

TECHNOLOGY VENTURES

FROM IDEA TO ENTERPRISE

FIFTH EDITION

THOMAS H. BYERS
RICHARD C. DORF
ANDREW J. NELSON

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Technology Ventures

From Idea to Enterprise

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Thomas H. Byers
Stanford University

Richard C. Dorf
University of California, Davis

Andrew J. Nelson
University of Oregon





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DEDICATION

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**We warmly recognize their love and support for this
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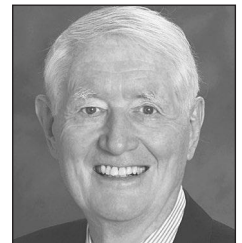
ABOUT THE AUTHORS

Thomas H. Byers is professor of management science and engineering at Stanford University and the founding faculty director of the Stanford Technology Ventures Program, which is dedicated to accelerating technology entrepreneurship education around the globe. He is the first person to hold the Entrepreneurship Professorship endowed chair in the School of Engineering at Stanford. He also is a Bass University Fellow in Undergraduate Education. He was a principal investigator and the director of the NSF's Engineering Pathways to Innovation Center (Epicenter), which aimed to spread entrepreneurship and innovation education across all undergraduate schools. After receiving his B.S., MBA, and Ph.D. from the University of California, Berkeley, Dr. Byers held leadership positions in technology ventures including Symantec Corporation. His teaching awards include Stanford University's highest honor (Gores Award) and the Gordon Prize from the National Academy of Engineering.



Courtesy of
Thomas H. Byers

Richard C. Dorf is professor emeritus of electrical and computer engineering and professor of management at the University of California, Davis. He is a Fellow of the American Society for Engineering Education (ASEE) in recognition of his outstanding contributions to the society, as well as a Fellow of the Institute of Electrical and Electronic Engineering (IEEE). The best-selling author of *Introduction to Electric Circuits* (9th ed.), *Modern Control Systems* (13th ed.), *Handbook of Electrical Engineering* (4th ed.), *Handbook of Engineering* (2nd ed.), and *Handbook of Technology Management*, Dr. Dorf is cofounder of seven technology firms.



Courtesy of
Richard C. Dorf

Andrew J. Nelson is associate professor of management and associate vice president for entrepreneurship and innovation at the University of Oregon. He also serves as academic director of the university's Lundquist Center for Entrepreneurship. Dr. Nelson holds a Ph.D. and a B.A. from Stanford University, and an M.Sc. from Oxford University. Well known for his research on the emergence of new technologies, Dr. Nelson serves on the editorial boards of several leading journals and has received numerous academic awards, including recognition from the Kauffman Foundation, the Academy of Management, and INFORMS. At the University of Oregon, he is the only tenured faculty member to have received the undergraduate business, MBA and executive MBA teaching excellence awards multiple times each.



Courtesy of
Andrew J. Nelson

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FOREWORD

by John L. Hennessy, President Emeritus of Stanford University

I am delighted to introduce this book on technology entrepreneurship by Professors Byers, Dorf, and Nelson. Technology and similar high-growth enterprises play a key role in the development of the global economy and offer many young entrepreneurs a chance to realize their dreams.

Unfortunately, there have been few complete and analytical books on technology entrepreneurship. Professors Byers, Dorf, and Nelson bring years of experience in teaching and direct background as entrepreneurs to this book, and it shows. Their connections and involvement with start-ups—ranging from established companies like Facebook and Genentech to new ventures delivering their first products—add real-world insights and relevance.

One of the most impressive aspects of this book is its broad coverage of the challenges involved in technology entrepreneurship. Part I talks about the core issues around deciding to pursue an entrepreneurial vision and the characteristics vital to success. Key topics include building and maintaining a competitive advantage and market timing. As recent history has shown, it is easy to lose sight of these principles. Although market trends in technology are ever shifting, entrepreneurs are rewarded when they maintain a consistent focus on having a sustainable advantage, creating a significant barrier to entry, and leading when both the market and the technology are ready. The material in these chapters will help entrepreneurs and investors respond in an informed and thoughtful manner.

