

当代设计管理丛书

创造突破性产品

——从产品策略到项目定案的创新
(英文版)



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内 容 提 要

许多新产品的开发往往不能成功,在少数成功范例之中,又只有更少数产品能够重新定义其原本的、甚至创造全新的市场,并且最终发展成为突破性产品。本书作者总结多年的研究结果,指明了与产品创新相关的一系列因素,并提供了一套全新的开发突破性产品的理论与方法。本书旨在帮助企业、技术和设计人员:

- ◆ 获得对用户的需求和市场新的趋势的准确洞察力;
- ◆ 认识可以创造新市场的产品机会缺口;
- ◆ 指导产品“模糊前期”的构造;
- ◆ 正确地运用定性和定量的研究方法;
- ◆ 确立产品开发与企业整体策划和品牌管理之间的关系;
- ◆ 建立灵活、高效的团队。

本书是一本关于企业设计管理的专著,适合企业产品的开发者和管理者参考,也适合作为高等院校相应的设计管理专业的教材。

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CREATING BREAKTHROUGH PRODUCTS

INNOVATION FROM PRODUCT PLANNING TO PROGRAM APPROVAL

(美) 乔纳森·恰安(Jonathan Cagan) 著
克雷格 M. 沃格尔(Craig M. Vogel)



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by Jonathan Cagan, Craig M. Vogel

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为了做好教材的引进工作，机械工业出版社特别成立了由著名专家组成的国外高校优秀教材审定委员会。这些专家对实施双语教学做了深入细致的调查研究，对引进原版教材提出了许多建设性意见，并慎重地对每一本将要引进的原版教材一审再审，精选再精选，确认教材本身的质量水平，以及权威性和先进性，以期所引进的原版教材能适应我国学生的外语水平和学习特点。在引进工作中，审定委员会还结合我国高校教学课程体系的设置和要求，对原版教材的教学思想和方法的先进性、科学性严格把关，同时尽量考虑原版教材的系统性和经济性。

这套教材出版后，我们将根据各高校的双语教学计划，举办原版教材的教师培训，及时地将其推荐给各高校选用。希望高校师生在使用教材后及时反馈意见和建议，使我们更好地为教学改革服务。

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序

本书是由美国卡耐基·梅隆大学 (Carnegie Mellon University) 工程学院 Jonathan Cagan 教授和设计学院 Craig M. Vogel 教授所撰写。书中提出了一个突破性产品开发的创新过程和工业设计教育的崭新理念,在美国和全世界的工业设计界引起了巨大的反响,被美国许多高等院校采用作为工业设计专业本科生或研究生的教材,同时也受到了公司和企业经理及广大工业设计师的欢迎。

工业设计在我国还是一个新兴的应用型领域。特别从我国加入 WTO 以后,人们越来越认识到工业设计对发展中国特色的市场经济、增强国内企业和产品在国际市场上的竞争力、促进人类社会可持续发展都有着特别重要的意义。

2004年,国家发展改革委员会为了鼓励和促进工业设计的发展,制定了《工业设计产业发展政策(讨论稿)》,对工业设计的发展提出了明确的目标,强调通过政策引导、资金支持,大力推动工业设计理念与方法渗透于国民经济各行业,通过推广、普及工业设计,促进各产业领域的设计创新和经济增值。

本书开拓了新的“一体化新产品设计”(integrated New Product Development—iNPD)的过程,为工业产品的创新设计提供了一条有效的新途径。从设计的社会、经济、技术(SET—Social, Economic, Technologic)动因分析来寻找和理解“产品机会缺口”(Product Opportunity Gap—POG),进而将这个机会转化为产品策划的设计“模糊前期”阶段。对产品价值的分析上,两位教授又提出了“价值机会”(Value Opportunities,VOs)的概念,并将它具体分为七类价值属性,即情感、美学、认同性、人机工程、影响力、核心技术和质量,为开发以人为本的“有用、好用、想用”的突破性产品提供准则。

本书的另一个贡献是 Jonathan Cagan 教授和 Craig M. Vogel 教授提出了一个工业设计教育的最新理念,即工业设计教育必须与工程教育和商业(管理)教育相结合。他们提出的最新教育模式是由设计学院、工程学院和管理学院的教授和学生共同组成设计课题组,以大公司实际项目为主线,教授学生跨学科领域的知识融合及不同专业之间的相互理解和配合。这样,彻底克服了工程师只追求技术和功能、而设计师只注重外观和装饰的矛盾,使学生从一开始便认识到一个创新性产品的开发一定是多方面合作的结果,技术与形式的完美结合才能设计出位于“定位图”中“右上角”的优秀产品,从而培养了学生的设计领导力和团队精神。

