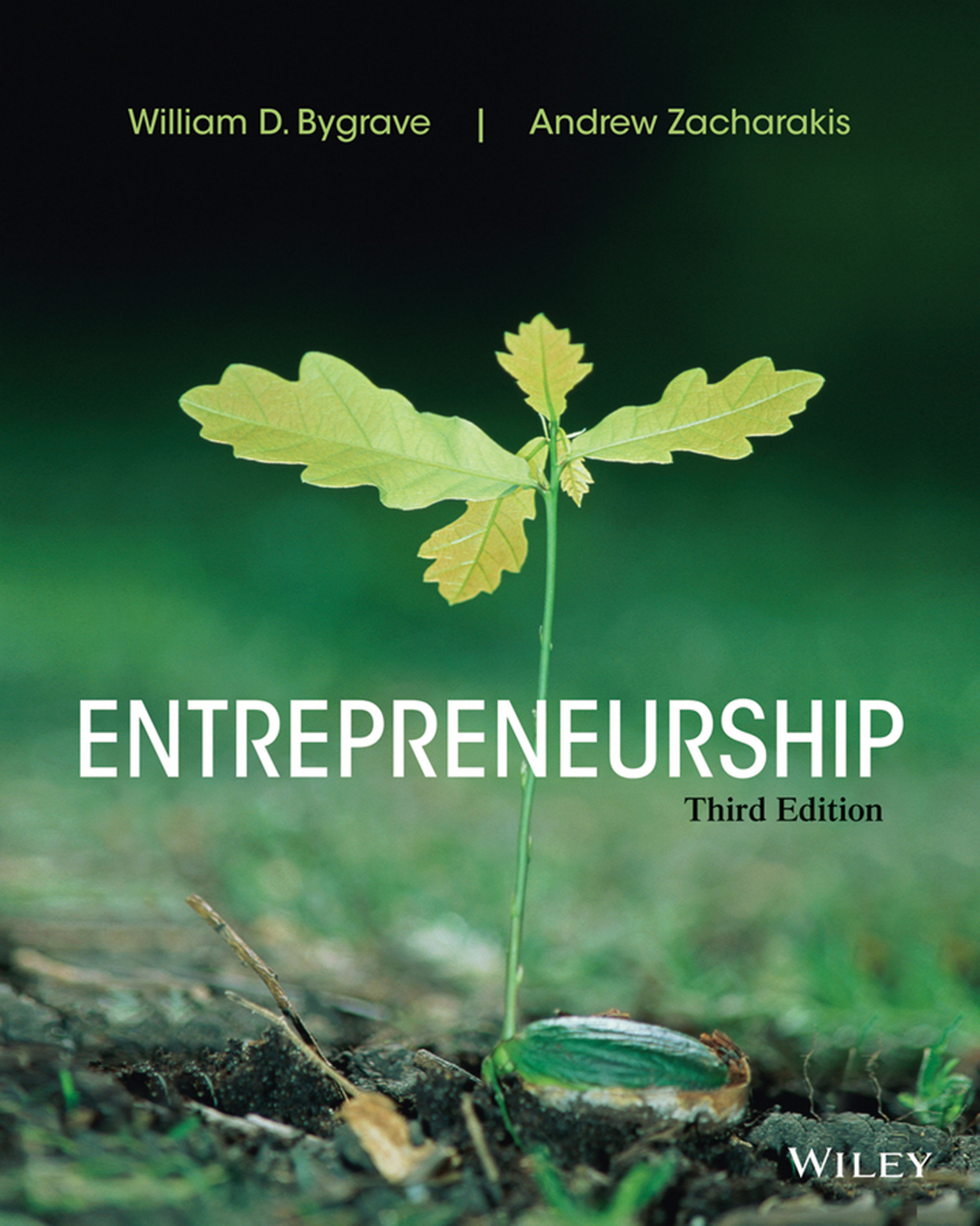
William D. Bygrave | Andrew Zacharakis



ENTREPRENEURSHIP

Third Edition

WILEY

Entrepreneurship

Third Edition

William D. Bygrave
Babson College

Andrew Zacharakis
Babson College

WILEY

To Frederic C. Hamilton and John H. Muller, Jr., pioneers, entrepreneurs, and benefactors of Babson College.

