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# 技术与创新的管理： 战略视角

(英文版)

玛格丽特·A·怀特

Margaret A. White  
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The Management of Technology and Innovation

A Strategic Approach



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# 前言

技术与创新的管理 (Management of Technology and Innovation, MTI) 是当今企业面临的共同问题。商业环境的变化速度比以往任何时期都快, 新技术不断被采用和创新的层出不穷, 迫使企业乃至整个行业不得不寻找能够让自己进行竞争并生存的新方式。

商业环境的变化要求商业机构必须寻找能够有效管理技术和创新的新途径, 比如找到能够产生并实施战略性目标的新方式。实施问题涉及的面很广, 比如如何有效沟通所需要的信息、如何进行工作安排、如何管理人员等。作为一个实际问题, 飞速发展的环境使得越来越多的工程师不再仅仅关注技术, 而也开始关注管理。与此相类似, 很多管理者一直都认为自己没必要了解复杂的技术问题, 他们也开始关注技术。这本书史无前例地提出 MTI 不单纯是关注技术, 也不单纯是关注管理, 而是对二者的系统性整合。无论对于学员, 还是实务领域的管理者来说, 都是如此。

## 本书的目标

早些时候的书一般把受众定位为管理群体中的某一类人, 比如技术专家 (特别是工程师) 或者是管理培训人员。本书则努力满足各管理群体中的人员。本书作者认为这种类型的写作方式是很必要的, 因为现实中参加我们的 MTI 课的学员不仅包括工程师, 还包括管理培训人员。因此, 本书力求满足如下目标。

1. 整合战略和技术 早些时候的书都假定学员有很强的工程或商业战略背景, 基于此, 他们通常都将重点放在了学员所熟悉的领域内。然而, 对于作者来说, 这种做法只能继续强调职能性问题, 并且导致学员不能发展系统地看待 MTI 的技能, 而这种技能是今天的商业环境非常需要的。本书的作者则做到了技术和战略并重。无论学员有什么教育背景, 本书对于他们来说都是适用的。
2. 努力使学员洞察 MTI 的真谛, 做到学以致用 诚然, 理论是重要的, 然而 MTI 是一门应用性学科, 学员需要能够运用这门学科。贯穿整本书, 作者使用了很多真实的情境来确保学员掌握这本书所提到的概念。每章末都有练习题和主要知识点回顾, 以帮助学员应用各章所讲授的知识。从某种意义上说, 它们也是辅助 MTI 决策的非常有效的一系列工具。
3. 为教师助一臂之力 这主要指针对教师开发的一整套教学支持资源。对于 MTI 来说, 它通常被视做一个小领域, 很多教学支持 (比如建议教师如何使用各章节和附加内容来丰富他们的课堂教师手册、测试题库、练习题的答案和一整套幻灯片演示文稿)

都不会提供。然而，本书的教学支持非常完备，这使得用户使用起来非常简单易行。本书的作者已经使用本书的草案讲过多次课，这使得本书更经得起检验，更便于教师使用。

## 本书的体系

本书包括四部分内容。第一部分介绍了 MTI 的概念，然后确定了 MTI 所研究的领域。这一部分包括两章内容。在发展和维护 MTI 方面，企业有两种主要的战略性抉择：内部创新和通过外部获取新技术。无论选择哪种途径，企业都必须历经计划、实施、评估与控制三个阶段，以确保计划得以顺利实施，目标得以实现。基于这种观点，第二部分详细分析了内部创新的计划（第 3 章）、实施（第 4 章）、评估与控制（第 5 章）。与第二部分的结构相似，第三部分分析了通过外部获取新技术的计划（第 6 章）、实施（第 7 章）、评估与控制（第 8 章）。本书的最后一部分讲解了如何构建成功进行技术和创新管理的能力（第 10 章）。本书各章节的内容非常充实，作者在实践中发现本书既适合一年四学期制的授课方式，也适合 15 周制的授课方式。

本书的各个部分都包含一个贯穿始终的现实的企業案例。第一部分采用了诺基亚公司作为案例。第 1 章借助诺基亚公司讲述了商业机构和当今社会是多么需要 MTI，以及 MTI 能带来的好处。第 2 章讲述了影响诺基亚公司 MTI 流程的战略活动。第 2 部分借助康宁公司讲述了内部创新（第 3~5 章）。杜邦公司则在第三部分被用来讲述如何获取外部技术（第 6~8 章）。最后一部分则利用微软公司来讲述如何获取 MTI 的战略性成功。

