

New Products Management

PHASE 1
Opportunity
Identification
and Selection

PHASE 2
Concept
Generation

PHASE 3
Concept/Project
Evaluation

PHASE 5
Launch

PHASE 4
Development

Marketing Tasks

Technical Tasks

ELEVENTH EDITION



C. Merle Crawford • C. Anthony Di Benedetto

New Products Management

This page intentionally left blank

New Products Management

Eleventh Edition

Merle Crawford

University of Michigan—Emeritus

Anthony Di Benedetto

Temple University

**Mc
Graw
Hill**
Education



NEW PRODUCTS MANAGEMENT, ELEVENTH EDITION

Published by McGraw-Hill Education, 2 Penn Plaza, New York, NY 10121. Copyright © 2015 by McGraw-Hill Education. All rights reserved. Printed in the United States of America. Previous editions © 2011, 2008, and 2006. No part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written consent of McGraw-Hill Education, including, but not limited to, in any network or other electronic storage or transmission, or broadcast for distance learning.

Some ancillaries, including electronic and print components, may not be available to customers outside the United States.

This book is printed on acid-free paper.

1 2 3 4 5 6 7 8 9 0 DOC/DOC 1 0 9 8 7 6 5 4

ISBN 978-0-07-802904-2

MHID 0-07-802904-x

Senior Vice President, Products & Markets: *Kurt L. Strand*

Vice President, General Manager, Products & Markets: *Michael Ryan*

Vice President, Content Production & Technology Services: *Kimberly Meriwether David*

Brand Manager: *Sankha Basu*

Development Editor: *Kelly Delso*

Marketing Manager: *Donielle Xu*

Director, Content Production: *Terri Schiesl*

Content Project Manager: *Melissa M. Leick*

Buyer: *Nichole Birkenholz*

Cover Designer: *Studio Montage, St. Louis, MO*

Front Cover Image: *Digital Tablet: Blend Images/Jetta Productions/Getty Images, Male Designer: Aping Vision/STS/Getty Images, Businesswoman: Stockbyte/Getty Images, African Female Scientist: ERproductions Ltd/Blend Images LLC, Two Businesspeople: © Sam Edwards/age fotostock, Business Meeting: © Chris Ryan/age fotostock*

Back Cover Image: *Author owned*

Typeface: *10/12 Palatino*

Compositor: *MPS Limited*

Printer: *R.R. Donnelley*

All credits appearing on page or at the end of the book are considered to be an extension of the copyright page.

Library of Congress Cataloging-in-Publication Data

Crawford, C. Merle (Charles Merle), 1924-

New products management / Merle Crawford, University of Michigan-Emeritus,

Anthony Di Benedetto, Temple University. — Eleventh edition.

pages cm

ISBN 978-0-07-802904-2 (alk. paper)

1. New products—Management. I. Di Benedetto, C. Anthony. II. Title.

HF5415.153.C72 2015

658.5'75—dc23

2013042977

Remembering Dr. C. Merle Crawford (1924–2012)

PROFESSOR, UNIVERSITY OF MICHIGAN

Merle Crawford created this pioneering textbook and was its sole author for the first five editions, published in 1983, 1987, 1991, 1994, and 1997. Beginning with the sixth edition, he invited C. Anthony Di Benedetto to join him as co-author. The frequency of publication of the book's editions increased as the need for skills in new products management became recognized, and the book has become a foundation for this emerging profession, appealing to both managers and students alike. Merle joined the faculty of the University of Michigan as an associate professor of marketing in 1965 after rising to the position of marketing director at Mead Johnson and Company and serving in other roles in that company for a decade. He retired from Michigan in 1992, taking his final year as a sabbatical leave. The combination of work in industry and in academe gave him a unique and valuable perspective that ultimately led him to become the primary force in the creation of the Product Development & Management Association in 1976. Simply put, Merle felt that academic researchers could do their best work when addressing challenges faced by leading managers, and that those leading managers would benefit from dialogue with leading academics. Merle served the PDMA in many capacities, beginning as its charter president for two years (1977 and 1978) while doubling in the role of secretary-treasurer for both years, collecting dues and publishing occasional newsletters. He operated the association from his university office as a volunteer from PDMA's founding until 1984 and also served in many other capacities including VP research (1984 and 1985), VP publications (1989), and as a director in seven years of the eight years that followed (1987–1988 and 1990–1994). During this time Merle was joined by many others, many of whom he enlisted, to help the PDMA develop into the world's leading association of new product development professionals with membership exceeding 1,700 by the end of his final term as a director.

Merle worked to create the first regularly scheduled executive development program in new products management offered by a university in the United States, recruiting colleagues from the PDMA and Michigan and other universities to join the program's charter faculty. The course began as a three-day program, offered quarterly, beginning in 1979. Due to its popularity, it soon transformed into a five-day program that continued for over 20 years. This course, along with subsequent growth of the PDMA, encouraged Merle to write the first edition of this book, published in 1983. The book was used by managers and executives in the course, making that program a living laboratory for extending the ideas he included in its pages. Merle's research documented actual new product failure rates following launch in 1979, helping to demolish the resilient myth that "most new

products fail.” He refined his original concept of the Product Innovation Charter through discussions with program participants and colleagues, and he created concise templates for product concept statements and his original depiction of the product protocol. These emerged as fully defined tools in his textbook and have become foundation skills for today’s professionals. Merle continued to refine them in subsequent editions of this book. Another of his enduring gifts to our profession was his development of a comprehensive glossary of new product terms, first published in the third edition of his book and continuing as the foundation for the glossary now presented in three languages on the PDMA’s website.

The PDMA honored his role as founder and champion of innovation with the creation of the order of Crawford Fellows of Innovation, appointing Merle the first Fellow in 1991. Appointment remains a highly exclusive honor, with four Fellows subsequently appointed to receive this honor.

Merle was skilled in building bridges to connect new products professionals who may have come to the profession from diverse backgrounds. In the first edition of this book’s introduction he wrote, “. . . the new products process is *both an art and a science*. That process demands creativity and emotional commitment, but it also allows and rewards thorough and sophisticated analysis. Both aspects of the new products process are emphasized here.” Those words were powerful and framed a foundation for the growth our profession enjoys today. Perhaps one thing would have disappointed him. He defined *new products* inclusively, including both tangible goods and intangible services. Today, common usage separates these forms with the word *product* restricted to tangible goods, separate from *services*. He might smile, though, at the irony that most of us realize that there are very few tangible products that lack a significant intangible service component (including customer support), and intangible services that lack any sort of tangible element, whether taking the form of a physical location, accessible Web site, or supportive elements of form and technology that help to frame their successful delivery.

Merle passed away on November 11, 2012. He was a friend and champion of innovation. We owe him a great debt.

Thomas P. Hustad
August 7, 2013

About the Authors

Merle Crawford was Professor of Marketing (Emeritus) at the University of Michigan, where he taught from 1965 until his retirement in 1992. Prior to his appointment at Michigan, he was Marketing Director at Mead Johnson & Co. Professor Crawford was an original member of the Product Development & Management Association from its founding in 1976, and he served as the charter president from 1977 to 1978 and on the Board of Directors until 1994. He authored the first edition of the groundbreaking textbook *New Products Management*, published in 1983 and still widely used by managers, executives, and business students.