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PREFACE

The green shoots of entrepreneurship give an economy its vitality. They give rise to new products and services, fresh applications for existing products and services, and new ways of doing business. Entrepreneurship stirs up the existing economic order and prunes out the dead wood. Established companies that fail to adapt to the changes cease to be competitive in the marketplace and go out of business.

Within the broadest definition, entrepreneurs are found throughout the world of business because any firm, big or small, must have its share of entrepreneurial drive if it is to survive and prosper. This textbook focuses on starting and growing independent new ventures. It is based on entrepreneurship courses taught at Babson College and at universities around the world.

One of the most common questions that entrepreneurship educators are asked is, Can entrepreneurship be taught? Our response is that anyone with a desire to become an entrepreneur will be more successful if he or she has taken a course on how to start and grow a new venture. About 30% of the students who have taken the new-venture course at Babson College since 1985 have gone on to start full-time businesses at some time in their careers. Many have started more than one.

While this textbook empowers would-be entrepreneurs to start and grow their new ventures, it's not only for them. Any student who reads this book will learn about the entrepreneurial process and the role of entrepreneurship in the economy. We believe that all business students, regardless of whether they start a new business, will benefit from learning about entrepreneurship. After all, entrepreneurship and small business create most of the jobs in the U.S. economy and account for almost half the GDP. They are ubiquitous, and so integral to the economy that almost every student will work in one way or another with entrepreneurs and small businesses after graduation. This textbook will stand students in good stead—not only for starting their own firms, but also for dealing with startups as investors, bankers, accountants, lawyers, customers, vendors, employees, landlords, and in any other capacity.

An entrepreneurial revolution has transformed the economy since the mid-1970s. Central to that revolution is information technology, especially personal computers and the Internet. Information technology has profoundly changed the way companies do business, none more so than startup companies. Today's students were born after the personal computer came into common use, and they came of age in the era of the Web. We believe they need an entrepreneurship text in which information technology is completely integrated all the way through.

This book combines concepts and cases to present the latest theory about entrepreneurship and relate actual experiences. The concepts cover what would-be entrepreneurs need to know to start and grow their businesses, and the cases illustrate how real entrepreneurs have gone out and done it. They cover all stages of the entrepreneurial process, from searching for an opportunity to shaping it into a commercially attractive product or service, launching the new venture, building it into a viable business, and eventually harvesting it.

Chapter 1 discusses the role of entrepreneurship in the U.S. economy and looks at the entrepreneurial competitiveness of nations throughout the world. Chapter 2 is an overview of the factors critical for starting a new enterprise and building it into a successful business.

Chapters 3 through 8 look in detail at what budding entrepreneurs need to do before they open their doors for business. The section starts with searching for opportunities and evaluating

them. It explains how to build a workable business model and covers marketing, strategy, team building, financial projections, and business planning. At the end of this section students know how to write a business plan and how much startup capital they need to start their ventures.

The next section, Chapter 9 through 11, deals with financing businesses. Chapter 9 reviews the sources of financing for starting and growing businesses, both in the United States and worldwide. Chapter 10 discusses the nuts and bolts of raising money, particularly equity, to start and grow a business. Chapter 11 examines debt and other sources of financing.

Entrepreneurs need to understand the legal and tax issues associated with organizing a new business. They also need to know how to protect their intellectual capital. Chapters 12 explores these topics.

Anyone can start a new venture, but very few new businesses grow into substantial enterprises. Chapter 13 discusses what it takes to grow a business into a healthy company that provides financial rewards for the entrepreneur and good jobs for employees.

Finally, Chapter 14 looks at social entrepreneurship. Today, many students are looking at business ideas that may not only earn a profit, but also address a social concern.

Each chapter is accompanied by a case study of entrepreneurs in action. We chose the cases carefully, using these criteria:

- The entrepreneurs and their companies represent a spectrum of situations and industries that is as broad as we could make it.
- The judgment point in most cases occurs in the 21st century—some as recently as 2012 .
- All stages of the entrepreneurial process are covered, from pre-startup through harvest.
- Almost all the entrepreneurs in the cases are in their 20s and 30s; some are recent graduates.

There's no substitute for the experience gained from actually starting a business, but we believe that by completing the case studies in this book students will gain wisdom that would take years to pick up by trial and error as entrepreneurs starting and building businesses from scratch.

