

New Food Product Development

**From Concept
to Marketplace**

THIRD EDITION

Gordon W. Fuller



CRC Press

Taylor & Francis Group

Boca Raton London New York

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

Contents

Preface.....	xv
Acknowledgments.....	xvii
Author.....	xix
1. What Is New Food Product Development?	1
1.1 Introduction.....	1
1.2 Defining and Characterizing New Food Products.....	2
1.2.1 New Products.....	2
1.2.1.1 Line Extensions.....	3
1.2.1.2 Repositioned Products.....	6
1.2.1.3 New Form of Existing Products.....	7
1.2.1.4 Reformulation of Existing Products.....	7
1.2.1.5 New Packaging of Existing Products.....	8
1.2.1.6 Innovative Products.....	10
1.2.1.7 Creative Products.....	11
1.2.1.8 Genetically Modified Products.....	11
1.2.2 Customers and Consumers.....	12
1.2.3 Added Value.....	13
1.2.4 Markets and Marketplaces.....	14
1.3 Marketing Characteristics of New Products.....	15
1.3.1 Product Life Cycles.....	18
1.3.2 Profit Picture.....	19
1.4 Why Undertake New Food Product Development?.....	20
1.4.1 The “Why” of “Why Undertake New Product Development?”.....	25
1.4.1.1 Corporate Avenues for Growth and Profitability.....	25
1.4.1.2 Opportunities in the Marketplace for New Product Development.....	27
1.4.1.3 Technological Advances Driving New Product Development.....	29
1.4.1.4 Government’s Hand in Influencing New Product Development.....	30
2. The New Product Development Team: Company Organization and Its Influence on New Product Development.....	35
2.1 Structure of Organizations.....	35
2.1.1 Types of Organizations.....	35
2.1.1.1 Committee Politics.....	36
2.1.1.2 Hierarchical Politics.....	37
2.1.1.3 Court Politics.....	38

2.2	Organizing for Product Development	38
2.2.1	Organizing for “the What”: The Physical Plant	40
2.2.2	Organizing for Whom: The Human Side.....	41
2.2.3	Organization and Management.....	42
2.2.4	Creativity: Thinking Differently	43
2.3	Research for Creativity: What Is It?	45
2.3.1	Characterizing Research.....	45
2.3.2	Organizing for Creative Research.....	47
2.3.2.1	The “Unhabitual” as a Tool in Creativity	48
2.3.2.2	Cross-Functionality in Product Development.....	49
2.3.2.3	Fluidity as an Organizational Tool in Creativity	50
2.4	Constraints to Innovation	51
2.4.1	The Corporate Entity.....	52
2.4.1.1	Risk Capital.....	52
2.4.1.2	Company Ego.....	52
2.4.2	Communication.....	54
2.4.2.1	Multiplant Communication	54
2.4.2.2	Technology: Its Management and Transfer	56
2.4.2.3	Personnel Issues	56
2.5	The New Product Development Team.....	58
2.6	Phases in New Product Development	60
3.	What Are the Sources for New Product Ideas?.....	67
3.1	Getting Ideas.....	67
3.1.1	General Guidelines for Ideas.....	68
3.1.2	Sources of Product Ideas.....	69
3.1.2.1	The Many Marketplaces.....	70
3.1.3	Getting to Know Them: General Techniques	72
3.1.3.1	Census and Economic Data	72
3.1.3.2	The Fallacy of Privacy.....	77
3.1.3.3	Data Mining	78
3.1.3.4	The Internet: Social Networking, Blogging, Tweeting, and All That Buzz	80
3.1.3.5	Just Looking and Being There.....	82
3.1.3.6	Using Acquired Knowledge to Source Ideas.....	90
3.1.3.7	Using Retailer/Distributor/Manufacturer Interfaces for Ideas	102
3.1.3.8	Other Environments as Sources of Ideas.....	104
3.1.3.9	Internal Sources of Ideas for Development	111
3.2	Criteria for Screening Ideas	116
3.2.1	Environment in which Criteria Are Applied.....	117
3.2.1.1	Conflict between Marketing and Research and Development	118
3.2.1.2	Conflict between Production and Marketing.....	119