Part II examines the major strategic decisions with which every entrepreneur grapples: how to balance risk and return, what entrepreneurial structure to pursue, and how to develop innovative products and services for the right users and customers. It is not uncommon for start-ups led by a technologist to question the role of sales and marketing. Sometimes, you hear a remark like: “We have great technology and that will bring us customers; nothing else matters!” But without sales, there is no revenue, and without marketing, sales will be diminished. It is important to understand these vital aspects of any successful business. These are challenges faced by every company, and the leadership in any organization must regularly examine them.

Part III discusses operational and organizational issues as well as the vital topic in technology-intensive enterprises of intellectual property. Similar matters of building the organization, thinking about acquisitions, and managing operations are also critical. If you fail to address them, it will not matter how good your technology is.

Finally, Part IV talks about putting together a solid financial plan for the enterprise including exit and funding strategies. Such topics are crucial, and they are often the dominant topics of “how-to” books on entrepreneurship. While the

financing and the choice of investors are key, unless the challenges discussed in the preceding sections are overcome, it is unlikely that a new venture, even if well financed, will be successful.

In looking through this book, my reaction was, “I wish I had read a book like this before I started my first company (MIPS Technologies in 1984).” Unfortunately, I had to learn much of this in real-time, often making mistakes on the first attempt. In my experience, the challenges discussed in the earlier sections are the real minefields. Yes, it is helpful to know how to negotiate a good deal and to structure the right mix of financing sources, especially so employees can retain as much equity as possible. However, if you fail to create a sustainable advantage or lack a solid sales and marketing plan, the employees’ equity will not be worth much.

Those of us who work at Stanford and live near Silicon Valley are in the heartland of technology entrepreneurship. We see firsthand the tenacity and intelligence of some of the world’s most innovative entrepreneurs. With this book, many others will have the opportunity to tap into this experience. Exposure to the extensive and deep insights of Professors Byers, Dorf, and Nelson will help build tomorrow’s enterprises and business leaders.

Entrepreneurship is a vital source of change in all facets of society, empowering individuals to seek opportunities where others see insurmountable problems. For the past century, entrepreneurs have created many great enterprises that subsequently led to job creation, improved productivity, increased prosperity, and a higher quality of life. Entrepreneurship is now playing a vital role in finding solutions to the huge challenges facing civilization, including health, communications, security, infrastructure, education, energy, and the environment.

Many books have been written to help educate others about entrepreneurship. Our textbook was the first to thoroughly examine a global phenomenon known as “technology entrepreneurship.” Technology entrepreneurship is a style of business leadership that involves identifying high-potential, technology-intensive commercial opportunities, gathering resources such as talent and capital, and managing rapid growth and significant risks using principled decision-making skills. Technology ventures exploit breakthrough advancements in science and engineering to develop better products and services for customers. The leaders of technology ventures demonstrate focus, passion, and an unrelenting will to succeed.

Why is technology so important? The technology sector represents a significant portion of the economy of every industrialized nation. In the United States, more than one-third of the gross national product and about half of private-sector spending on capital goods are related to technology. It is clear that national and global economic growth depends on the health and contributions of technology enterprises.

Technology has also become ubiquitous in modern society. Note the proliferation of smartphones, personal computers, tablets, and the Internet in the past 25 years and their subsequent integration into everyday commerce and our personal lives. When we refer to “high-technology” ventures, we include information technology enterprises, biotechnology and medical businesses, energy and sustainability companies, and those service firms where technology is critical to their missions. At this time in the 21st century, many technologies show tremendous promise, including computational systems, Internet advancements, mobile communications platforms, networks and sensors, medical devices and biotechnology, artificial intelligence, robotics, 3D manufacturing, nanotechnology, and clean energy. The intersection of these technologies may indeed enable the most promising opportunities.

The drive to understand technology venturing has frequently been associated with boom times. Certainly, the often-dramatic fluctuations of economic cycles can foster periods of extreme optimism as well as fear with respect to entrepreneurship. However, some of the most important technology companies have been founded during recessions (e.g., Intel, Cisco, and Amgen). This book’s principles endure regardless of the state of the economy.