Anthony Di Benedetto is Professor of Marketing and Supply Chain Management and Senior Washburn Research Fellow at Temple University, Philadelphia, PA, and Professor of High-Tech Entrepreneurial Marketing, TU Eindhoven, The Netherlands. He has held visiting professorships worldwide, lecturing on product development and management. He was named one of the 50 leading research scholars worldwide in Innovation and Technology Management by the International Association of Management of Technology. Professor Di Benedetto served as Editor-in-Chief of the *Journal of Product Innovation Management* for nine years.

Preface

New products have always been of interest to both academics and practitioners, and organized, college-level instruction on the subject of new products management traces to the 1950s. By the 1990s, a new products management discipline had evolved. The Product Development & Management Association (PDMA) has flowered to close to 3,000 members in some 50 countries around the world, and there are over 20 local chapters in the United States alone, plus international affiliates in a dozen countries. Over 300 colleges have courses on the subject of new products, and the field's journal, the *Journal of Product Innovation Management*, has a 30-year track record of publication. The job title of new products manager or director is becoming much more common and is offering much earlier entry than 15 or 20 years ago; we also see the emergence of higher level positions for careers to build to. The PDMA now offers a practitioner certification (New Product Development Professional, or NPDP), recognizes the best product developing firms (with its Outstanding Corporate Innovator award), and has been able to do what those in many fields have not, that is, merge the thinking and activity of professors and practitioners. Information on the PDMA can be found at www.pdma.org.

How This Book Views the Field of New Products Management

Such exploding growth means that we still take a variety of approaches to the teaching of the new products subject—marketing, technical, creative, design, and so on. This book provides the management approach with the perspective of marketing. In every organization (industry, retailing, government, churches, and any other kind of institution) there is a person or group of persons who, knowingly or unknowingly, are charged with getting new goods and services onto the market. More and more today, those people are new products managers, or project managers, or team leaders. They lead a multifunctional group of people, with the perspective of a general manager, operating as a company within a company. They must deal with the total task—strategy, organization, concept generation, evaluation, technical development, marketing, and so on. They are not finished with their work until the new product has achieved the goals assigned to the team—this usually means some form of sales or profit, and certainly means the task is not finished when the new product is put onto the shipping dock.

We try to avoid a functional myopia, and it is rare today to hear that “Marketing tells everyone what to do” or “R&D runs our new products activity.” When a functional specialist is assigned leadership of a new products team, that person must learn the general manager viewpoint, but one usually has to succeed as a functional member of new products teams before getting a shot at being a team leader. Marketing people, working as team members or as team leaders, need the types of information in this book.

Some Basic Beliefs That Guided the Writing

People who have used the first 10 editions of this book know its unique viewpoints on the subject. But for newcomers, and of course all students are newcomers, here are some of them.

1. Product innovation is one single operation in an organization. It has parts (strategy, teams, plans, etc.) but they are all just parts. Any operation that runs as separate pieces misses the strength of the whole.
2. The field is still new enough that it lacks a systematic language. This makes it very difficult for students, who are accustomed to studying subjects where a term means one thing, and only that one thing. We use all product terms consistently throughout the book, and we urge students to use them. Naturally, new terms come and go; some survive and some don't.

Because of the terminology problem in a rapidly growing field, every term that might require definition has been made bold the first time it is used, and the index directs the reader to that section. We don't include a glossary, but a useful one is available at the Product Development & Management Association Web site.

3. Ideas learned without application are only temporary residents in your mind. To become yours, a concept must be applied, in little ways or in big ones. Thus, the book is peppered with applications, short cases, and other opportunities for using the concepts studied. Projects are encouraged in the Instructor's Manual. There are many examples from the business world, and up-to-date references on all important topics.
4. As much as we would like them and have diligently tried to find them, we believe there is no standard set of procedures for product innovators, nor particular sets for makers of consumer packaged goods, or of consumer durables, industrial goods, services, and so on. Like a marketing plan, there is a best plan for any particular situation. A manager must look at a situation and then compile a set of tools and other operations appropriate to that situation. All large firms use scores of different approaches, not one.
5. Next, there is the halo effect, which is a problem in the field of new products. The halo effect shows in the statement, "It must be a good thing for us to do—Apple does it, or GE does it, or Honda does it." Those are excellent companies, but one reason they're good is they spend lots of time and money studying, learning from others. They have huge training programs in product innovation and bring in every expert who appears on the scene with what looks like a good new products management idea. They assume everything they do is wrong and can be improved. You should too. This book does. Citations of their actions are given as examples, not recommendations. These well-known firms have many divisions and hundreds of new products under development at any one time. Managers there can't know what other managers are doing, nor do they care, in the prescriptive sense. Each group aims to optimize its situation, so they look around, see what others in comparable situations are doing (inside and outside their firm), and pick and

choose to fit the situation. To the extent there are generalizations (e.g., there should be some form of strategy), these will stand out as you work your way through the course. But what strategy, and exactly how should one determine it—that is situational.

6. An example of this lies in rejection of the belief that new products strategy should rest on the base of either technology or market. This choice has been argued for many years. But most firms seek to optimize on both, a dual-drive strategy. Of course, true to the previous point, firms will build on one or the other if the situation seems to fit—for example, DuPont’s platform program to find applications for the superstrength fabric Kevlar, or auto components firms that rely on process development engineering to better meet the needs of original equipment manufacturers. And yet, DuPont works to advance that technology, and the components firms are evolving their own research and development operations.
7. We believe that students should be challenged to think about concepts they have been introduced to. This book contains lists of things from time to time, but such lists are just a resource for thinking. The above belief about the best approach being situational is based on the need to analyze, consider, discuss, apply. The great variety in approaches used by businesspeople is not a testimony to ignorance, but to thinking. On a majority of the issues facing us today, intelligent people can come down with different views. Decisions are the same—they are not necessarily right or wrong at the time they are made. Instead, the manager who makes a decision then has to work hard to make that decision turn out right. The quality of the work is more important than the quality of the decision. An example of this phenomenon is the sadness we feel when a manager says, “We’re looking for the really great idea.” Managers of product innovation make ideas great—they don’t come that way.
8. Last, we have tried to implement more clearly the view that two things are being developed—the product and the marketing plan. There are two development processes going on in tandem. Marketing strategy begins at the very start and runs alongside the technical work and beyond it.