本书包括作者的大量设计实践和案例，为我们的设计教育提供了有用的参考素材。

这本书是设计教育理念上的创新，它强调工业设计是跨专业的交叉学科，因此在设计教育中必须与其他相关学科有机地融合为一体，必须与实践相结合，因而从根本上突破了目前大多数国内院校从艺术教育出发、过多注重绘画能力的培养模式。虽然我国的工业设计教育规模很大(已有300多所大学设置了工业设计专业)，但许多高等院校是艺术类教育，学生不掌握工程的基本知识，不懂得产品的生产和材料，更不着重于创新思维的培养。只有彻底改变我国目前设计教育的理念，走多学科综合的培养道路，才能造就出真正合格的现代设计师。

2002年5月“第一届中美工业设计教育研讨会”在北京航空航天大学召开之际，Craig M. Vogel教授将本书第一次介绍到中国，受到中国工业设计界学者的热烈欢迎。随后在沈阳举行的工业设计国际会议上，此书的英文原版令中国学者争相传阅。

为了更好地适应国内工业设计界的需要，Craig M. Vogel教授的学生辛向阳博士等将此书翻译成中文，并由机械工业出版社于2004年初在中国首次出版。随即在国内工业设计界和工业企业中引起了强烈的反响，高等院校纷纷以此书做为教材或参考书，来进行本科专业教育或研究生教学，或开展新型工业设计教育模式的研究；更有许多设计师、企业经理、公司各级管理者购买了此书，并开始将工业设计列为企业发展的重要因素之一。

北京航空航天大学工业设计系师生作为国内最早接触和学习此书的读者，除坚持“以工为背景”和“面向国际合作”这两条办专业的基本原则外，还多次邀请Craig M. Vogel教授和辛向阳博士来校讲学，不仅工业设计专业的师生、更有机械工程学院和管理学院的领导、教师和学生来聆听Craig M. Vogel教授的讲座，并积极开展多专业、多学院合作进行设计课程的教学改革实践，获得了很大的收益和体会。

为了使国内读者更准确地理解原书作者的思想，机械工业出版社又将此书影印出版，这必将为我国工业设计界的发展、提升中国工业产品的国际竞争力提供宝贵的资源。

热忱希望此影印版的出版能带给我国各方面读者更大的收益，特别希望能有助于工业设计教育走上一个崭新阶段，而为促进我国市场经济的繁荣发展起到更大作用。

北京航空航天大学

黄毓瑜教授

Foreword

Bruce Nussbaum, Editorial Page Editor
and Design Editor, *BusinessWeek*

Design has come to play a critical role in our economic lives. For many decades Corporate America neglected design, treating style as superficial, fashion as transitory. Design was felt to be last-minute gloss to be applied after the real product development was done. No longer. Design is fast becoming a key corporate asset, essential to establishing and extending brands, transforming new technologies into usable products, and bridging company identities and customer loyalties. CEOs and managers are scrambling to learn how to use it to maximize their sales and profits. Most believe that design is a business tool, a way of gaining advantage in the marketplace for products and services. That's true but a few chief executives understand that design is much more — it's a strategy, a business behavior, a way to bring together the very best a corporation has to offer and focus it directly on the consumer. Design increases the odds of winning in the global marketplace.

For the past decade, I have been fortunate in having *BusinessWeek* embrace this point of view. Its coverage is distinct from other "design" magazines in that it focuses on design as a powerful core competency for Corporate America. The dozens and dozens of articles that I've written as the design editor of *BusinessWeek* are all basically stories about how companies use design as part of their overall business strategies or how design firms develop products that bust open new markets or extend brands. I've tried to demystify the process of design by describing how some of the best product designers actually work. Jonathan Cagan and Craig M. Vogel have the same goals in their book, *Creating Breakthrough Products*. They show readers how to peel back the mystery of design to

reveal how it actually works. They describe how companies can harness design to buttress their bottom line. And they provide simple methods for achieving the best design.