Each chapter ends with a unique Opportunity Journal. Here students can reflect on the lessons learned and think about how to apply them to their own entrepreneurial ventures or to managing their careers. Finally, a Web exercise builds upon key concepts covered in each chapter.

New to this Edition

The third edition has been thoroughly updated and enhanced throughout. Since the second edition, the United States and the world have seen increasing turmoil: the great recession; continuing wars in Iraq and Afghanistan; the Arab spring; a major oil spill in the Gulf of Mexico; earthquakes in Haiti and Chile; and an ongoing debate over climate change, just to name a few issues. To that end, we've noticed that more students than ever before are interested in not only creating great companies, but also addressing social issues. Thus, we've added a new Chapter 14 on Social Entrepreneurship, written by our colleagues Brad George and Candida Brush. Brad and Candy provide a typology of differing social entrepreneurial ventures, ranging from non-profits to for-profit businesses with a strong social mission. The chapter also provides metrics beyond the traditional financial measures to gauge the impact of the social venture.

We replaced several older cases. Vera Bradley steps through the process by which two women created an iconic brand, leveraging what they knew and were passionate about. Zumba

looks at how three South American entrepreneurs created a new exercise craze. It explores the entrepreneurs as they try to determine the best business model for their venture. Eu Yang Sang looks at how a highly successful Singaporean company works to grow into new global markets; specifically China and the United States. The company has to consider how customers in these markets are different and also what kinds of channels might be appropriate to reach these customers. Zeo looks at how three college age founders build their team. They recruit and form a scientific advisory board; they seek and hire a CEO to help the company penetrate and build its market. Meta Carta details the capital raising process for a venture through good times and bad. It graphically illustrates the impact of dilution, especially during a down round. Tessera shows how a smaller entrepreneurial company can patent its technology, license it and protect its intellectual property from companies that would try to steal it. Finally, Year Up illustrates the creation of a social venture that works with underprivileged minority teens by providing them with mentors and internships. The company is trying to identify the best way to grow and reach more teens. With these changes, we are confident that the third edition of Entrepreneurship, not only continues our mission of empowering and enabling young entrepreneurs, but enhances it.

Teaching Supplements

Instructor's Manual

The Instructor's Manual has been designed to facilitate convenient lesson planning and includes the following:

- *Sample Syllabi*. Suggestions are given on dividing up the chapter material based on the frequency and duration of your class period.
- *General Chapter Outline*. The main headers provide a quick snapshot of all of the chapter content.
- *Case Teaching Notes*. Detailed teaching notes go into depth on the material covered in each chapter's accompanying case. They include discussion questions, classroom activities, and additional information on the businesses and entrepreneurs from the cases.

This comprehensive resource can be found on the Instructor Companion Site at www.wiley.com/college/bygrave

PowerPoint Slides

A robust set of PowerPoint slides gives you the ability to completely integrate your classroom lecture with a powerful visual statement of chapter material. The entire collection of roughly 150 slides is available for downloading from the Instructor and Student Companion Sites.

Test Bank

With 60 questions per chapter, the test bank consists of multiple choice, true/false, and short answer questions of varying difficulty. A computerized version of this test bank is also available on the Instructor Companion Site so that you can customize your quizzes and exams. Access these resources on the Instructor Companion Site.

Additional Cases

In addition to the 14 cases included in the book, additional cases, available on the book's companion site, give instructors more choices and give students more real-life examples. Cases available online include:

Adam Air
Andres Galindo
Ajay Bam
Alexander Norman and Toni Randolph-Norman
BladeLogic
ClearVue
College Coach
Matt Grant
Enox
CardSmith
Makers Mark
Vayusa (the *Ajay Bam* second case)
Beautiful Legs by Post
Living Patio Rooms
Malincho
Neverfail
Matt Coffin
Jon Hirschtick
SolidWorks (the *Jon Hirschtick* second case)
David Pearlman
StudentCity.Com
Nancy's Coffee
Earth Watch

Video Cases

Several videos accompany cases from the book, engaging students and giving them the opportunity to hear first-hand accounts from the entrepreneurs themselves. Available on the Instructor Companion Site, these videos are ideal lecture launchers and a great way to grab a class's attention. Ask your local Wiley representative for more information. Video cases include:

Alison Barnard
Jim Poss
College Coach
P'kolino
DayOne
Feed Resource Recovery

Acknowledgments

A comprehensive textbook on entrepreneurship covers a very wide range of disciplines that require specialized knowledge, so we invited leading experts to write some of the chapters.