每一部分的末尾都有一个附录，每个附录中都提出了这一部分中能够对所有章节都产生影响的话题。简介部分的附录着重讲解了战略性财务分析。内部创新部分的附录集中讲解了如何管理创新项目。获取外部技术部分的附录强调了管理平台问题和技术的组合。预测则是第四部分的附录提出的核心问题。

我们尽量用丰富的案例来阐释书中所论述的概念，每一章都有丰富的案例。为了进一步突出这一特色，每一章的结尾处我们还安排了若干小案例。这些小案例中的问题都可以用来帮助学员进行分析和讨论。

## 本书的基础

本书作者的教学经历和咨询经历加在一起已有 50 多年。我们的根本目标是提供一本易学易用的关于 MTI 中的战略性问题的书。这也意味着本书是基于现实的情境和公司做法的。无论对于内部创新选择，还是对于通过外部获取技术的选择，我们都采用了系统性的计划、实施、评估与控制这一解决问题的模式。这种模式中的各举措也是所有成功的战略性抉择的必要组成。本书中所采用的这种模式是非常独特的，是通过易学易用的

方法来帮助学员理解如何进行成功的战略性抉择的书。

本书还为学员提供了积极借助多种资源学习的机会。各章中的练习包括如下内容：有些使学员能够通过互联网学习；有些使学员能够把他们学到的知识应用到他们所知道的公司中去，那些公司可能是他们所研究的公司，也可能是他们所工作的公司；有些能使学员在课堂上积极讨论。总之，这些补充内容为学员探究 MTI 提供了新途径。

另外，本书是基于 MTI 是一种全球现象这一认识的。因此，我们使用了大量来自全球很多公司的案例。其中一些公司的名字可能对于学员来说并不熟悉，不过问题却是相同的。我们的初衷是让学员学到更多关于全球公司的知识，帮助他们认识到 MTI 在很多方面都是没有国界的，同时 MTI 也反映了他们将为之工作的公司所处的全球经济环境。

## 本书的特色

- 贯穿各部分始终的知名公司案例，如诺基亚、康宁、杜邦和微软。
- 每章结尾所提供的可供学员使用的练习，主要包括真实的小案例、互联网练习、讨论题，以及帮助学员学以致用用的练习（如果他们正受雇于某一公司或对之非常了解）。
- 每章结尾都有学习指导，都有主要知识点回顾。
- 每一部分的结尾都有一个附录，提供了一些非常有用的分析工具。

## 丰富的教学资源

- 提供给教师光盘 光盘里有试题库、幻灯片演示文稿和案例。
- 试题库 试题库由 Margaret White 和 Garry Bruton 编写，每章有大约 35 个选择题、15 个判断题和 7~10 个简答题。
- 幻灯片演示文稿 幻灯片演示文稿有益于教师授课。每章各包含大约 20 张幻灯片，另外，教师手册中包含有关于如何使用幻灯片的说明。
- 网络资源主要由 <http://white.swlearning.com> 提供 教师可根据本书提供的教学支持服务表免费索取以上教学资源。

## 关于作者

### 玛格丽特·A·怀特 (Margaret A. White)

玛格丽特·A·怀特获取了萨姆·休斯顿州立大学的学士学位和 MBA 学位，得克萨斯 A&M 大学的博士学位。怀特教授与人合作发表了 70 多篇论文，她的很多论文都发表于重要的学术期刊上，如 *Academy of management review*、*Academy of Management Journal* 及 *Strategic Management Journal*。她当前的研究领域主要包括组织结构与创新、技术的战略管理等。她是美国管理学会颁发的最佳论文奖的两届得主，她曾任教于奥斯汀州立大学和爱荷华州西部社区学院，也是 *Academy of Management Journal*、*Academy of Management Review*、*Administrative Science Quarterly*、*Journal of Management Review* 和 *Strategic Management* 的特别评论家，还是 *Academy of Management Journal* 的编辑。怀特教授现在是管理学会的会员，她曾经担任过西南管理学会、战略管理学会和项目管理协会的董事会成员。

