## Contents

Preface	. xv
CHAPTER 1: ELEMENTS OF DIFFUSION	1
Water Rotting in a Peruvian Village: Diffusion That	Fatted 1
What Is Diffusion?	5
Controlling Scurvy in the British Navy Nondiffusion of the Dvorak Keyboard	7 8
Four Main Elements in the Diffusion of Innovations	11
<ol> <li>The Innovation</li> <li>Communication Channels</li> <li>Time</li> <li>A Social System         Diffusion of Hybrid Corn in Iowa     </li> </ol>	12 13 20 23 <b>31</b>
Summary	35
CHAPTER 2: A HISTORY OF DIFFUSION RESEARCH	39
The Beginnings of Diffusion Research in Europe	40
Gabriel Tarde and Imitation Georg Simmers Stranger The British and German-Austrian Diffusionists	41 42 42

The Rise of Diffusion Research Traditions	. 43
Paradigms and Invisible Colleges The Anthropology Research Tradition	46 48
Miracle Rice in Bali: the Goddess and the Computer	50
Early Sociology	53
Rural Sociology	54
The Diffusion of Modern Math in Pittsburgh	62
Worldwide Diffusion of the Kindergarten	<b>63</b> 64
Public Health and Medical Sociology  The Columbia University Drug Diffusion Study	65
The Taichung Field Experiment	70
STOP AIDS in San Francisco	72
Communication	74
Diffusion of News of the September 11 Terrorist Attacks	79
Marketing	82
Opinion headers and Mavens in the Diffusion of Electric	
Geography	. 90
General Sociology	91
Networks in Recruitment to Freedom Summer Trends by Diffusion Research Traditions	91 93
A Typology of Diffusion Research	94
Summary	101
CHAPTER 3: CONTRIBUTIONS AND CRITICISMS	102
OF DIFFUSION RESEARCH	
The Status of Diffusion Research Today	102
Criticisms of Diffusion Research	105
The Pro-Innovation Bias of Diffusion Research	106
Pure Drinking Water in Egyptian Villages	107
Preference for Sons in India and China	117
The Individual-Blame Bias in Diffusion Research	118
The Recall Problem in Diffusion Research	. 126
The Issue of Equality in the Diffusion of Innovations	130
Summary	134

Contents	vii
CHAPTER 4: THE GENERATION OF INNOVATIONS	136
<ol> <li>The Innovation-Development Process</li> <li>Recognizing a Problem or Need</li> <li>Basic and Applied Research         <i>Birth of the Laptop Computer at Toshiba</i></li> <li>Development         <i>How the Refrigerator Got Its Hum Classifying the Segway</i></li> <li>Commercialization         <i>Fumbling the Future at Xerox PARC</i></li> <li>Diffusion and Adoption</li> <li>Consequences         <i>Serendipity in the Discovery of Warfarin</i></li> </ol>	137 137 139 <b>144</b> 146 <b>147</b> <b>148</b> 152 <b>153</b> 155 157
Socioeconomic Status, Equality, and Innovation Development  Hard Tomatoes in California	159 <b>159</b>
Tracing the Innovation-Development Process The Shortcomings of Tracer Studies Future Research on the Innovation-Development Process	161 163 164
The Agricultural Extension Model	165
Summary	166
CHAPTER 5: THE INNOVATION-DECISION PROCESS	168
A Model of the Innovation-Decision Process	169
The Knowledge Stage	171
Which Comes First, Needs or Awareness of an Innovation? Three Types of Knowledge About an Innovation	172
Early Versus Late Knowers of Innovations	174
The Persuasion Stage	174
The Decision Stage	177
The Implementation Stage	179
Re-Invention	180