Changes in the Eleventh Edition

Past adopters of *New Products Management* will notice major changes in this edition. While there are some changes in virtually every chapter, some of the most substantial changes are as follows:

1. We have made major additions and updates to the cases to provide more plentiful and more current examples. We retired several cases from the previous edition, wrote many new cases, and thoroughly updated many others. New cases for this edition include: corporate strategy at LEGO (Chapter 2), open innovation at Pillsbury (Chapter 4), positioning and competition in the smartphone industry (Chapters 6, 9, and 16), the turnaround at Domino’s Pizza (Chapter 9), product protocol development at Fisher & Paykel (Chapter 12), business product development at DuPont (Chapter 12), corporate

culture at Provo Craft (Chapter 14), and the development of the Ford Fusion (Chapter 14). Substantial upgrades were also made to the following cases: Rubbermaid (Chapter 7), WiLife (A) and (B), now listed as Logitech (Chapters 10 and 12), and Gillette (Chapter 13). We also kept the Palm Pilot case (Chapter 13); though this case describes an older product, it is such a great illustration of how to respond to competitive challenges and customer requirements through excellent design that we leave it in as a good basis of discussion. As always, we aim to offer a mix of high-tech products and consumer products and services in the set of cases.

2. In addition, we have substantially updated examples throughout the text wherever possible. We try to make use of illustrative examples that will resonate with today's students wherever possible. For example, we use the Hapifork (a fork that monitors one's eating speed and provides health benefits) as an example of how to bring a product concept to product form, and how to make trade-offs and decisions at product protocol development. (Also, when trying this case out in class, it seems to stimulate a discussion of whether the claims made by the manufacturer are believable, making it a good illustration of "pre-use sense reaction" in product use testing.) Of course, we welcome the reader's comments and suggestions for improvement.
3. There continues to be much new research in new products, and we have tried to stay current on all of these topics. The newest Comparative Performance Assessment Study (CPAS), published by the PDMA, was released shortly before this revision and provided many new statistics reflecting the state of the art in product development. Readers will also notice new or expanded coverage of serial innovators, spiral development, portfolio management, voice of the customer, open innovation, user toolkits, social media, crowdsourcing, conjoint analysis, design-driven innovation, product forecasting, concept testing, launch planning, postlaunch management, product development for emerging markets, and sustainable design, among other topics.
4. We continue the practice of referencing Web sites of interest throughout the text, from the Product Development & Management Association and the Consumer Product Safety Commission, to Web sites referencing failed products or bad designs, and we have added several new ones. Rather than a collective list of sites, we chose to place each reference in a suitable context in the book.

We have received positive feedback from users of the last edition, so we have not made changes to the basic 20-chapter format. We still use analytical models to integrate the stages of the new products process. As in previous editions, perceptual mapping is introduced early in the new products process, during concept generation, but its output may guide selection of attributes in a conjoint analysis task, and may later be used in benefit segmentation and product positioning. Conjoint analysis results may be used in concept generation or evaluation and may provide a set of desired customer attributes for house-of-quality development. The sequence of three smartphone end-of-chapter cases illustrates how the analytical models bind the new products process together. As in previous editions, many other concepts—Product Innovation Charter, A-T-A-R models, evaluation

techniques, the multifunctional nature of new products management—are also used to integrate topics horizontally throughout the text.

Because this book takes a managerial focus and is updated extensively, it is useful to the practicing new products manager. It has been used in many executive education programs. Great pains have been taken to present the “best practices” of industry and offer footnote references to business literature.

From the first edition, the ends of chapters do not have a list of questions. Rather, we have culled mainly from many conversations with students the questions and comments they received from business managers on their fly-backs. These comments are built into a conversation with the president of a conglomerate corporation. Explanation of how to use them is given at the end of Chapter 1.

As always, effort has been aimed at making the book increasingly relevant to its users. We consider a text revision to be a “new product,” and thus an opportunity for us to become even more customer-oriented. Academic colleagues have made many thoughtful suggestions based on their experiences with previous editions and have provided much of the driving force behind the changes you see in this edition. We gratefully acknowledge all the reviewers who provided extensive comments and suggestions that were extremely helpful in this revision, as well as all the instructors and students who contacted us to make suggestions and correct errors.

We are very excited about the changes to this new edition and sincerely hope they fit your needs.

Online Resources

The instructor will find plenty of online support for this text at the companion Web site, www.mhhe.com/crawford11e. Available on the Web site are an online Instructor’s Manual, a set of PowerPoint slides, a test bank, and exercises and cases that can be used to accompany the text materials. Some of these materials are also available to the students where appropriate.

Dedication

This edition is dedicated to Merle Crawford (1924–2012), Professor Emeritus (University of Michigan), sole author of the first five editions of this textbook, co-founder of the Product Development & Management Association, and influential marketing scholar and consultant in new product development. In the field of product development, the highest award conferred by the PDMA, in recognition of a lifetime of achievements and contributions to the field of product development, is the Crawford Fellow. Merle Crawford was the namesake of this prestigious award, and also its first recipient. The naming of this award in his honor speaks eloquently of the high regard and respect bestowed on Professor Crawford by his colleagues at the PDMA. With this dedication I would also like to personally express my thanks for the opportunity to be his writing partner on this textbook.

A.D.B.

Contents in Brief

PART ONE

Overview and Opportunity Identification/Selection 3

1. The Strategic Elements of Product Development 5
2. The New Products Process 25
3. Opportunity Identification and Selection: Strategic Planning for New Products 60

PART TWO

Concept Generation 95

4. Creativity and the Product Concept 97
5. Finding and Solving Customers' Problems 130
6. Analytical Attribute Approaches: Introduction and Perceptual Mapping 154
7. Analytical Attribute Approaches: Trade-Off Analysis and Qualitative Techniques 171

PART THREE

Concept/Project Evaluation 191

8. The Concept Evaluation System 193
9. Concept Testing 214
10. The Full Screen 243
11. Sales Forecasting and Financial Analysis 262
12. Product Protocol 291

PART FOUR

Development 319

13. Design 323
14. Development Team Management 351
15. Product Use Testing 381

PART FIVE

Launch 403

16. Strategic Launch Planning 406
17. Implementation of the Strategic Plan 441
18. Market Testing 464
19. Launch Management 492
20. Public Policy Issues 515

APPENDIXES

- A** Sources of Ideas Already Generated 543
- B** Other Techniques of Concept Generation 549
- C** The Marketing Plan 559
- D** Guidelines for Evaluating a New Products Program 565

INDEX 569

Contents

PART ONE

OVERVIEW AND OPPORTUNITY IDENTIFICATION/SELECTION 3

Chapter 1

The Strategic Elements of Product Development 5

- Setting 5
- The Importance of New Products 6
- Globalization and New Product Development 9
- How Product Development Is Different 11
- What Is a New Product, and What Leads to Success? 14
- Does This Field of Activity Have a Unique Vocabulary? 16
- Does the Field of New Products Offer Careers? 17
- The Strategic Elements of Product Development 18
- The Basic New Products Process 19
- The Other Strategic Elements 22
- Product Development in Action 23
- Summary 24
- Applications 24

Chapter 2

The New Products Process 25

- Setting 25
- The Procter & Gamble Cosmetics Saga 25
 - The Product Innovation Charter (PIC)* 26
 - The New Products Process* 27
 - The New Product Portfolio* 27
 - Supporting the Strategic Elements: Effective Team Management* 28
 - What Happened in That Saga?* 28

The Phases in the New Products Process 29

- Phase 1: Opportunity Identification and Selection* 30
- Phase 2: Concept Generation* 31
- Phase 3: Concept/Project Evaluation* 31
- Phase 4: Development* 32
- Phase 5: Launch* 33