This is especially important in a period of fast technological change such as the one we are in now. When new technologies throw up a multitude of options and possibilities, design can filter them, fitting them appropriately to what people actually want and need. Really good design operations integrate the engineering of functions and features as well as the marketing goals of brand identity and brand extension. Teaming product industrial designers with engineers and marketing people is often the key to quick success.

When companies rely on the new technologies themselves to attract consumers, they often stumble. They make the mistake of thinking that more functions translate into better products, when often the very opposite is true. We all remember the first personal digital assistant, the Apple Newton, which had the ability to do all kinds of things, none of them, it turned out, all that well. People wanted simplicity in their PDAs and had to wait years for Palm to offer it to them.

Indeed, there is no better example of the bottom-line power of design than the creation of the breakthrough Palm. Three programmers developed handwriting software that organized data. They were smart enough to learn from the Newton fiasco and kept their product very simple — datebook, address book, memo pad, and to-do list, plus a very simple hot-synch with the PC. They then brought in a savvy West Coast design firm, Palo Alto Design Group, which designed an amazingly easy-to-use form. But Palo Alto Design Group went even further. It arranged for the tooling and manufacturing to take place in Asia. The whole development cycle took less than a year. From the writing of the software to the actual Palm being sold in electronics stores took a mere 12 months. That's the power of design. So powerful, in fact, that Palo Alto Design Group was recently bought by Flextronics, one of the largest manufacturers in the world.

And that is precisely the message from *Creating Breakthrough Products: Innovation from Product Planning to Program Approval*. Jonathan Cagan and Craig M. Vogel at Carnegie Mellon University show the way to designing such breakthrough products and services as the OXO GoodGrips, the Motorola Talkabout, the Crown Wave, and the Starbucks coffee experience. In fact, there are a whole slew of case studies in the book, including the Black & Decker SnakeLight, the Herman Miller Aeron Chair, and the Apple iMac. These are products we love, products we lust after.

But Cagan and Vogel go beyond just presenting detailed examinations of the best products. They offer up a best practices approach to design, a systematic approach to creating innovative, brand-enhancing products. It is a guidebook that corporations, large and small, can follow. It's a methodology that everyone involved in product development can use, be they engineers, marketers, manufacturing people, sales people, or industrial

designers. And it's step by step, focusing on user-driven, not just technology-driven, development, integrating and balancing teams and disciplines, shaping the process and raising the odds of success in the marketplace. And their advice is right on: "If a product does not connect with the values of a customer, it will fail." It's not just the utility of a product that's important. It's the emotional component — the experience people have with it and the values they want expressed by it — that's key.

To guide the way, Cagan and Vogel have developed a number of valuable models and useful methodologies. They are very helpful. Take the SET Factors. To really understand consumer trends and catch the moment when opportunities present themselves, product developers need a systematic approach. Hence SET — Social trends, Economic forces, and Technological advances. Follow them and companies can get to the edge of the new in society. And once they understand the SET Factors of their marketplace, they can picture the Product Opportunity Gap (POG) that makes itself available. With the OXO potato peeler, determining the SET Factors involved a growing number of aging Boomers with arthritic hands, an unwillingness to be stigmatized, a willingness to spend more on kitchen utensils than their parents, and an openness to new materials and shapes. Enter Sam Farber and Smart Design and you have the building of one of the most successful new brands in recent history. Ergonomically sound tools for the kitchen were extended to the garden, the car, and on and on. Brilliant. The book shows how they did it, why they did it, and how others can follow.

There is tremendous detail in *Creating Breakthrough Products* for the product development specialists. On one level, the entire book is aimed at them. It provides a path down which companies can enter to increase their chances of success in launching new products. But anyone interested in the design of everyday things in our lives would appreciate this book. It shows how good design can be made and why there is no longer any excuse for not having it in all the things we love to use.

—Bruce Nussbaum

Preface

For nearly a decade, we have worked as a team in teaching, research, and consulting. As a result, we have developed a unique understanding of the product development process. We constantly identify and analyze examples of successful products, many illustrated in this book, and look for new techniques for user-centered research and integrated New Product Development (iNPD). We have come to believe that breakthrough products should provide an optimum experience for the people who buy and use them. They should also provide an equally rewarding and gratifying experience for the product development teams who create them.

