

Ethical IT Innovation

A Value-Based System Design Approach

Sarah Spiekermann

*Vienna University of Economics and Business
Institute for Management Information Systems*

CRC Press

Taylor & Francis Group
Boca Raton London New York

CRC Press is an imprint of the
Taylor & Francis Group, an **Inform*** business

AN AUERBACH BOOK

Contents

List of Figures	xiii
List of Tables	xvii
List of Abbreviations	xix
Preface	xxi
Acknowledgments	xxiii
Author	xxv
1 Introduction	1
1.1 How This Book Frames Computer Ethics	2
1.2 The Ethical System Development Life Cycle (E-SDLC)	3
1.3 Value-Based IT Design: A Positive Message for IT Markets	3
1.4 Engineers, Managers, and "Ethical Machines"	4
References	5
2 IT Innovation	7
2.1 Human Growth and Eudemonia through IT	7
2.2 Human Nightmares Caused by IT and a Short Reflection on Good and Bad	9
2.3 End of IT Innovation Based on Functionality	9
2.4 Questioning "Function Hypes"	10
2.5 True Cost of Hype Cycles	12
2.6 Post Hype Cycles: Catering to Higher Human Values	12
2.7 Values in IT Design	13
2.8 Necessity for Value-Based Design	15
2.9 Envisioning the Value of IT Services	16
References	17
3 Future IT Environments: Five Scenarios	19
3.1 Personas Used in the Scenarios	19
3.2 Scenario 1: Future of Gaming	19
3.3 Scenario 2: Future of Work	23
3.4 Scenario 3: Future of Retail	24
3.5 Scenario 4: Future of University Education	27
3.6 Scenario 5: Future of Robotics	29
3.7 IT Innovation Lying Ahead	32
3.8 Positive Potential Outcomes of IT Innovation	33
3.9 Negative Potential Outcomes of IT Innovation	34
References	36
4 Value Ethics and IT	39
4.1 An Introduction to Values	39
4.2 What Is a Value?	39
4.3 Intrinsic versus Extrinsic Values	40

4.4	Intrinsic Values in Philosophy and Psychology	40
4.4.1	Nonmoral Values versus Moral Values	42
4.4.2	Values versus Virtues	42
4.4.3	Necessary Values for Human Growth	43
	References	45
5	Ethical Knowledge for Ethical IT Innovation	47
5.1	What Is Knowledge?	47
5.2	Ethical Challenges in IT-Driven Knowledge Creation	48
5.3	Ethical Challenges in Data Collection	49
5.3.1	Informed Consent	50
5.3.2	User Control over Data Collection	52
5.4	Ethical Challenges in Information Aggregation and Knowledge Creation	56
5.4.1	Data Quality	56
5.4.2	Truth	57
5.4.3	Transparency	59
5.5	Ethical Challenges for Accessing Knowledge	61
5.5.1	Conditional Access to Knowledge and the Digital Divide	62
5.5.2	Objectivity versus Filter Bubbles	63
5.6	Ethical Uses of Information and Knowledge, a Privacy Issue	66
5.6.1	Contextual Integrity	66
5.6.2	Privacy Harms	67
5.6.3	Computer Bias and Fairness	68
5.7	Summing Up: Ethical Knowledge Management	69
	References	71
6	Preserving Freedom in Future IT Environments	73
6.1	Negative Liberty and Machines	73
6.2	Positive Liberty and Machines	74
6.3	Technology Paternalism and Controllability	76
6.4	Autonomy vis-k-vis Machines	79
6.5	Attention-Sensitive Machines	83
6.5.1	Attention-Sensitive Interruption	84
6.6	Summing Up: Freedom and Liberty in Future IT Environments	86
	References	86
7	Health and Strength in the Machine Age	89
7.1	Direct Effect of Machines on Physical Health and Strength	89
7.2	Long-Term Effect of Machines on Physical Health and Strength	90
7.3	Direct Effect of Machines on Mental Health and Strength	91
7.4	Indirect Effect of Machines on Mental Health	92
7.4.1	Mental Health Challenges in Response to Computer Use on the Job	92
7.5	Indirect Effect of Machines on Physical Health	93
	References	94
8	Safety, Security, and Privacy in Future IT Environments	97
8.1	Safety versus Security	97
8.2	Safety, Cyberwar, and Cybercrime	98
8.3	Security and Privacy Principles in Machine Engineering	100
8.3.1	Information Security Goals	100
8.3.2	Auditability	101
8.3.2.1	Security Audits versus Privacy Efforts	102
8.3.2.2	Data Minimization for Security and Privacy Reasons	102
8.3.2.3	Audit Trails for Privacy Management	102