Evaluation Tasks Throughout the New Products Process 34

Speeding the Product to Market 37

- Risks and Guidelines in Speeding to Market* 40

What about New Services? 43

New-to-the-World Products 46

The Role of the Serial Innovator 48

Spiral Development and the Role of Prototypes 50

Closing Thoughts about the New Products Process 51

Summary 52

Applications 53

Case: Lego 53

Case: Tastykake Sensables 55

Case: The Levacor Heart Pump 57

Chapter 3

Opportunity Identification and Selection: Strategic Planning for New Products 60

Setting 60

A Product Strategy for a “Company within a Company” 61

New Product Strategy Inputs and Identifying Opportunities 61

Product Platform Planning 61

Opportunity Identification 66

Noncorporate Strategic Planning 68

Miscellaneous Sources 70

The Product Innovation Charter 70

Why Have a PIC? 72

The Sections of the PIC	74
<i>Background Section of the PIC</i>	74
<i>The Arena (Area of Focus) Section of the PIC</i>	74
<i>Goals and Objectives Section of the PIC</i>	77
<i>Special Guidelines Section of the PIC</i>	77
How to Prepare a Product Innovation Charter	80
Product Portfolio Analysis: The New Product's Strategic Fit	82
Summary	87
Applications	87
Case: New Product Strategy at Kellogg	88
Case: The Honda Element	90

PART TWO

CONCEPT GENERATION 95

Chapter 4

Creativity and the Product Concept 97

Setting	97
Preparation	97
<i>The Product Innovation Charter</i>	97
<i>Finding the Right People</i>	98
<i>Management's Role in Creativity</i>	99
<i>Activities to Encourage Creativity</i>	101
<i>Special Rewards</i>	103
<i>The Removal of Roadblocks</i>	103
The Product Concept	104
<i>The Designer Decaf Example</i>	107
<i>The Concept Statement</i>	108
Two Basic Approaches	110
Important Sources of Ready-Made New Product Ideas	111
<i>User Toolkits</i>	111
<i>Crowdsourcing</i>	114
<i>Lead Users</i>	115
<i>Open Innovation</i>	118
Summary	123
Applications	123
Case: Pillsbury Grands! Biscuit Sandwiches	124
Case: P&G CarpetFlick	126
Case: Aquafresh White Trays	127

Chapter 5

Finding and Solving Customers' Problems 130

Setting	130
The Overall System of Internal Concept Generation	130
Gathering the Problems	131
<i>Internal Records</i>	132
<i>Direct Inputs from Technical and Marketing Departments</i>	132
<i>Problem Analysis</i>	133
<i>Scenario Analysis</i>	141
Solving the Problems	145
<i>Group Creativity</i>	145
<i>Brainstorming</i>	145
<i>Electronic Brainstorming and Computer-Assisted Creativity Techniques</i>	146
<i>Online Communities</i>	147
<i>Disciplines Panel</i>	149
Concept Generation Techniques in Action	149
Summary	150
Applications	150
Case: Campbell's IQ Meals	151
Case: Earning Organizational Respect	152

Chapter 6

Analytical Attribute Approaches: Introduction and Perceptual Mapping 154

Setting	154
Understanding Why Customers Buy a Product	154
<i>Products Are Groups of Attributes</i>	154
<i>Analyzing Product Attributes for Concept Generation and Evaluation</i>	156
Gap Analysis	156
<i>Determinant Gap Maps</i>	157
<i>Perceptual Gap Maps Based on Attribute Ratings (AR)</i>	158
<i>Perceptual Gap Maps Based on Overall Similarities (OS)</i>	164
<i>Comments on Gap Analysis</i>	167
Summary	168
Applications	168
Case: Comparing Smartphones (A)	169

Chapter 7

Analytical Attribute Approaches: Trade-Off Analysis and Qualitative Techniques 171

Setting 171

Trade-Off Analysis 171

Using Trade-Off Analysis to Generate Concepts 172

A Conjoint Analysis Application 173

Is Conjoint the Right Method? 177

Alternatives to Full-Profile Conjoint Analysis 178

Recent Modifications in Conjoint Analysis 179

Virtual Prototypes in Concept Testing 179

Qualitative Techniques 180

Dimensional Analysis 180

Checklists 182

Relationships Analysis 183

About the Dimensions Used in Relationships

Analysis 183

Two-Dimensional Matrix 183

Morphological or Multidimensional Matrix 184

Analogy 186

Summary 187

Applications 187

Case: Rubbermaid 188

PART THREE

CONCEPT/PROJECT EVALUATION 191

Chapter 8

The Concept Evaluation System 193

Setting 193

What's Going On in the New Products

Process? 193

The Evaluation System for the Basic New Products

Process 194

Product Line Considerations in Concept

Evaluation 197

The Cumulative Expenditures Curve 198

The Risk/Payoff Matrix 199

The Decay Curve 200

Planning the Evaluation System 201

Everything Is Tentative 201

Potholes 202

The People Dimension 203

Surrogates 204

The A-T-A-R Model 205

Where Do We Get the Figures for the A-T-A-R

Model? 209

Further Uses of the A-T-A-R Model 209

Summary 209

Applications 210

Case: Chipotle Mexican Grill 210

Case: Concept Development Corporation 212

Chapter 9

Concept Testing 214

Setting 214

The Importance of Up-Front Evaluations 214

The Product Innovation Charter 215

Market Analysis 216

Initial Reaction 216

Concept Testing and Development 217

What Is a New Product Concept? 219

The Purposes of Concept Testing 219

Considerations in Concept Testing

Research 221

Prepare the Concept Statement 221

Define the Respondent Group 225

Select the Response Situation 226

Prepare the Interviewing Sequence 227

Variations 228

Analyzing Research Results 228

Identifying Benefit Segments 228

Joint Space Maps 230

Preference Regression 232

Conjoint Analysis in Concept Testing 233

Market Research to Support Concept

Testing 235

Conclusions 238

Summary 238

Applications 239

Case: Domino's 240

Case: Comparing Smartphones (B) 242

Chapter 10

The Full Screen 243

Setting 243

Purposes of the Full Screen 244

The Scoring Model	246
<i>Introduction to Scoring Models</i>	246
<i>The Screening Procedure</i>	247
<i>Profile Sheet</i>	252
A Screening Model Based on Project NewProd	253
The Analytic Hierarchy Process	255
Special Aspects	258
Summary	258
Applications	259
Case: Logitech (A)	259

Chapter 11

Sales Forecasting and Financial Analysis 262

Setting	262
Sales Forecasting for New Products	263
Forecasting Sales Using Traditional Methods	264
Forecasting Sales Using Purchase Intentions	266
Forecasting Sales Using the A-T-A-R Model	267
Techniques for Forecasting Product Diffusion	269
Observations on Forecasting Models	271
Problems with Sales Forecasting	272
<i>Summary of the Problems</i>	273
Actions by Managers to Handle These Problems	274
<i>Improve the New Product Process Currently in Use</i>	274
<i>Use the Life Cycle Concept of Financial Analysis</i>	274
<i>Reduce Dependence on Poor Forecasts</i>	275
Return to the PIC	280
Summary	283
Applications	283
Case: Bay City Electronics	284