We have been consultants to and conducted research with small and large companies. We have also conducted professional development seminars in iNPD. During this time we have also co-taught an annual course in integrated New Product Development at Carnegie Mellon University, which has resulted in patented products. Through our consulting, research, and teaching we have identified a number of factors that contribute to successful products. We are not just talking about products that are competitive but products that redefine their markets and often transcend their original program goals to create new markets. This book summarizes our findings in a form that will aid practitioners and managers in the product development process.

This book is a proof of our process. We began by identifying the opportunity for a book by recognizing the difficulty that companies have in working through the early stages of product development. We did extensive research, building on our existing base, to understand what managers and practitioners who create new products (our target market) required in their process that they did not already have. The focus on breakthrough

products, the integration of disciplines, the merging of style and technology, and the creation of true consumer value, all at the Fuzzy Front End, became the themes that drove the development of this book. We identified expert users who had the vision and insight to help us identify critical issues and weed through many ideas. We created prototypes that these expert users read and used to provide feedback. After several iterations, we moved into the design refinement stage to finally deliver what we hope is a useful, usable, and desirable book to help you create breakthrough products.

What to Expect from This Book

In this book you will find some new ideas in product development. You will also find seasoned best practices used by large or small companies. We have integrated these different approaches into a logical framework that takes you from product planning to program approval. You can expect to gain an understanding of the following six aspects of the new product development process:

1. methods to obtain insights into emerging trends in consumer and industrial markets;
2. a means to navigate and control what is often called the “Fuzzy Front End” of the product development process, that portion of the design process when the product and market are not yet defined and qualitative tools are needed to complement quantitative research;
3. the use of qualitative research to understand who the customer is;
4. techniques to assist in the integration of diverse team players, especially engineers, industrial and interaction designers, and market researchers and planners;
5. a complete product development process that brings the product from its opportunity identification stage through to program approval and product patenting;
6. an approach that connects strategic planning and brand management to product development.

We then provide case studies that demonstrate the successful use of the methods introduced in this book. We show that these methods apply to both products and services.

The book’s logical flow is designed to provide a useful guide for anyone involved in the product development process. Readers can also use the book by first scanning and then focusing on the areas initially perceived as most relevant. In either case, we have

tried to make sure that the book is interconnected and cross referenced so that issues addressed in one part are referred to again in other parts.

The book is divided into three main sections. The first section (Chapters 1–4) establishes our main argument that the best new products are designed by merging style and technology in a way that connects with the lifestyle and values of intended customers. The second section (Chapters 5–7) presents a process for creating such products by integrating different disciplines with a focus on the needs, wants, and desires of the customers. The final section (Chapters 8 and 9) provides additional case studies as further support of our argument and its application to several product categories.

Chapter 1 explains the forces that generate opportunities for new product development. This chapter introduces the process of scanning Social, Economic, and Technology (SET) Factors that leads to Product Opportunity Gaps (POGs) and new market segments. Four case studies of successful companies and the products or services they deliver are used to illustrate this process: the OXO GoodGrips, the Motorola Talkabout, the Crown Wave, and the services provided by Starbucks coffeehouses.

Chapter 2 outlines our major premise. In order to produce new products, a company needs to commit to “Moving to the Upper Right.” This phrase represents an integration of style and technology through added product value based on insight into the SET trends that respond to customers’ emerging needs for new products and services. Our Positioning Map is introduced to model and map Upper Right products.

Chapter 3 focuses on consumer-based value and further refines product opportunities into what we call “Value Opportunities” (VOs). We have identified seven Value Opportunity classes — emotion, aesthetics, identity, ergonomics, impact, core technology, and quality — that each contribute to the overall experience of the product. The challenge is to interpret the VOs and their attributes and translate them into the right combination of features and style that match with current trends.

Chapter 4 discusses, through corporate and product branding, how to make Moving to the Upper Right a core part of a company’s culture. Products and services are the core of a company’s strategic planning and brand strategy and they should be driven by the theme of user-centered interdisciplinary product development. The establishment of a clear brand identity necessitates the integration of customer values with company values in a way that differentiates a company and its products in the marketplace.

Chapter 5 is devoted to the planning of product development programs through the presentation of an integrated New Product Development — iNPD — process for the early stages of product development (i.e., the Fuzzy Front End). Most product programs go through a stage where the product opportunity is researched, prototyped, and evalu-

ated. Many companies, however, do not have clear methodologies for this frequently underdeveloped stage of the product development program costing them significant resources. The process we have developed helps companies navigate and control this process by keeping focus on the user. The process is broken into four phases that brings the development team from the stage of identifying opportunities to the program approval stage where intellectual property is protected.