- Entrepreneurial marketing is an emerging academic discipline; two of its leading experts are Abdul Ali at Babson College and Kathleen Seiders at Boston College, who wrote Chapter 6, "Entrepreneurial Marketing."

- Joel Shulman, Babson College, who specializes in entrepreneurial finance, contributed Chapter 11, "Debt and Other Forms of Financing."
- Legal, tax issues and Intellectual Property go hand in hand when setting up a new business; Richard Mandel, who is a Babson professor and a partner with the law firm Bowditch and Dewey that specializes in small business, wrote Chapter 12 along with Joseph Iandorio and Kirk Teska, who are patent attorneys in the firm that bears their names.
- Babson professors Donna Kelley and Edward Marram wrote Chapter 13, "Entrepreneurial Growth." Kelley is an expert on innovation, and Marram specializes in growing businesses.
- Professors Brad George and Candida Brush of Babson College wrote Chapter 14.

We thank all the contributing authors for their commitment and dedication to making this book as valuable as it can be for students.

We are forever indebted to everyone involved in the entrepreneurial process who has shared experience and wisdom with us. They include entrepreneurs from novices to old hands, informal investors, business angels, venture capitalists, bankers, lawyers, and landlords—indeed, anyone involved with entrepreneurs. We have learned so much from them. We're especially thankful for all the students and alumni we have worked with over the years. Their feedback has helped us shape what we teach and how we teach it.

We believe that entrepreneurs who successfully build businesses are inherently good coaches and teachers; they have to be if they are to develop and encourage employees. This generosity is borne out by their willingness to share their know-how with budding entrepreneurs. One important way in which entrepreneurs have done that is by allowing us to write cases about them and their companies, and then by coming to class when the cases are discussed. We make a video of each entrepreneur in a question-and-answer session with students immediately after the case is taught for the first time. Those videos, which are an integral part of the case study, are available to instructors using this textbook.

A huge "thank you" to the principals featured in the case studies in this book. They are Alberto Aghion, Alison Barnard, Barbara Baekgaard, Doug Brenhouse, Gerald Chertavian Tom DiStefano, Jason Donahue, Shane Eten, Richard Eu, Dan Hermann, Igor Khandros, Reg Mathelier, Patricia Miller, Joel Pedlikin, Alberto "Beto" Perez, Alberto Perlman, Jim Poss, Ben Rubin, J.B. Schneider, Eric Shashoua, Antonio Turco-Rivas, and Andrew Zenoff.

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Andy Freeberg/Getty Images

Tony Avelar/AFP/Getty Images

Bill Gates and Steve Jobs: Entrepreneurial leaders who drove the information technology revolution that transformed the way in which we live, work, and play.

CHAPTER 1

THE POWER OF ENTREPRENEURSHIP

This is the entrepreneurial age. More than 500 million persons worldwide either were actively involved in trying to start a new venture or were owner-managers of a new business in 2012.[1]

More than 1,500 new businesses are born every hour of every working day in the United States. Entrepreneurs are driving a revolution that is transforming and renewing economies worldwide. Entrepreneurship is the essence of free enterprise because the birth of new businesses gives a market economy its vitality. New and emerging businesses create a very large proportion of the innovative products and services that transform the way we work and live, such as personal computers (PCs), computer software, the Internet and the World Wide Web (WWW or Web), social media, biotechnology drugs, overnight package deliveries, and big-box stores. They generate most new jobs; from 1993 through 2011, companies with 500 or fewer employees created 64% of all new jobs in the United States; that number increased slightly to 67% from mid-2009 through 2011 in the aftermath of the worst recession since the Great Depression of the 1930s.[2]

There has never been a better time to practice the art and science of entrepreneurship. But what is entrepreneurship? Early in the 20th century, Joseph Schumpeter, the Moravian-born economist writing in Vienna, gave us the modern definition of an entrepreneur: a person who destroys the existing economic order by introducing new products and services, by introducing new methods of production, by creating new forms of organization, or by exploiting new raw materials. According to Schumpeter, that person is most likely to accomplish this destruction by founding a new business but may also do it within an existing one.