Chapter 12

Product Protocol 291

Setting	291
The Product Protocol	292

Purposes of the Protocol	294
Protocol's Specific Contents	296
<i>Target Market</i>	298
<i>Positioning</i>	298
<i>Product Attributes</i>	299
<i>Competitive Comparisons and Augmentation Dimensions</i>	301
<i>Other Components of the Product Protocol</i>	301
Protocol and the Voice of the Customer	302
<i>Hearing the Voice of the Customer</i>	302
Protocol and Quality Function Deployment (QFD)	305
<i>QFD and the House of Quality</i>	305
<i>Outcomes of QFD</i>	309
Some Warnings about the Difficulty of the Protocol Process	311
Summary	312
Applications	312
Case: Fisher & Paykel	313
Case: DuPont	315
Case: Logitech (B)	317

PART FOUR

DEVELOPMENT 319

Chapter 13

Design 323

Setting	323
What Is Design?	324
Design-Driven Innovation	324
The Role of Design in the New Products Process	325
<i>Contributions of Design to New Product Goals</i>	325
Product Architecture	331
<i>A Process for Product Architecture</i>	331
<i>Product Architecture and Product Platforms</i>	333
Industrial Design and the Industrial Designer	333
Prototype Development	334
Managing the Interfaces in the Design Process	336
Improving the Interfaces in the Design Process	339
Computer-Aided Design and Design for Manufacturability	340

Continuous Improvement in Design 342
Summary 343
Applications 343
Case: The Mini 344
Case: Palm Pilot 345
Case: Gillette Mach3 and Fusion 348

Chapter 14
Development Team Management 351

Setting 351
What Is a Team? 351
Structuring the Team 352
 Another Look at Projectization 355
Building a Team 356
 Establishing a Culture of Collaboration 356
 The Team Assignment and Ownership 357
 Selecting the Leader 358
 Selecting the Team Members 359
 Roles and Participants 360
 Network Building 363
 Training the Teams 363
Managing the Team 364
 Cross-Functional Interface Management 364
 Overcoming Barriers to Market Orientation 367
 Ongoing Management of the Team 368
 Team Compensation and Motivation 368
 Closing the Team Down 370
Virtual Teams 370
Managing Globally Dispersed Teams 372
Summary 376
Applications 376
Case: Provo Craft 377
Case: Ford Fusion 378

Chapter 15
Product Use Testing 381

Setting 381
The Role of Marketing During
 Development 382
 Marketing Is Involved from the Beginning of the
 Process 382
 Marketing Ramp-Up, or the “I Think We’ve Got It”
 Phase 383
Why Do Product Use Testing? 384

Is Product Use Testing Really Necessary? 384
 Are These Arguments Correct? 385
Knowledge Gained from Product Use
Testing 387
 Pre-Use Sense Reactions 387
 Early Use Experiences 388
 Alpha and Beta Tests 388
 Gamma Testing 390
 Diagnostic Information 391
Decisions in Product Use Testing 391
 Who Should Be in the User Group? 391
 How Should We Reach the User Group? 392
 Should We Disclose Our Identity? 393
 How Much Explanation Should We Provide? 393
 How Much Control over Product Use Should
 There Be? 393
 How Should the Test Be Conducted? 394
 Over What Time Period Should the Test
 Be Conducted? 395
 What Should Be the Source of the Product Being
 Tested? 396
 What Should Be the Form of the Product
 Being Tested? 396
 How Should We Record Respondents’
 Reactions? 397
 How Should We Interpret the Figures We Get? 398
 Who Should Do the Product Use Test? 398
Special Problems 399
 Don’t Change the Data Just Because They Came
 Out Wrong 399
 Be Alert to Strange Conditions 399
 What If We Have to Go Ahead without Good
 Use Testing? 399
Summary 399
Applications 400
Case: Product Use Testing for New
 Consumer Nondurables 401

PART FIVE
LAUNCH 403

Chapter 16
Strategic Launch Planning 406

Setting 406

The Strategic Givens	407
Revisiting the Strategic Goals	408
Strategic Platform Decisions	409
<i>Type of Demand Sought</i>	409
<i>Permanence</i>	410
<i>Aggressiveness</i>	411
<i>Competitive Advantage</i>	411
<i>Product Line Replacement</i>	411
<i>Competitive Relationship</i>	413
<i>Scope of Market Entry</i>	413
<i>Image</i>	413
The Target Market Decision	413
<i>Alternative Ways to Segment a Market</i>	414
<i>Targeting May Also Use Diffusion of Innovation</i>	418
Product Positioning	420
Creating Unique Value for the Chosen Target	422
Branding and Brand Management	424
<i>Trademarks and Registration</i>	424
<i>What Is a Good Brand Name?</i>	426
<i>Managing Brand Equity</i>	428
<i>Brand Equity and Branding Strategies</i>	432
<i>Global Branding and Positioning: Standardize or Adapt?</i>	433
<i>Global Brand Leadership</i>	434
Packaging	435
<i>The Role of Packaging</i>	435
<i>The Packaging Decision</i>	435
Summary	436
Applications	437
Case: Wii	437
Case: Iridium	439
Case: Comparing Smartphones (C)	440

Chapter 17

Implementation of the Strategic Plan 441

Setting	441
The Launch Cycle	441
<i>Prelaunch and Preannouncement</i>	441
<i>Announcement, Beachhead, and Early Growth</i>	444
Lean Launch and Launch Timing	445

Launch Tactics	447
<i>The Communications Plan</i>	447
<i>The Copy Strategy Statement</i>	449
<i>Personal Selling</i>	449
Alliances	450
A-T-A-R Requirements	451
<i>Awareness</i>	451
<i>Stocking and Availability</i>	452
<i>Trial</i>	454
<i>Repeat Purchase</i>	457
Summary	458
Applications	458
CASE: Hulu	459
Case: Dodge Nitro	461

Chapter Eighteen

Market Testing 464

Setting	464
The Market Testing Decision	464
<i>When Is the Decision Made?</i>	465
<i>Is This an Easy Decision to Make?</i>	465
<i>Market Tests Must Have Teeth</i>	466
<i>The Factors for Deciding Whether to Market Test</i>	468
Methods of Market Testing	470
<i>Pseudo Sale</i>	470
<i>Controlled Sale</i>	470
<i>Full Sale</i>	471
Pseudo Sale Methods	471
<i>Speculative Sale</i>	472
<i>Simulated Test Market</i>	473
Controlled Sale Methods	476
<i>Informal Selling</i>	476
<i>Direct Marketing</i>	477
<i>Minimarkets</i>	477
<i>Scanner Market Testing</i>	479
Full Sale Methods	480
<i>Test Marketing</i>	480
<i>The Rollout</i>	484
Wrap-Up on Market Testing Methodologies	488
Summary	488
Applications	489
Case: PepsiCo—Pepsi-Kona and Pepsi One	489