Chapter 6 focuses on team integration and management. Effective interaction of disciplines is integral to the product development process. We describe how team members, and in particular designers and engineers, can work in a context of positive tension where they use their different perspectives to a competitive advantage for the whole team. We also lay out a strategy for breaking down actual parts and components of the product and, by understanding their impact on customer lifestyle and complexity, determining where integration is required to effectively design them. The chapter concludes with insights on how to manage interdisciplinary teams.

Chapter 7 focuses on developing a comprehensive approach to understanding the user's behavior. We discuss the use of existing and emerging methods for understanding how consumers use products and translating that understanding into what we refer to as "actionable insights," which become the basis for developing appropriate product characteristics. These approaches empower the product development team to translate customer preferences into appropriate style, ergonomics, and features.

Chapter 8 highlights nine additional case studies of successful new product development representing a range of product and service categories and types of product development teams.

Chapter 9 highlights the user-centered iNPD process for automobiles, a particularly complex and exciting consumer product market.

The Epilogue concludes with a look at future trends for new product development and final thoughts on why companies should commit to use of the iNPD process.

User's Guide

Through our many interactions with industry, people have asked us questions that relate to their product development problems. We have answered many of them in this book. In this section, we list these questions together with pointers to the chapters where they are answered. Readers with a specific issue may want to begin the book here. They are divided into five areas: 1) how to get started; 2) how to become user-driven instead of

technology driven; 3) how to balance team, people, and discipline interactions; 4) how to commit the time, money, and people for an integrated New Product Development (iNPD) process; and 5) how to succeed in the marketplace.

I. How to Get Started

How do you learn a successful user-centered iNPD process?	The whole book
What is the Upper Right?	Chapter 1
What does it mean to design for fantasy?	Chapter 1
How do you jumpstart the process?	Chapters 1 and 5
What is the Fuzzy Front End?	Chapter 5
How do you develop a core competency that separates you from your competitors?	Chapters 5 and 7
Why is quality for manufacture no longer enough?	Chapters 1, 2, 3, and 4
How do you balance up-front research and development with downstream refinement in the product development process?	Chapter 5

II. How to Become User-Driven Instead of Technology-Driven

How do you know when you have a true product opportunity?	Chapters 1, 2, 3, and 5
How do you get beyond being tech driven?	Chapters 5 and 7
What is ethnography and how do you use it?	Chapter 7
How do you determine the user value in different parts of a product?	Chapter 6
How do you design for a full sensory experience?	Chapters 3 and 5
How do you successfully use qualitative research to understand the needs of a user?	Chapters 5 and 7
How do you use psychometrics to determine what users want and what they will pay for it?	Chapters 3 and 7

III. How to Balance Team, People, and Discipline Interactions

How do you plan and manage an effective product development process?	Chapter 5
How do you prevent turf battles from having a negative effect on the product development process?	Chapters 5 and 6
How do you maintain an interdisciplinary approach that keeps different disciplines communicating effectively?	Chapter 6
How do you get team members to respect each other's capabilities?	Chapter 6
How does team integration affect career development for individuals?	Chapter 6
How do you effectively partner with suppliers?	Chapters 6 and 9

IV. How to Commit Resources to an iNPD Process

How do you determine how much time, money, and personnel to commit to the iNPD process?	Chapter 5
How do you know how long it will take to address the Fuzzy-Front End?	Chapter 5
How do you meet deadlines within the product development process?	Chapter 5
How do you integrate industrial, interface, and communication design into your company's product development process?	Chapters 1, 5, 6, 8, and 9

V. How to Succeed in the Marketplace

How do you create a product that reaches the majority of customers in the marketplace?	Chapter 5
How do you gain confidence that the product warrants the capital investment?	Chapters 1, 5, 8, and 9
How do you balance being cost-driven and being profit-driven?	Chapters 3 and 6
Have there been any successes from this approach?	Case studies throughout book, especially Chapters 1, 2, 4, 8, and 9
How does the development of services differ from that of products?	Chapter 1
How can you develop a brand strategy that integrates your products and services with your corporate structure?	Chapter 4