### 加里·D·布鲁顿 (Garry D. Bruton)

加里·D·布鲁顿获取了奥克拉荷马大学的学士学位，乔治·华盛顿大学的 MBA 学位，以及奥克拉荷马州立大学的博士学位。布鲁顿教授在重要学术期刊上曾个人发表和与人发表过论文共计 50 余篇，那些刊物包括 *Academy of Management*、*Strategic Management Journal* 和 *Journal of Business Venturing*。她的主要研究领域包括高科技创业和风险资本融资。她的大部分研究活动都集中在新兴市场中的中国和俄罗斯。布鲁顿教授现在为五种期刊写社论，她还是 *Academy of Management Perspective* 的副主编，*Asia Academy of Management* 的副总裁。另外，她还被富布赖特基金会选中，参加了 2005 年春在波兰华沙举办的企业家论坛。

# Preface

The management of technology and innovation (MTI) is a fundamental issue that faces all firms today. The pace of change in the business environment is faster today than ever before as new technologies and innovations force industries and firms to find new ways to compete and survive.

To meet these demands, business has been required to find ways to manage technology and innovation. These changes have included new ways to generate and implement strategic goals. These implementation issues include concerns such as new ways to communicate needed information and organize tasks and manage people. As a practical matter, this rapid pace of change has resulted in an increasing number of engineers moving beyond technology concerns into management. Likewise, it has also pushed managers who never thought they would need to understand the intricacies of working with technology to understand such issues. This text is the first to recognize that MTI is not strictly a technical concern or a business concern. Rather, MTI is a domain that needs an integrated approach for students and managers.

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## GOALS FOR THE TEXT

Prior texts have typically addressed only one or the other of these managerial groups, technical professionals (typically engineers) or those with business (or other) training. This text is designed to serve as an information link between the managerial needs of both domains. The authors believe that this type of approach and information is needed because in the reality of our MTI classes there are mixed groups of engineering and business students, and this is the situation that faces business practitioners. Therefore, the book was developed to meet several goals:

1. To integrate strategy and technology: Prior texts have assumed that the student has a strong engineering or business strategy background. Those texts then build on that knowledge, emphasizing the domain they believe the students already know. To



the authors, however, this continues to stress functional silos and results in students not developing the integrated understanding of MTI that today's business requires. Therefore, this text develops an integrated approach with strategy and technology intertwined. This integrated approach is applicable no matter what the educational background of the student may be.

2. To provide insight into the management of technology and innovation that will be useful to students as they enter practice: While theory is important, MTI is an applied discipline that students need to be able to use. Throughout the text the authors employ numerous realistic settings to ensure that students understand different concepts. Exercises and checklists at the end of each chapter then help students apply the material in the text. The net result is a useful set of tools to aid actual MTI decision making.
3. To help the instructor excel in the classroom: This view has led to the development of a full set of teaching supports for the text. Too often, MTI has been viewed as a minor domain and adequate teaching supports (including teachers' manuals with suggestions on how to use the chapter and additional material that instructors can use to supplement their lectures, test banks, sample answers on the exercises, and a complete set of PowerPoint slides) have not been provided. This text is fully supported and has a complete set of supplements that makes it the most user friendly text on the market today. The authors have used the draft version of this text on multiple occasions. The result is a text that has been tested and further developed for maximum usability by the instructor.

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## ORGANIZATION OF THE BOOK

The text has four sections. The first section introduces the concept of MTI and then establishes what is in the domain of management of technology and innovation. This section contains two chapters. There are two major strategic options that an organization can take in the development and maintenance of MTI—(1) internal innovation, and (2) obtaining technology through external means. The process utilized in each of these two approaches to MTI involves (a) planning, (b) implementation, and (c) evaluation and control to ensure that the plans and goals of the firm are met. As a result of this view the second section of the text examines internal innovation planning (Chapter 3), implementation (Chapter 4), and evaluation and control (Chapter 5).

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The third section repeats this pattern for external efforts to obtain technology planning (Chapter 6), implementation (Chapter 7), and evaluation and control (Chapter 8). The last section of the text examines the building of the capabilities necessary for MTI success (Chapter 9), and organizational learning and knowledge management (Chapter 10). These chapters are very rich and the authors found by using the book that there is material for a course whether it be in the quarter system or a fifteen-week semester.