CHAPTER 19

Launch Management 492

- Setting 492
- What We Mean by Launch Management 492
- The Launch Management System 493
 - Step One: Spot Potential Problems* 494
 - Step Two: Select the Control Events* 498
 - Step Three: Develop Contingency Plans* 499
 - Step Four: Design the Tracking System* 500
- Effective Innovation Metrics 504
- A Sample Launch Management Plan 506
- Launch Management and Knowledge Creation 506
- Product Failure 509
- Summary 511
- Applications 512
- Case: Levitra 512

CHAPTER 20

Public Policy Issues 515

- Setting 515
- Bigger Picture: A Cycle of Concerns 515
 - Phase I: Stirring* 516
 - Phase II: Trial Support* 517
 - Phase III: The Political Arena* 517
 - Phase IV: Regulatory Adjustment* 518
- Business Attitudes toward Product Issues 518
- Current Problem Areas 518
- Product Liability 519
 - Typology of Injury Sources* 519
 - The Four Legal Bases for Product Liability* 521
 - Other Legislation* 523
- Planning for the Product Recall 524
 - Prior to the Recall* 524
 - During the Recall* 524
 - After the Recall* 524

- Attempts at Standardization and Clarification 525
- Environmental Needs 525
- Product Piracy 528
- Worthy Products 529
- Morality 530
- Designing Products for Emerging Markets 530
- Personal Ethics 532
- The Underlying Residual Issues 533
- What Are New Products Managers Doing about All This? 534
 - Strategy and Policy* 534
 - Control Systems* 534
 - Product Testing* 534
 - Marketing and Market Testing* 534
 - Customer Education and External Affairs* 535
- Summary 535
- Applications 536
- Case: Clorox Green Works 536
- Case: Hybrid or Hydrogen Vehicles at General Motors? 539
- Case: Product (RED) 541

Appendix A Sources of Ideas Already Generated 543

Appendix B Other Techniques of Concept Generation 549

Appendix C The Marketing Plan 559

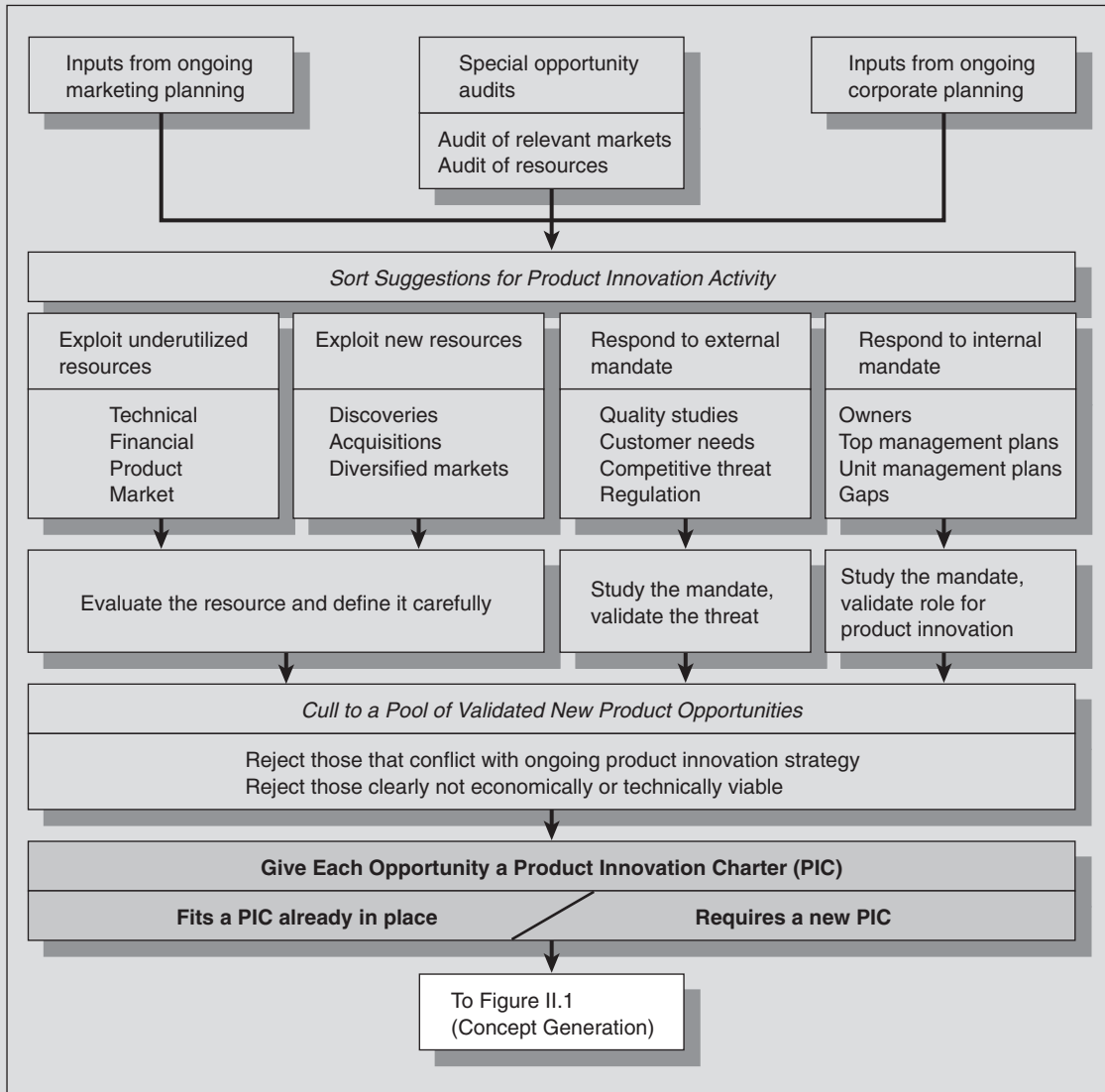
Appendix D Guidelines for Evaluating a New Products Program 565

Index 569

New Products Management

FIGURE I.1

Opportunity Identification and Selection



Overview and Opportunity Identification/Selection

This book is divided into parts. They are (1) Overview and Opportunity Identification and Selection, (2) Concept Generation, (3) Concept/Project Evaluation, (4) Development, and (5) Launch. They follow the general flow of the new products process, which we will present in Chapter 1, Figure 1.5. We will see later, however, that the phases are not sequential, compartmentalized steps. They are quite fluid and overlap each other.

At the beginning of each part is a short Part Introduction (noted with a Roman numeral) and a figure (see Figure I.1). The introduction describes briefly what aspects of the new products process will be covered in the upcoming chapters. The figure provides detailed information about what goes on at that phase in the new products process, and shows what phases come immediately before and after. Figure I.1, for example, details the opportunity identification and selection process, ending with the product innovation charter, a key topic of Chapter 3. Hence, the five part figures (Figures I.1, II.1, III.1, IV.1, and V.1) actually make up one long, detailed new products process, the essence of which is presented briefly in Figure 1.5.