APPROACH

Just as entrepreneurs innovate by recombining existing ideas and concepts, we integrate the most valuable entrepreneurship and technology management theories from the world's leading scholars to create a fresh look at entrepreneurship. We also provide an action-oriented approach to the subject through the use of examples, exercises, and lists. By striking a balance between theory and practice, our readers gain from both perspectives.

Our comprehensive collection of concepts and applications provides the tools necessary for success in starting and growing a technology enterprise. Throughout the book, we use the term enterprise interchangeably with venture, business, startup, and firm. We show the critical differences between scientific ideas and true business opportunities for these organizations. Readers benefit from the book's integrated set of cases, examples, business plans, and recommended sources for more information.

We illustrate the book's concepts with examples from the early stages of technology enterprises (e.g., Apple, Google, and Genentech) and traditional ones that execute technology-intensive strategies (e.g., FedEx and Wal-Mart). How did they develop enterprises that have had such positive impact, sustainable performance, and longevity? In fact, the book's major principles are applicable to any growth-oriented, high-potential venture, including high-impact nonprofit enterprises such as Conservation International and the Gates Foundation.

AUDIENCE

This book is designed for students in colleges and universities, as well as others in industry and public service, who seek to learn the essentials of technology and high-growth entrepreneurship. No prerequisite knowledge is necessary, although an understanding of basic accounting principles will prove useful.

Entrepreneurship was traditionally taught only to business majors. Because entrepreneurship education opportunities now span the entire campus, we wrote this book to be approachable by students of all majors and levels, including undergraduate, graduate, and executive education. Our primary focus is on science and engineering majors enrolled in entrepreneurship and innovation courses, but the book is also valuable to business students and others including the humanities and social sciences majors with a particular interest in high-impact ventures.

Our courses at Stanford University, the University of Oregon, and the University of California, Davis, based on this textbook regularly attract students from majors as diverse as computer science, product design, political science, economics, pre-med, electrical engineering, history, biology, and business. Although the focus is on technology entrepreneurship, these students find this material applicable to the pursuit of a wide variety of endeavors. Entrepreneurship education is a wonderful way to teach universal leadership skills, which include being comfortable with constant change, contributing to an innovative team, and demonstrating passion in any effort. Anyone can learn entrepreneurial

thinking and leadership. We particularly encourage instructors to design courses in which the students form study teams early in the term and learn to work together effectively on group assignments.

WHAT'S NEW

Based upon feedback from readers and new developments in the field of high-growth entrepreneurship, numerous enhancements appear in this fifth edition. The latest insights from leading scholarly journals, trade books, popular blogs and press have been incorporated. In particular, Chapter 18 has been improved significantly to reflect the latest developments in venture finance. Every example in the textbook has been reviewed with many updated to reflect up-and-coming, technology-intensive ventures in multiple industries and based around the world. The special Spotlight sections highlight 10 new companies that further illustrate key insights in that chapter. Video resources have been revised to reflect recent compelling seminars distributed through Stanford's eCorner series. Cases in Appendix B have been updated, streamlined, and augmented with the addition of Gusto.

FEATURES

The book is organized in a modular format to allow for both systematic learning and random access of the material to suit the needs of any reader seeking to learn how to grow successful technology ventures. Readers focused on business plan and model development should consider placing a higher priority on Chapters 3, 6, 9, 11, 12, and 17–19. Regardless of the immediate learning goals, the book is a handy reference and companion tool for future use. We deploy the following wide variety of methods and features to achieve this goal, and we welcome feedback and comments.

Principles and Chapter Previews—A set of 20 fundamental principles is developed and defined throughout the book. They are also compiled into one simple list following the Index. Each chapter opens with a key question and outlines its content and objectives.

Examples and Exercises—Examples of cutting-edge technologies illustrate concepts in a shaded-box format. Information technology is chosen for many examples because students are familiar with its products and services. Exercises are offered at the end of each chapter to test comprehension of the concepts.

Sequential Exercise and Spotlights—A special exercise called the “Venture Challenge” sequentially guides readers through a chapter-by-chapter formation of a new enterprise. At the end of each chapter's narrative, a successful enterprise is profiled in a special “spotlight” section to highlight several key learnings.

Business Plans—Methods and tools for the development of a business plan are gathered into one special chapter, which includes a thoroughly

TABLE P1 Overview of cases.