- 3.2.2 Applying the Criteria 120
 - 3.2.2.1 Reality of New Product Development Ideas.....121
 - 3.2.2.2 Caution about Copy-Cat Products 122
- 4. Strategy and the Strategists..... 125**
 - 4.1 Strategy..... 125
 - 4.1.1 Defining the Company..... 126
 - 4.2 The Strategists 127
 - 4.2.1 An Involved Senior Management..... 128
 - 4.2.2 Shaping the Company’s Objectives 131
 - 4.2.2.1 Company Objectives That Shape Product Development..... 132
 - 4.2.2.2 Sanctioned Espionage or Competitive Intelligence?..... 133
 - 4.2.2.3 Benchmarking 138
 - 4.3 Finance Department: The Cautionary Hand in Development... 138
 - 4.3.1 Finance’s Not So Passive Role in Development 138
 - 4.3.2 Financial Realities of Product Development..... 140
 - 4.3.2.1 Slotting Fees 141
 - 4.3.2.2 Financial Criteria..... 142
 - 4.3.3 Financial Tools..... 144
 - 4.3.3.1 Comparing Costs with Anticipated Revenues 144
 - 4.3.3.2 Probability Index 146
 - 4.3.3.3 Other Tools 147
 - 4.4 Strategy: Marketing’s Perspective..... 147
 - 4.4.1 Marketing’s Functions..... 148
 - 4.4.2 Market Research 149
 - 4.4.3 Time: A Critical Element in Marketing Planning and Development..... 151
 - 4.4.4 Nature of Market Information 153
 - 4.4.5 Qualitative and Quantitative Market Research Information..... 155
 - 4.4.5.1 Focus Groups 156
 - 4.4.5.2 Beyond Focus Groups: Neuromarketing—Invading the Consumer’s Inner Space 157
 - 4.4.6 Marketing’s War Room 160
 - 4.4.7 Marketing and Sales Departments..... 162
 - 4.4.8 Marketability and Marketing Skills..... 163
 - 4.4.9 Summary..... 163
- 5. The Tacticians: Their Influence in Product Development 165**
 - 5.1 Science and Technology in Action..... 165
 - 5.1.1 Research and Development: Meeting the Challenges.... 166

- 5.1.1.1 Recipe Development and Recipe Scale-Up: Meeting the Challenge 166
- 5.1.2 Spoilage and Public Health Concerns..... 169
 - 5.1.2.1 Food Spoilage Concerns..... 169
 - 5.1.2.2 Microbial Spoilage..... 174
 - 5.1.2.3 Naturalness: Minimal Processing..... 176
- 5.1.3 Maintaining Safety and Product Integrity..... 177
 - 5.1.3.1 General Methods and Constraints to Their Use 177
- 5.1.4 Summary and a Caution..... 200
- 5.2 Role of Engineering in the Development Process 201
 - 5.2.1 Engineers..... 201
 - 5.2.1.1 Process Design..... 202
 - 5.2.1.2 Scale-Up 202
 - 5.2.1.3 In-Process Specifications 204
- 5.3 Manufacturing Plant: A Stumbling Block or an Asset in Development?..... 205
 - 5.3.1 The Plant 205
 - 5.3.1.1 Concerns: Space, Facilities, Labor, and Disruptions..... 205
 - 5.3.1.2 Co-Packers and Partnerships..... 206
 - 5.3.2 Roles of the Purchasing and Warehousing Departments 207
 - 5.3.2.1 Purchasing Department’s Activities..... 207
 - 5.3.2.2 Activities in Warehousing and Distribution..... 209
 - 5.3.3 IT Department’s Contribution 210
 - 5.3.3.1 Information Management and Retrieval 211
 - 5.3.3.2 Number Crunching 211
 - 5.3.3.3 Graphics..... 213
- 5.4 Commercial Feasibility 214
 - 5.4.1 The Loop: The Interconnectivity of Questions with Indefinite Answers 214
 - 5.4.1.1 The Art of Guesstimating 216
- 5.5 Summary 218