Each of these four sections has a unifying real company case that introduces it. For example, in the first section, Nokia is the firm of interest. Chapter 1 uses the firm to illustrate the need and benefit of MTI to business and society. Chapter 2 then illustrates the strategic activities that impact the MTI process at Nokia. In a similar manner, Corning is used in the section about internal innovation (Chapters 3–5) and DuPont provides the example for the section about acquisition of technology (Chapters 6–8). Finally, Microsoft illustrates how to build strategic MTI success (Chapters 9–10).

For each of the four sections an appendix addresses a key topic that impacts all chapters in that section. For the introduction section, the appendix focuses on strategic financial analysis. For the innovation section, the appendix centers on managing innovation projects. For the acquisition of technology section the appendix addresses the issues of managing platforms and portfolios of technology. Forecasting is the focus of the appendix for the fourth section.

We have sought to ensure that there are rich examples in the text to illustrate the concepts discussed. Within each chapter there are examples that illustrate different activities for that chapter. To further this emphasis there are several mini-cases about different firms at the ends of the chapters. These cases have questions that can be used to generate analysis and discussion by the students.

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## FOUNDATION FOR THE TEXT

This book was written by authors with over 50 years of combined teaching and consulting experience. Our primary goal was to provide a readable, useful text about strategic issues in MTI. This means that the book is focused on real contexts and organizational actions. The direct systematic planning, implementation, and evaluation and control approach to the two major strategic actions required to obtain technology is unique to this text. These activities are part of every strategic decision of successful organizations. However, this text is the first to lay a practical, understandable method for students, no matter their background, to see how to accomplish such activities.

The text is based on material that gives the student active learning opportunities from a variety of sources. For example, the exercises included in each chapter include those that focus on using the world-wide web, others that are intended to enable students to apply the knowledge learned in a chapter to a firm they know, whether it be one they research or one they work for, and still others that are intended to generate discussion in class. In addition, the supplements available to instructors and students provide other avenues for exploring MTI.

Third, the text is based on the recognition that MTI is a global phenomenon. To that end, we use numerous examples from companies around the world. Some of the names may be unfamiliar to some students, but the issues are the same. The hope is to allow students to learn more about businesses around the world and to help them see that MTI, in many ways, transcends national boundaries and reflects the global economy in which they will work.

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## FEATURES OF THE BOOK

- I Integrated cases for each section that focus on high-profile companies such as Nokia, Corning, DuPont, and Microsoft
- I Exercises designed to engage the students at the end of each chapter
  - I real life mini-cases
  - I WWW exercises
  - I discussion questions
  - I exercises to help students apply the knowledge to their firms if they are currently employed or very knowledgeable about a given firm
- I Managerial checklists and guidelines at the end of each chapter
- I An appendix at the end of each section that discusses useful analytical tools

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## OUTSTANDING INSTRUCTOR RESOURCES

- I **The Instructor's Resource CD-ROM** (ISBN: 0324145535), consisting of PowerPoint slides, the Instructors Manual, and an ExamView computerized Test Bank.
- I **The Test Bank**, written by Margaret White and Garry Bruton, includes approximately 35 multiple choice, 15 true/false, and 7 to 10 short-answer questions for each chapter.

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- I **ExamView** is an easy-to-use automated testing program that enables instructors to create exams by using provided questions, modifying questions, or adding new questions.
- I **The Instructor's Manual with Test Bank (IM)** helps instructors create tests, streamline course preparation, and get the most from the text. Included in the IM are answers to the questions at the end of each chapter. These include "Relating to Your World," questions that connect course material to the students' own experiences, WWW Exercises, Technology Audit Exercises, Discussion Questions designed to generate broad-based classroom discussion, and questions that connect the opening case for each section to the chapter.
- I **PowerPoint Presentation Slides** let you incorporate images from your book right into your own lectures. Each chapter contains approximately twenty slides. In addition, the Instructor's Manual contains a guide on how to use the slides with each chapter.
- I **Web Resources at <http://white.swlearning.com>** include rich teaching and learning resources, including the Preface, Key Terms with definitions in separate files by chapter, the Instructor's Manual, PowerPoint slides, a list of potential cases, and the computerized test bank.

## About the Authors

### **Margaret A. White**

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