How Much Re-Invention Occurs?	181
Re-Invention Is Not Necessarily Bad	184
Why Does Re-Invention Occur?	186
Re-Invention of Hone Culture by the Plains Indians	188
The Confirmation Stage	189
Dissonance	189
Discontinuance	190
The Discontinuance of Smoking	192
Forced Discontinuance and the Rise of Organic Farming	193
<b>Are. There Stages in the Innovation-Decision Process?</b>	195
Process Versus Variance Research	196
Evidence of Stages	197
The Hierarchy-of-Effects	198
Stages-of-Change	198
Communication Channels in the Innovation-Decision  Process for Tetracycline	202
Communication Channels by Stages in the Innovation-Decision Process	204
<b>Categorizing Communication Channels</b>	204
Mass Media Versus Interpersonal Channels	205
Cosmopolite Versus Localite Channels	207
The Bass Forecasting Model	208
<b>Communication Channels by Adopter Categories</b>	211
The Innovation-Decision Period	213
The Rate of Awareness-Knowledge and Rate of Adoption	213
The Length of the Innovation-Decision Period by Adopter Category	214
How the Internet Is Changing the Innovation-Decision Process	215
Summary	216
· · · · · · · · · · · · · · · · · · ·	

Con	tents	ix
CHAPTER 6: ATTRIBUTES OF INNOVATIONS ATTHEIR RATE OF ADOPTION	ND	219
Black Music in White America: Bap		220
Rate of Adoption		221
Research on the Attributes of Innovations  Measuring the Attributes of Innovations Organizations as the Units of Adoption Postdiction Versus Prediction  An Agricultural Innovation That Failed		223 223 225 227 <b>227</b>
Relative Advantage Economic Factors and Rate of Adoption Status Aspects of Innovations Overadoptiori Relative Advantage and Rate of Adoption Preventive Innovations The Effects of Incentives Mandates for Adoption		229 230 230 231 232 234 236 239
Compatibility Compatibility with Values and Beliefs Compatibility with Previously Introduced Ideas Compatibility with Needs Photovoltaics on a Million Roofs The Daughter-in-Law Who Doesn't Sp Compatibility and Rate of Adoption Technology Clusters Naming an Innovation Positioning an Innovation Acceptability Research Indigenous Knowledge Systems	oeak	240 241 243 246 <b>246</b> <b>247</b> 249 249 250 251 253 254
Complexity		257
Trialability		258
Observability Cellular Telephones and the Lifestyle Revolution		258 259
Summary	•	265

CHAPTER 7: INNOVATIVENESS AND ADOPTER CATEGORIES	267
Diffusion of Farm Innovations in a Colombian Village in the Andes	268
Classifying Adopter Categories on the Basis of Innovativeness	272
The S-Shaped Curve of Adoption and Normality	272
Measuring Organizational Innovativeness	275
Who Adopts? Adopter Categorization	277 279
Adopter Categories as Ideal Types	282
Innovators: Venturesome	282
Early Adopters: Respect Early Majority: Deliberate	283 283
Late Majority: Skeptical	284
Laggards: Traditional	284
People Who Said No to Innovation: The Old Order Amiah	285
Characteristics of Adopter Categories	287
Socioeconomic Characteristics	288
Personality Variables	289
Communication Behavior	290
Audience Segmentation and Adopter Categories	292
Cell Phone Laggards in Hong Kong  The Imposed was a Needs Dander and the Strategy	294
The Innovativeness/Needs Paradox and the Strategy of Least Resistance	295
Network Influences on Innovativeness	296
Summary	297
CHAPTER 8: DIFFUSION NETWORKS	300
Opinion Leadership in the Diffusion of Modern Math	300
Models of Communication Flows	303
The Hypodermic Needle Model	303
The Two-Step Flow Model	304
Homophily and Heterophily in Communication Networks	305
Homophily and Heterophily	305
Homophily as a Barrier to Diffusion	306