- 6. The Legal Department: Protecting the Company—Its Name, Goodwill, and Image 221**
 - 6.1 Introduction 221
 - 6.2 The Law and Product Development 222
 - 6.2.1 Nongovernmental Organizations 223
 - 6.2.2 Advocacy Groups..... 225
 - 6.2.3 Geopolitical Groups..... 226
 - 6.2.4 Expert Panels 226
 - 6.2.5 Industrial Sector..... 227
 - 6.2.6 Summary..... 228

6.3	Food Regulation and the Development Process.....	228
6.3.1	Legislation, Regulations, and Safety: A Dilemma	228
6.3.2	Role of Lawyers	231
6.3.3	Legislating Quality and Safety	232
6.4	Environmental Standards.....	233
6.5	Summary	234
7.	Quality Control: Protecting the Consumer, the Product, and the Company.....	237
7.1	Introduction	237
7.2	The Ever-Present Watchdog.....	237
7.2.1	Sensory Analysis in Product Development	238
7.2.1.1	Sensory Techniques	238
7.2.1.2	Objective Sensory Testing.....	240
7.2.1.3	Subjective or Preference Testing	241
7.2.1.4	Panelists	242
7.2.1.5	Other Considerations in Sensory Analysis	244
7.2.1.6	To Test Blind or Not?.....	244
7.2.1.7	Can All Tasters Discriminate?.....	246
7.2.1.8	Using Children	247
7.2.2	Using Electronics: The Perfect Nose?.....	247
7.2.3	Shelf Life Testing.....	248
7.2.3.1	Selecting Criteria to Assess Shelf Life.....	248
7.2.3.2	Selecting Conditions for the Test	250
7.2.3.3	Types of Tests	252
7.2.3.4	Guidelines to Determining Shelf Life	255
7.2.3.5	Advances in Shelf Life Determination.....	258
7.3	Designing for Product Integrity	262
7.3.1	Safety Concerns.....	264
7.3.2	Concerns in Designing for Food Safety	264
7.3.3	New Concepts of Safety	265
7.3.4	Costs of Quality and Safety Design	267
7.3.5	Hazard Analysis Critical Control Point Programs	270
7.3.6	Standards Necessary for Safety	270
7.3.7	International Standards	271
7.4	Summary	272
8.	Going to Market: Success or Failure?	275
8.1	Final Screening.....	275
8.1.1	Test Market: What It Is	275
8.1.1.1	Examples.....	276
8.1.2	Test Market: Its Goals.....	277
8.1.2.1	Some Cautions	279
8.1.2.2	Costs: A Deterrent.....	279

- 8.1.3 Considerations for a Successful Traditional Test Market..... 280
 - 8.1.3.1 Where to Introduce 280
 - 8.1.3.2 When to Introduce 282
 - 8.1.3.3 Length of the Test Market Period 283
 - 8.1.3.4 Disruptive and Unexpected Elements
in Test Markets..... 283
 - 8.1.3.5 How to Introduce 284
 - 8.1.3.6 What Product to Market..... 285
- 8.1.4 Evaluating the Results..... 285
 - 8.1.4.1 The Market: Misinterpreted
and Misunderstood..... 286
- 8.1.5 Judgment Day: The Evaluation 291
- 8.1.6 Failures in the Marketplace 292
 - 8.1.6.1 Causes of Failure 295
- 9. Why Farm Out New Product Development?..... 301**
 - 9.1 Introduction 301
 - 9.1.1 A Rose Is a Rose Is a Rose..... 302
 - 9.1.1.1 Outsourcing 302
 - 9.1.1.2 Outsourcing, Consulting, Partnering,
and Joint Venturing..... 304
 - 9.1.1.3 A Classification of Consultants 307
 - 9.2 Going Outside for Product Development..... 311
 - 9.2.1 The Need 312
 - 9.2.2 Finding and Selecting the Appropriate Consultant 313
 - 9.2.3 Some Caveats in Selecting and Working
with Consultants..... 316
 - 9.2.3.1 Exposure..... 316
 - 9.2.3.2 Loss of a Collective Learning Opportunity 317
 - 9.2.3.3 Employee Growth..... 318
 - 9.2.3.4 Dissension 318
 - 9.2.3.5 Other Obligations: Problems in Academe 318
 - 9.2.4 Advantages and Disadvantages 319
 - 9.2.4.1 Utilization of Resources 319
 - 9.2.4.2 The Need to Monitor..... 321
 - 9.2.4.3 Does the Client Understand
Consultantspeak? Communication 321
 - 9.3 Summary 323
- 10. New Food Product Development in the Food Service Industry 325**
 - 10.1 Understanding the Food Service Industry..... 325
 - 10.1.1 Food Service Marketplaces..... 325
 - 10.1.2 Customers and Consumers in the Food Service
Industry..... 328