Cases in appendix B	Synopsis	Issues
Method	A start-up contemplates a new product line	Part I: Opportunities, vision and the business model, marketing and sales
Method Products	A product development effort runs into problems	Part II: Innovation strategies, creativity, and product development
Biodiesel	Three founders consider an opportunity in the energy industry	Part I: Opportunity identification and evaluation, business model
Barbara's Options	A soon-to-be graduate weighs two job offers	Part III and IV: Stock options, finance
Gusto	A founding team endeavors to scale their culture	Part III and IV Culture, scaling issues

annotated table of contents. A sample business model is provided in Appendix A. Links to additional business plans, models, and slide (pitch) decks are provided on the textbook's websites.

Cases—Five comprehensive cases are included in appendix B. A short description of each case is provided in Table P1. Additional cases from Harvard Business Publishing and The Case Centre are recommended on this textbook's McGraw-Hill websites. Cases from previous editions that are no longer included are available on the textbook's website.

References and Glossary—References are indicated in brackets such as [Smith, 2001] and are listed as a complete set in the back of the book. This is followed by a comprehensive glossary.

Chapter Sequence—The chapter sequence represents our best effort to organize the material in a format that can be used in various types of entrepreneurship courses. The chapters follow the four-part layout shown in Figure P1. Courses focused on creating business plans and models can reorder the chapters with and emphasis on Chapters 3, 6, 9, 11, 12, 17, 18, and 19.

Video Clips—A collection of suggested videos from world-class entrepreneurs, investors, and teachers is listed at the end of each chapter and provided on this textbook's websites. More free videos clips and podcasts are available at Stanford's Entrepreneurship Corner website (see <http://ecorner.stanford.edu>).

Websites and Social Networking—Please visit websites for this book at both McGraw-Hill Higher Education (<http://www.mhhe.com/byersdorf>) and Stanford University (<http://techventures.stanford.edu>) for supplemental information applicable to educators, students, and professionals. For example, complete syllabi for introductory courses on entrepreneurship are provided for instructors.