٧ _		4	
.OI	nte	nts	

хi

Measuring Opinion Leadership and Network Links	308
The Role of Alpha Pups in the Viral Marketing of a Cool Electronics Game	313
Monomorphic and Polymorphic Opinion Leadership	314
Paul Revere's Ride	314
Characteristics of Opinion Leaders	316
External Communication	316
Accessibility	317
Socioeconomic Status	318
Innovativeness	318
Ihnovativeness, Opinion Leadership, and System Norms	318
Opinion Leader Organizations	319
Do Opinion Leaders Matter?	321
Networks in the Diffusion of a Medical Drug	326
Diffusion Networks	330
Building a Network for the Diffusion of Photovoltaics in the Dominican Republic	331
Cluster Studies	333
Dr. John Snow and the Cholera Epidemic in London	335
Communication Network Analysis	337
The Strength-of-Weak-Ties Theory	339
Who Is Linked to Whom in Networks?	341
Social Learning Theory	341
The Critical Mass in the Diffusion of Interactive Innovations	343
The Critical Mass in the Diffusion of Fax	345
. Diffusion of the Internet	346
The Concept of Critical Mass	349
Watching While Being Watched	352
The Sleeper	354
Individual Thresholds for Adoption	355
Why Do Individuals Adopt Prior to the Critical Mass?	357
Networks and the Turbocharger Effect	360
Strategies for Getting to Critical Mass	361
Summary	362

CHAPTER 9: THE CHANGE AGENT	365
Targeting	· 366
Change Agents as Linkers *	368
The Sequence of Change Agent Roles  Coercion in Norplant Diffusion Safaris in Indonesia	369 <b>371</b>
Factors in Change Agent Success Change Agent Efforts Client Orientation Compatibility with Clients; Needs Sustainability: "Chicken" Davis in Nigeria Change Agent Empathy	373 373 374 375 <b>376</b> 376
Communication Campaigns  The ORT Campaign in Egypt	377 <b>380</b>
Homophily and Change Agent Contact Change Agents' Contact with Lower-Status Clients Para-Professional Aides Change Agent Credibility Inauthentic Professionalization of Aides THE Baltimore Needle-Exchange Project	381 383 384 384 386 387
The Use of Opinion Leaders The Role of Demonstrations	388 389
Clients' Evaluative Ability  The Agricultural Extension Service	390 <b>391</b>
Centralized and Decentralized Diffusion Systems Advantages and Disadvantages of Decentralized Diffusion	394 398
Summary	400
CHAPTER 10: INNOVATION IN ORGANIZATIONS	402
Types of Innovation-Decisions	403
Organizations  Virtual Organizations	404 405

· Contents	xiii
Organizational Innovativeness Size and Organizational Innovativeness Structural Characteristics and Organizational Innovativeness The Role of Champions	407 409 411 414
The Innovation Process in Organizations  Adoption of New Communication Technologies	417 419
Stages in the Innovation Process 1. Agenda-Setting 2. Matching 3. Redefining / Restructuring 4. Clarifying 5. Routinizing The Santa Monica Freeway Diamond Lane Experiment:	420 422 423 424 427 428 430
Implementation Failure	•
New Communication Technologies in Organizations	433
Summary	433
CHAPTER 11: CONSEQUENCES OF INNOVATIONS	436
Snowmobile Revolution in the Arctic	437
Studying Consequences	440
Classifications of Consequences Desirable Versus Undesirable Consequences Direct Versus Indirect Consequences ORT: The Consequence* of Consequences Anticipated Versus Unanticipated Consequences Steel Axes for Stone-Age Aborigines	442 442 445 446 448 449
Form, Function, and Meaning of an Innovation  The Irish Potato Famine	451 <b>452</b>
Achieving a Dynamic Equilibrium  The Mosquito Killer	452 <b>453</b>
Equality in the Consequences of Innovations The Communication Effects Gap Gap-Widening Consequences of the Diffusion of Innovations Social Structure and the Equality of Consequences Strategies for Narrowing Gaps	456 457 460 462 464

## xiv Contents

Wider Gaps Are Not Inevitable  The Digital Divide	<b>467</b> 468
Summary	470
Glossary	473
Bibliography	4T7
Name Index .	537
Subject Index	543