Before getting to opportunity identification and selection, we begin Part I with two introductory chapters. The first introduces the three *strategic elements of product development*: the new products process, the product innovation charter, and the product portfolio. It presents the first of these, the new products process, in relatively simplified form, as a kind of introduction to the rest of the book. Chapter 1 also attempts to answer the questions most often asked about such a course and helps to define some of the concepts we will be returning to throughout the text (such as, what exactly is a new product, how many new products really do succeed, and how do firms achieve globalization in product development). Chapter 2 goes much deeper into the new products process. Chapter 2 also introduces the key concepts of radical innovation, new service development, and speed to market, and how each of these may have an impact on the new products process as presented in the chapter.

Chapter 3 completes the introductory part of the book, as it presents the second and third strategic elements. First, opportunity identification and selection are presented, which deal with the strategic planning lying at the very base of new products work that guides a new products team, just as corporate or SBU strategy guides the unit as a whole. Figure I.1 provides a flow model that describes the process of opportunity identification. Chapter 3 then discusses the product innovation charter (PIC). This can be thought of as a statement of strategy that will guide the new product development team: the arena in which they will operate, their goals and objectives, and other considerations. The last part of Chapter 3 discusses the product portfolio. Innovative ideas that can be converted into high-potential new product opportunities can come from many sources; but however the new product idea is arrived at, its fit with the firm's product innovation strategies needs to be assessed. This is a portfolio issue: When assessing any potential new product, the firm needs to consider its technical viability (can we make it?) and its market viability (will customers buy it?). Most firms will have many other criteria, both financial and strategic, that they consider at this important step.

As seen in Figure I.1, once the PIC has been determined, the next step is to generate product concepts. This will be taken up in Part II of this book.

The Strategic Elements of Product Development

Setting

Mention new products and people think about technology—iPods, iPhones, YouTube, virtual realities, fiber optics, and the like. But most new products are far simpler—low-carb colas, new movies, new singing stars, fast foods, and new flavors of frozen yogurt. New products run the gamut from the cutting edge of technology to the latest version of the ballpoint pen. New products can be tangible goods or services. New products can be destined for the consumer market, the business-to-business market, or both.

You have chosen to study how new products are developed and managed, so it would be nice to say they come from an orderly process, managed by experienced persons well versed in product innovation. Some do, but some don't. Years ago, Art Fry became famous for an idea that became Post-it notes, when his hymnal page-marking slips kept falling out. He had a rough time persuading others at 3M that the idea was worth marketing, even though it soon became the second largest volume supply item in the office supply industry! Or consider James Dyson, an industrial designer by training who was dissatisfied with the performance of commercially available vacuum cleaners and set out to create a better one. After five years and about 5,000 prototypes, he created the Dual Cyclone bagless vacuum cleaner. Over the next eight years, he was unable to interest vacuum cleaner manufacturers or venture capitalists in the new product, frequently hearing that since he was a designer, he couldn't possibly know anything about manufacturing or marketing! In 1985 and on the verge of bankruptcy, Dyson found an interested Japanese investor, and by 1993 he had set up Dyson Appliances in the United Kingdom (his home country). Since that time, Dyson Appliances has sold over \$2 billion worth of vacuums worldwide.¹

So you may be confused by the uncertainty you meet in this book. If so, welcome to the land of creative exploration. The activity we study in this book is sometimes called **product innovation management**; some call it **product planning**, and some (from a very biased perspective) call it *research & development* (R&D) or

¹Anonymous, "Dyson Fills a Vacuum," @ Issue, 8(1), 2003.

marketing. In this book, we use the most descriptive term we have—**new products management**—and we adopt the viewpoint of the marketing manager; that is, we are primarily concerned about the specific role for marketing in the overall task.

The Importance of New Products

New products are *big business*. Over a hundred billion dollars are spent yearly on the technical development phase alone. Untold thousands of new products are marketed every year, perhaps millions if we call each new Web site a new product. Hundreds of thousands of people make their living producing and marketing new products. Many managers realize that *radical innovation* is critical to future growth and even the survival of the firm. Here, we are defining radical innovation as innovation that displaces or makes obsolete current products and/or creates totally new product categories.² The Industrial Research Institute identified “accelerating innovation” and “business growth through innovation” as the top challenges faced by technology leaders, and well-known business writer Gary Hamel has described the creation of radical innovation as “the most important business issue of our time.”³

The reason firms invest this much in new products is that they *hold the answer to most firms’ biggest problems*. Competitors do the most damage when (1) there is so little product differentiation that price-cutting takes everyone’s margins away or (2) when they have a desirable new item that we don’t. The fact is: *A successful new product does more good for a firm than anything else*. The very reason for a firm’s existence is the value its operations provide to others, and for which they pay. And in a competitive world this means that what we offer—be it a physical good or a service—must be better than what someone else offers, at least part of the time. This is true in all organizations, including hospitals, churches, colleges, and even political parties. Look at the winners in those arenas and ask yourself which ones are popular and growing.

Another reason for studying about new products is that *the new products process is exceedingly difficult*. Hundreds of individuals are involved in the creation of a single product, but all are from separate departments (sales, engineering, manufacturing, and so on) where they may have their own agendas. When a product flops miserably, it often generates huge publicity, much to the chagrin of the producers: think of New Coke, Premier smokeless cigarettes, the movies *Gigli* and *Catwoman*, or countless others. Perhaps, as a result, we think failure rates are higher than they really are. New products do fail, of course, but at around a 40 percent rate, not

²M. Rice, R. Liefer, and G. O’Connor, “Assessing Transition Readiness for Radical Innovations,” *Research-Technology Management*, 45(6), 2002, pp. 50–56; and Gina O’Connor, Joanne Hyland, and Mark P. Rice, “Bringing Radical and Other Innovations Successfully to Market: Bridging the Transition from R&D to Operations,” in *The PDMA Toolbook 2 for New Product Development*, ed. P. Belliveau, A. Griffin, and S. M. Somermeyer (Hoboken, NJ: Wiley, 2004), pp. 33–70.

³Industrial Research Institute 2001/2002 Annual Reports, Washington, DC, Industrial Research Institute; and Gary Hamel, “Innovation Now! (It’s the Only Way to Win Today),” *Fast Company*, December 2002, pp. 114–124.

the 90 percent rate you often hear, and this percentage holds for both goods and services. The best product-developing firms can improve their odds further: They require only about four ideas to generate one winning product, as compared to over nine ideas for other firms. This is probably because the best firms are better at screening out bad ideas earlier.⁴ And after many years of research, we know many of the most important reasons why products fail. The firm doesn't understand the customer, or underfunds the required research and development, or doesn't do the required homework before beginning development (sometimes called the *ready—fire—aim approach*), or doesn't pay enough attention to quality, or lacks senior management support, or chases a moving target (we will see moving-target issues such as unstable specifications and scope creep in Chapter 3).⁵

The goal at most firms is not necessarily to reduce failure rates to zero. Having too low a failure rate might mean that the firm is playing it too safe with close-to-home innovations, while missing out on the (risky) breakthroughs. The definition of "too low" probably depends on the industry and on how inherently risky product development is. The goal here is to minimize the dollar losses on the failures (don't bankrupt the company!) and to learn from them. Regardless of the actual failure rate you encounter, the amount at stake and the risk of failure are high in new product development.