Schumpeter explained how entrepreneurs had suddenly increased the standard of living of a few industrialized nations.[3] When the Industrial Revolution began in England around 1760, no nation had enjoyed a standard of living equal to that of Imperial Rome 2,000 years earlier. But from 1870 to 1979, for example, the standard of living of 16 nations jumped sevenfold on average.[4]

This chapter is written by William D. Bygrave.

Very few new businesses have the potential to initiate a Schumpeterian "gale" of creative destruction, as Apple Computer did in the computer industry. The vast majority enter existing markets. So, in this textbook, we adopt a broader definition of entrepreneurship than Schumpeter's. Ours encompasses everyone who starts a new business. Our entrepreneur is the person who perceives an opportunity and creates an organization to pursue it. And the entrepreneurial process includes all the functions, activities, and actions associated with perceiving opportunities and creating organizations to pursue them. Our entrepreneur's new business may, in a few rare instances, be the revolutionary sort that rearranges the global economic order, as Walmart, FedEx, Apple, Microsoft, Google, eBay, and Amazon.com have done and social networking companies such as Facebook and Twitter are now doing. But it is much more likely to be of the incremental kind that enters an existing market.

The Changing Economy

General Motors was founded in 1908 as a holding company for Buick. On December 31, 1955, General Motors became the first American corporation to make over $1 billion dollars in a year. At one point, it was the largest corporation in the United States in terms of its revenues as a percentage of gross domestic product (GDP). In 1979, its employment in the United States peaked at 600,000. In 2008, General Motors reported a loss of $30.9 billion and burned through $19.2 billion in cash. In a desperate attempt to save the company in February 2009, GM announced plans to reduce its total U.S. workforce from 96,537 people in 2008 to between 65,000 and 75,000 in 2012. By March 2009, GM, which had already received $13.4 billion of bailout money from the U.S. government, was asking for an additional $16.6 billion. The Obama administration forced GM's CEO, Rick Wagoner, to resign; his replacement, Fritz Henderson, said that bankruptcy was a real possibility. It became a reality when GM filed for bankruptcy in June and emerged a shrunken company 40 days later. In 2012, its US workforce was 77,000.

Walmart was founded by Sam Walton in 1962. For the fiscal year ending on January 31, 2012, Walmart had record sales of $443.9 billion, record earnings of $15.8 billion, and free cash flow of $10.7 billion. Walmart is the world's largest corporation, with 2.2 million associates and 10,130 stores in 2012.

"We're all working together; that's the secret. And we'll lower the cost of living for everyone, not just in America, but we'll give the world an opportunity to see what it's like to save and have a better lifestyle, a better life for all. We're proud of what we've accomplished; we've just begun."

—Sam Walton (1918–1992)

In this chapter, we will look at the importance of entrepreneurship and small business to the United States and the global economies, describe the entrepreneurial revolution, present a conceptual model for the entrepreneurial sector of the economy, and use it to explain major factors in the revolution; finally, we will compare and contrast entrepreneurial activity among nations within the context of the conceptual model.

Entrepreneurship and Small Business in the United States

In 2010, there were 28 million or so U.S businesses, of which approximately 99.9% were small businesses.[5] In general, businesses with 500 or fewer employees are classified as small.[6] They account for half the private-sector workers and 42.9% of the private payroll, and they generate approximately half the non-farm private GDP. If the small-business sector of the

U.S. economy were a nation, its GDP would rank third in the world behind that of the U.S. medium- and big-business sector and the entire economy of China, ahead of Japan, and far ahead of Germany, the United Kingdom, France, and Italy.[7]

Not only are small businesses the engine for job creation, but also they are a powerful force for innovation. They hire 43% of all high-tech workers and produce approximately 16 times more patents per employee than large firms; those patents are twice as likely as large firm patents to be among the 1% most cited.[8] Their share of U.S. research and development (R&D) grew from 5.9% in 1984 to an estimated 20.7% in 2003, with the dollar value growing from $4.4 billion in 1984 to an estimated $40.1 billion in 2003—a ninefold increase.[9]

Half of the 28 million small businesses are part-time undertakings and half are full-time. Approximately 5.8 million small businesses are employer companies with one or more employees in addition to the self-employed owner.[10] About two-thirds of the full-time businesses are unincorporated and one-third are incorporated. Self-employment is more prevalent among men than women, whites, and Asians; and in construction, services, and agriculture industries.[11]