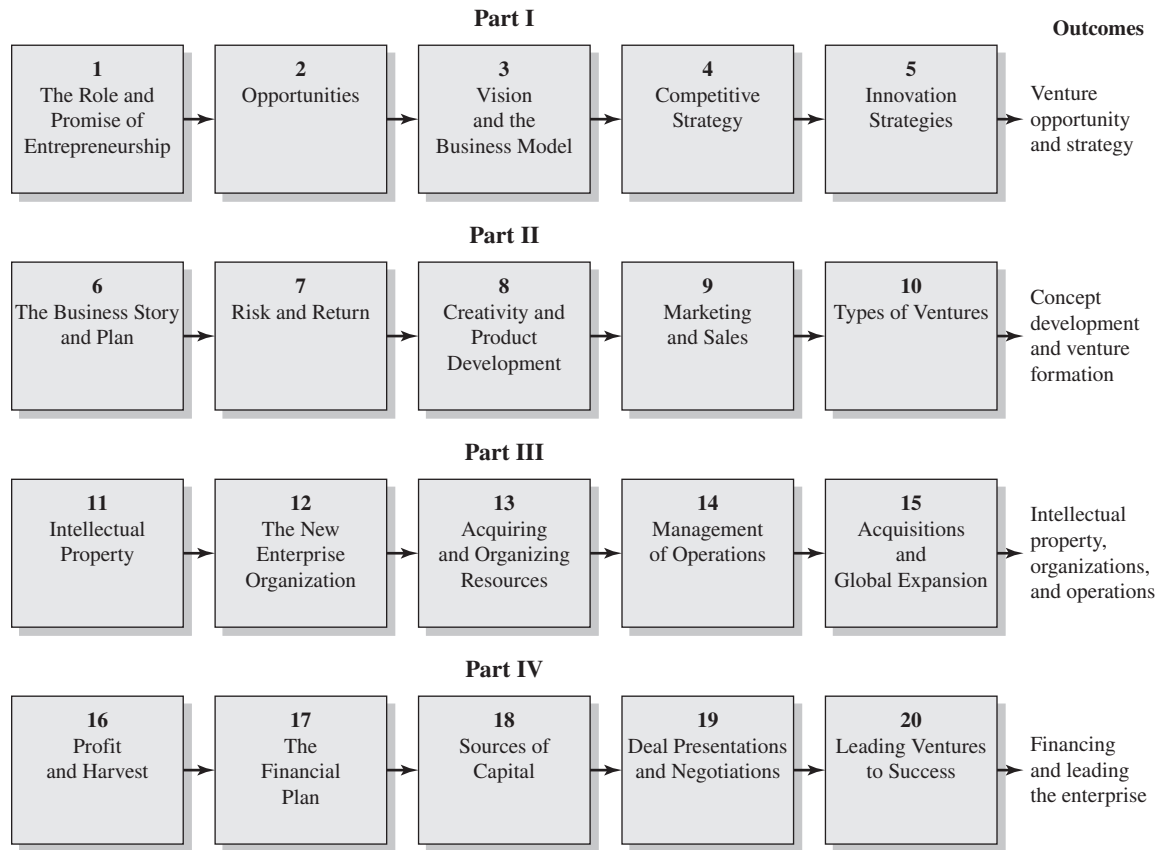


FIGURE P1 Chapter sequence.

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Thomas H. Byers, Stanford University, tbyers@stanford.edu

Richard C. Dorf, University of California, Davis

Andrew J. Nelson, University of Oregon, ajnelson@uoregon.edu



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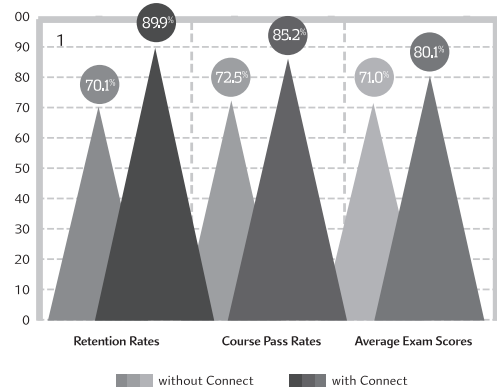
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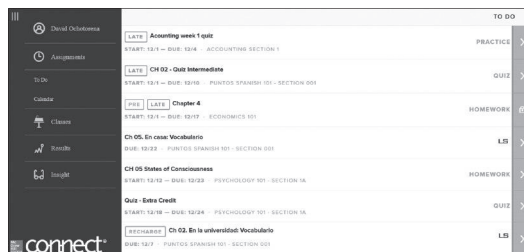


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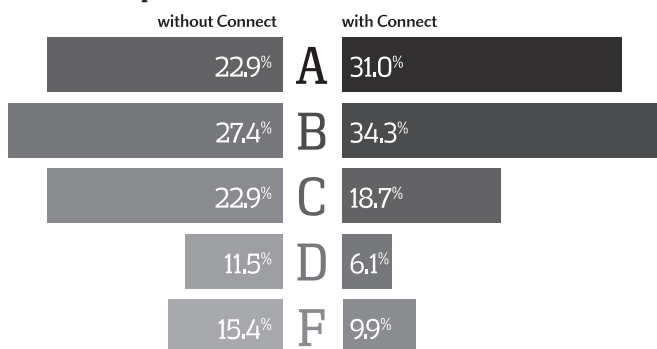
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- Connect offers comprehensive service, support, and training throughout every phase of your implementation.
- If you're looking for some guidance on how to use Connect, or want to learn tips and tricks from super users, you can find tutorials as you work. Our Digital Faculty Consultants and Student Ambassadors offer insight into how to achieve the results you want with Connect.

The fifth edition is supplemented by two websites, collectively bringing students and instructors the most extensive resources available for technology and high-growth entrepreneurship courses. Visitors to the Stanford-based website at <http://techventures.stanford.edu> can access the Video Resources featuring entrepreneurs, CEOs, investors, educators, and other thought leaders noted at the end of each chapter.

McGraw-Hill Website www.mhhe.com/byersdorf

Accessed with a password, the McGraw-Hill website for instructors features:

- Answers to end-of-chapter exercises
- Teaching notes for the cases in Appendix B
- Extensive sample syllabi based on the text
- Sample presentations from actual courses using the book