Success rates have remained remarkably consistent over the years. The Comparative Performance Assessment Study (CPAS) is periodically conducted by the Product Development & Management Association (PDMA), most recently in 2012.⁶ In these studies, for every 100 ideas, a little under 70 make it through the initial screen; fewer than 50 pass concept evaluation and testing and are moved to the development phase; a little more than 30 make it through development; about 30 make it through testing; about 25 of them are commercialized; and about 15 are considered to be successes (about 60 percent of those that were commercialized). Interestingly, the percent success rate does not vary too much from one category to the next. The percent success rate ranges from 51 percent (frequently purchased consumer goods) to 65 percent (health care). If one splits the CPAS sample into two groups, the "Best" (the top-performing 25 percent of firms) and the "Rest," a slightly different pattern emerges: In 2012, the Best firms attained a success rate of

⁴Marjorie Adams, *Competitive Performance Assessment (CPAS) Study Results*, PDMA Foundation, 2004; and Stephen K. Markham and Hyunjung Lee, "Product Development and Management Association's 2012 Comparative Performance Assessment Study," *Journal of Product Innovation Management*, 30(3), 2013, pp. 408–429. Success rate has held steady at around 60 percent of products marketed since the 1995 CPAS study; the 2012 study suggests the success rates are slightly lower in Europe and Asia.

⁵Robert Cooper, *Winning at New Products: Accelerating the Process from Idea to Launch*, 3rd ed. (New York: Perseus Books, 2001).

⁶2003 CPAS results are found in Doug Boike and Marjorie Adams, "PDMA Foundation CPAS Study Reveals New Trends—While the 'Best-Rest' Gap in NPD Widens," *Visions*, 28(3), July 2004, pp. 26–29; and Gloria Barczak, Abbie Griffin, and Kenneth B. Kahn, "Perspective: Trends and Drivers of Success in NPD Practices: Results of the 2003 PDMA Best Practices Study," *Journal of Product Innovation Management*, 26(1), January 2009, pp. 3–23. The 2012 results are summarized in Markham and Lee (2012), *op. cit.*

FIGURE 1.1
The Best
Firms Achieve
Superior NPD
Results

	The Best (top 25% of firms)	The Rest (bottom 75% of firms)
Percent Successes	82.2	52.9
Percent of Sales from New Products	47.9	25.4
Percent of Profits from New Products	48.5	25.0
Number of Ideas Per Successful New Product	4.5	11.4

Source: Adapted from Stephen K. Markham and Hyunjung Lee, "Product Development and Management Association's 2012 Comparative Performance Assessment Study," *Journal of Product Innovation Management*, 30(3), 2013, pp. 408–429.

over 80 percent, while the Rest's success rate was much lower at about 50 percent. The Best, therefore, have greater success with new product development!⁷

Figure 1.1 shows that the Best firms not only have a higher percentage rate of successes, but also derive almost twice as many sales and profits from new products (defined as five years old or younger) than do the Rest. Best firms are also more efficient in developing successful products: they require about 4.5 ideas to generate one success, while the Rest require almost three times as many ideas per success. In addition, the development cost per successful project for Best firms is roughly half the cost per successful project for the Rest.⁸

The 2012 CPAS study also reveals that the Best companies at product development manage their new products process differently than do the Rest. In sum, the Best companies are better at implementing many of the new products process concepts and principles that we discuss in upcoming chapters of this book. Relative to the Rest, the Best:

- Are more likely to use market research tools like creativity sessions (which we explore in Chapter 5), trade-off analyses (Chapter 7), concept tests (Chapter 9), voice of the customer (Chapter 12), alpha and beta testing (Chapter 15), and test markets (Chapter 18).
- Are more likely to have global market and operations strategies (Chapters 3 and 14).
- Rely more on portfolio analysis for product selection (Chapter 3).
- Tend to use social media and online communities more for information gathering (Chapter 5).
- Employ formal processes for selecting which concepts to develop (Chapter 10).
- Are more effective in using team support tools and team incentives (Chapter 14).⁹

⁷The "Best" are defined in the CPAS study as those firms that are in the top 25 percent in their industry and above the mean in both program success and sales and profit success from new product development.

⁸Stephen K. Markham and Hyunjung Lee, op. cit.

⁹Stephen K. Markham and Hyunjung Lee, op. cit.

In sum, the concepts of new products management as presented throughout this book are used extensively, and well, by the top innovating companies, who achieve superior results from their new products!

Globalization and New Product Development

Like all aspects of modern business, product development has become more challenging due to increased **globalization**. To a greater extent than ever before, firms are seeing new product development as a global process in order to take advantage of worldwide opportunities and increase their efficiency and effectiveness of innovation. According to a 2007 study by consultants Booz & Company, the top global firms in terms of R&D spending deployed about 55 percent of their R&D spending in foreign countries. Among the 80 top U.S. R&D firms, \$80.1 billion out of \$146 billion was spent overseas, and similar percentages were found for top European and Japanese R&D firms.¹⁰ The Booz & Company study also showed that the firms with higher percentages of R&D spending deployed elsewhere did better than average on many important performance measures, such as return on investment and total shareholder return.

This study found that firms have multiple reasons for increasing their global R&D efforts. In many foreign countries, R&D engineers are lower paid than in the United States, Western Europe, or Japan—but the salary gap is narrowing, especially for the most skilled engineers and scientists. Now, many firms look overseas not just to access a cheaper labor force, but to access the talent residing in these markets and the ideas generated by these skilled personnel. Huge markets such as India and China are obvious sources of talented engineers, and there is some evidence of specialization: India boasts strengths in automotive engineering, China in electronics.

Another reason for increased global R&D is the increasing globalization of the innovating firms themselves. For example, as automakers seek to penetrate new markets such as China or India, it makes sense to conduct more of their design work in or near these markets than back in the home office located in Michigan or Bavaria. In addition, firms are under increased pressure to reduce product development times, or may be competing in increasingly turbulent market environments. These factors lead firms to leverage all the global resources they have at their disposal for product development.¹¹

Many multinational firms seek to leverage their product development skills across their subsidiaries and gain competitive advantage by setting up *global new*

¹⁰For a summary of the Booz & Company findings, see Barry Jaruzelski and Kevin Dehoff, “Beyond Borders: The Global Innovation 1000’ Study Reveals a Global Shift in R&D Spending,” *Visions*, 33(3), October 2009, pp. 27–30.

¹¹Elko J. Kleinschmidt, Ulrike de Brentani, and Sören Salomo, “Performance of Global New Product Development Programs: A Resource-Based View,” *Journal of Product Innovation Management*, 24(5), September 2007, pp. 419–441; see summary in K. Sivakumar, “Global Product Development,” in Jagdish N. Sheth and Naresh K. Malhotra, *Wiley International Encyclopedia of Marketing*, Volume 5, Product Innovation and Management (West Sussex, UK: John Wiley, 2011), pp. 68–74.