.3	From WebEDI to ASP-hosted EDI for SMEs.....	136
5.1.4	The Future of EDI for SMEs.....	138
5.2	Advancing Business Process Automation by Means of Customer Reputation Accounts.....	140
5.2.1	Reputation and EDI-based Process Automation.....	142
5.2.1.1	EDI Research Fields.....	142
5.2.1.2	Automation-oriented Business Process Reengineering.....	143
5.2.1.3	Reputation and Trust.....	144
5.2.1.4	Reputation and Transaction Costs.....	145
5.2.2	Customer Complaints Handling, Reputation Mechanism, and Simulation Model.....	146
5.2.2.1	Customer Complaints Alternatives and Implications.....	146
5.2.2.2	A Simplified Complaints Handling Process Model.....	148
5.2.3	A Reputation Mechanism to inhibit Opportunistic Behavior.....	151
5.2.4	Developing an Automated Customer Complaints Processing System.....	154
5.2.5	Trust versus Control in long term Relations.....	155
6	Simulation of the Diffusion of Network Effect Goods.....	159
6.1	Application of Network Effect Theory to Developing a Network of Mobile Service Users.....	160
6.1.1	Theoretical Foundation: Standards and Network Effects.....	165
6.1.2	Concept of a Network Effect Helix.....	167
6.1.3	The Standard Battle: i-mode vs. WAP.....	168
6.1.4	A Simulation Model for Mobile Service Markets.....	170
6.1.5	Mobile Network Simulation Analysis.....	179

6.1.6	Implications for the Diffusion of i-mode.....	186
6.2	Application of Network Effect Theory to Developing an EDI Network.....	188
6.2.1	Network Behavior under Network Effects: the Start-up Problem	189
6.2.2	Extending the Basic View of Network Effects.....	191
6.2.3	Standards in Corporate Reality: EDI.....	195
6.2.4	Simulating the Diffusion of EDI.....	197
6.2.5	Discussion: The Network Effect Helix.....	205
6.2.6	Limitations and Managerial Implications.....	210
6.2.7	Implications for the Diffusion of EDI.....	212
7	Conclusions.....	215
7.1	Diffusion Theory in the Light of Network Effect Theory.....	216
7.2	Empirical Cross-Country Analysis of E-Business Diffusion.....	219
7.3	Development of E-Business Solutions.....	220
7.4	ACE-based Diffusion Model of Communication Standards.....	222
8	Future Research.....	225
8.1	Strengthening the Empirical Foundation.....	225
8.2	Next Generation Mobile Communication Standards.....	226
8.3	Investigation of Wireless Broadband Standards Development.....	228
8.4	Development of Economic Models to explain the Diffusion of Wireless Broadband Standards.....	229
8.5	Developing Mobile Business Models and Market Strategies.....	230
8.6	Grid-Economic Perspectives.....	231
	References.....	235
	Appendix: Global E-Commerce Survey.....	261