8.3.3	Accountability	103
8.4	Privacy and Surveillance	104
8.4.1	Surveillance and Dataveillance	104
8.4.2	Pros and Cons of Surveillance	105
8.4.3	Reaching Golden Means in Surveillance?	108
	References	110
9	Trust in Future IT Environments	113
9.1	What Is Trust?	113
9.2	Distinguishing Trust from Confidence and Reliance	114
9.3	Trust Mechanisms in Machines	115
9.4	How Computer Scientists Understand Trust	116
9.5	Reputation Systems	116
	References	118
10	Friendship in Future IT Environments	119
10.1	What Is Philia (Friendship)?	119
10.2	Machines as Mediators of Friendship	122
10.3	Shared Life and Learning in Virtual Worlds	123
10.4	Empathy in Virtual Worlds	126
10.5	Intimacy and Disinhibition in Online Environments	127
10.6	Intimacy with Artificial Beings	128
10.7	Final Thoughts on Friendship in Future IT Environments	130
	References	132
11	Dignity and Respect in the Machine Age	135
11.1	Dignity and Respect	135
11.2	Respectful Machines	136
11.3	Polite Machines	137
11.4	Psychological Ownership in Future IT Environments	139
11.5	Self-Esteem through Open and Free Software	142
11.6	Influence of Patents and Copyrights on Human and Economic Growth	144
11.7	Outlook on Human "Doing": Impact of Machines on Work	146
	References	147
12	Privacy and a Summary of the Value Fabric	149
12.1	Privacy and Ethical Knowledge	149
12.2	Privacy and Freedom	150
12.3	Privacy Trade-Offs at All Levels of the Value Pyramid	151
12.4	Summing Up: Values in Future IT Environments	152
	References	155
13	Ethical Value-Based IT System Design: An Overview	157
13.1	Management View of New Product Development	158
13.2	Engineering View of New IT Product Development	159
13.2.1	IT Project Identification and Selection	160
13.2.2	IT Project Initiation and Planning	161
13.2.3	System Analysis	161
13.2.4	System Design, Implementation, and Software Engineering	162
13.3	Computer Ethics and IT System Design	166
13.4	Value-Sensitive Design	167
13.4.1	Value Discovery	168
13.4.2	Value Conceptualization	170
13.4.3	Empirical Value Investigation	170

13.4.4	Technical Value Investigation	171
13.5	Stakeholder Involvement in Ethical IT System Design	172
13.5.1	Challenges and Rules in Stakeholder Processes	173
13.5.2	Choosing the Stakeholders	174
13.5.3	Rational Arguments and Ideal Speech Situations	175
	References	177
14	Value Discovery for IT Project Selection	179
14.1	Envisioning with Cards	179
14.2	Envisioning with Scenarios	181
14.3	Critical Information Systems and Reflective Design	181
	References	182
15	Wise Leadership in the IT Project Selection Phase	183
15.1	Why Should Leaders Care about the Ethical Design of IT?	184
15.2	Why Many Executives Still Ignore Ethics	185
15.3	Tough Decisions for Wise Leaders	185
15.3.1	What Is Philosophical Mode?	186
15.4	Utilitarian Reasoning	186
15.4.1	Act Utilitarian Reasoning	187
15.4.2	General Utilitarian Reasoning	188
15.4.3	Rule Utilitarian Reasoning	189
15.4.4	Problems with Utilitarian Reasoning	189
15.5	What Makes a Wise Leader?	191
15.6	Deontological Philosophical Reasoning	192
15.7	Rawls's Theory of Justice and the Veil of Ignorance	194
15.8	Classical Virtue Ethics	195
15.9	Ethical Decision Making in the IT Selection Phase	196
15.9.1	Mapping IT Effects and Values	197
15.9.2	A Matrix for Ethical IT Decisions	198
15.10	Challenges for Leaders in the IT Selection Phase	199
15.10.1	Practical Challenges for Ethical Decision Making in the IT Selection Phase	200
15.10.1.1	Stating the Obvious: Catering IT Solutions to Mainstream Values	200
15.10.1.2	Functional Enthusiasm Leads to Embellishing the New IT Idea	200
15.10.2	Organizational Challenges for Wise Leadership	201
15.10.2.1	Inflated Trust in a Scientific Method for IT Investments	201
15.10.2.2	Leaders' Lack of Time and Alienation from the Decision Base	201
15.10.2.3	The Idea That IT Is Merely a Support Function	202
15.10.2.4	"Being Good" Is Delegated to the Corporate Social Responsibility Department	202
	References	202
16	Ethical IT Planning	205
16.1	Conceptual Value Analysis	205
16.2	Feasibility Analysis	206
16.2.1	Political Feasibility and Ethical Feasibility	207
16.2.2	Economic, Legal, and Ethical Feasibility	207
16.2.3	Technical and Operational Feasibility	209
	References	211
17	Ethical IT System Analysis	213
17.1	Context Analysis	213
17.1.1	Physical Context Analysis	214
17.1.2	Technical Context Analysis	217

17.1.2.1	How Technical Context Influences IT Design	217
17.1.2.2	How IT Design Impacts the Technical Context	218
17.2	From Value Dams and Flows to Development Goals	219
17.3	Analyzing Ethical Priorities for System Design	220
17.3.1	Qualitative Persona Analysis	221
17.3.1.1	What Should a Persona Description Contain?	221
17.3.1.2	How Personas Can Be Used to Analyze Ethical Priorities	222
17.3.2	Quantitative Value Dams and Flows Analysis	222
17.3.3	Using Risk Analysis to Identify Ethical System Design Priorities	223
17.4	Operationalizing Development Goals	224
	References	226
18	Ethical IT System Design	229
18.1	Threat and Control Analysis	229
18.2	Modeling and Understanding System Design Alternatives	232
18.3	System Implementation	237
	References	238
19	Machine Ethics and Value-Based IT Design	239
19.1	Explicit Ethical Agents	240
19.2	Full Ethical Agents?	243
	References	246
	Index	249