- 10.2 Characteristics of the Food Service Market 329
 - 10.2.1 Clientele..... 330
 - 10.2.2 Food Preparation and Storage Facilities 331
 - 10.2.2.1 Equipment 331
 - 10.2.2.2 Storage Facilities 332
 - 10.2.2.3 Labor 333
 - 10.2.3 Price, Quality, Consistency, Safety, and Sometimes Nutrition..... 335
 - 10.2.3.1 Standards..... 339
 - 10.2.3.2 Health Care Sector of the Institutional Market 341
 - 10.2.3.3 Military Sector of the Institutional Market 342
- 10.3 Developing Products for the Food Service Sector 343
 - 10.3.1 Physical Facilities of the Customer 343
 - 10.3.2 Energy Requirements..... 345
 - 10.3.3 Labor 346
 - 10.3.4 Waste Handling 347
 - 10.3.5 Customers and Consumers 347
 - 10.3.5.1 Consumer and Nutrition: An Oxymoron..... 348
- 10.4 Quality in the Food Service Market 349
 - 10.4.1 Safety 349
- 10.5 Development of Products for the Food Service Market 350
- 10.6 Criteria for Evaluating a Test Market..... 352

11. Product Development in the Food Additive and Food

- Ingredient Industries**..... 355
 - 11.1 Additive and Ingredient Market Environment 355
 - 11.1.1 Characteristics of the Food Ingredient Industry 356
 - 11.1.1.1 Chain of Customers and Consumers: A Welter of Identities and Needs 356
 - 11.1.1.2 Similarities and Dissimilarities to the Food Service Industry 357
 - 11.1.1.3 The Ever-Present Government 358
 - 11.1.1.4 Proliferation of New Ingredients 359
 - 11.1.2 Focusing on the Customer Who Is Also the Consumer 360
 - 11.1.2.1 Customer Research 361
 - 11.1.2.2 “Consumer” Research: “Yes” and “No” Possibilities..... 362
 - 11.1.3 Development Process 364
 - 11.1.3.1 Development Process and Food Legislation 365
 - 11.1.3.2 What Are the Criteria for Screening? 365
 - 11.1.4 Looking to the Future for Developments in Food Ingredients..... 368

11.1.5	Meeting the Challenge: New Ingredients	370
11.1.5.1	Marketing's Impact on the Direction of Research and Development.....	370
11.2	Ingredients and the New Nutrition	380
11.2.1	Opportunities Provided by the New Nutrition.....	381
11.2.1.1	Biologically Active Nonnutrients.....	381
11.2.1.2	Other Ingredients: Some with and Some without Nutritive Properties	388
11.2.2	Challenges for the New Nutrition.....	392
11.2.2.1	Problems Presented by Enriched Foods	392
11.2.3	A Cautionary Summary	393
12.	Dancing but Uncertain of the Music	397
12.1	Introduction	397
12.2	Looking Forward and Backward.....	398
12.2.1	The Changed and Changing Scene.....	398
12.2.1.1	The Past.....	398
12.2.1.2	Recent Times and the Present	399
12.2.1.3	The Future	400
12.2.2	Being Sure of the Concept	404
12.2.2.1	Value of the Earlier Literature	406
12.2.2.2	What Customers and Consumers Want or What Purveyors Want?	408
12.3	What Food Science and Technology Have Wrought	409
12.3.1	Impact of Food Science and Technology	409
12.3.1.1	How Food Savvy Are People?	409
12.3.1.2	Impact of Technology	412
12.3.1.3	Trends as Social History.....	418
12.3.2	Factors Shaping Future Product and Process Development.....	429
12.3.2.1	Influences: Known and Unknown.....	429
12.4	What I Have Learned So Far about Product Development.....	438
12.4.1	My Mentors.....	438
12.4.1.1	New Food Products of the Future	438
References	443