At any one time, approximately 7 million *nascent entrepreneurs* in the United States are trying to create a new business; they have conceived an idea for a new venture and have taken at least one step toward implementing their idea. Many of them abandon their ventures during the gestation period and never actually open their businesses; nonetheless, each year at least 3 million new ventures are born, of which about 75% start from scratch. Most of the others are purchases of existing businesses.[12] Two in every three businesses are started in the owner's home. Most remain tiny because they are part-time businesses, but around 600,000 have at least one full-time employee.

Survival rates for new businesses were the focus of several different studies.[14] One of the most thorough was done at the U.S. Census Bureau by Alfred Nucci, who calculated the 10-year survival rates of business establishments.[15] He found that 81% survive for at least one year, 65% for two years, 40% for five years, and 25% for 10 years. The survival rate for independent startups was slightly lower. For example, the one-year rate was 79% instead of 81%. The chance of survival increased with age and size. Survival rates also varied somewhat with industry but not as strongly as with age and size.

Of course, survival does not necessarily spell success. In general, the median income of small business owners is almost the same as that of wage and salary earners. However, the income distribution is much broader for small business owners, which means that they are more likely to have significantly less income or significantly more income than wage and salaried workers.[16] But small business owners are also building equity in their companies as well as taking income from them, so it is possible that small business owners are better off overall than their wage-earning cohorts. However, a study of business owners disposing of their businesses through sale, closure, passing it on, and other methods found that comparatively few saw their standard of living changed by their business. Only 17% reported that their business had raised their standard of living, while 6% reported the opposite.[17]

Looking back at the new business formation index, we can see that it was stable through the 1950s and most of the 1960s; there was virtually no growth. By 1970, net new business formation was growing, and the growth continued through the 1970s and 1980s and into the 1990s.[18] No one noticed the change at the time. One of the first documented references to what was taking place was a December 1976 article in *The Economist* called "The Coming Entrepreneurial Revolution."[19] In this article, Norman Macrae argued that the era of big business was drawing

A survey by ACNielsen International Research in July 2005 found the following:[13]

- 58% of Americans say they've dreamed of starting a business and becoming their own boss.
- The most common reason for wanting to start a business is to increase one's personal income (66% of respondents), followed by increased independence (63%).
- The primary barriers to starting a business are insufficient financial resources (cited by 49% of respondents) and satisfaction with their current situation (29%).

to an end and that future increases in employment would come mainly from either smaller firms or small units of big firms. In 1978, David Birch published his book *Job Creation in America: How Our Smallest Companies Put the Most People to Work*.[20] The title says it all. It captures the important finding from Birch's comprehensive study of business establishments.

No issue gets the attention of politicians more than job creation. Birch's findings and the stream of research that ensued forever changed the attitude of policymakers toward small business.[21] Until then, most of their focus had been on big business. After all, in 1953 Charles Erwin Wilson, then GM president, is reported to have said during the hearings before the Senate Armed Services Committee, "What's good for General Motors is good for the country." At the time, GM was one of the largest employers in the world—only Soviet state industries employed more people.[22]

Entrepreneurial Revolution

On November 1, 1999, Chevron, Goodyear Tire & Rubber Company, Sears Roebuck, and Union Carbide were removed from the Dow Jones Industrial Average (DJIA) and replaced by Intel, Microsoft, Home Depot, and SBC Communications. Intel and Microsoft became the first two companies traded on the NASDAQ exchange to be listed in the DJIA.

This event symbolized what is now called the *entrepreneurship revolution* that transformed the U.S. economy in the last quarter of the 20th century. Intel and Microsoft are the two major entrepreneurial driving forces in the information technology revolution that has fundamentally changed the way in which we live, work, and play. SBC (formerly Southwestern Bell Corporation) was one of the original "Baby Bells" formed after the U.S. Department of Justice antitrust action resulted in the breakup of AT&T. It is an excellent example of how breaking up a monopoly leads to entrepreneurial opportunities. And Home Depot exemplifies the big-box stores that have transformed much of the retail industry.

Intel was founded in Silicon Valley by Gordon Moore and Robert Noyce and funded by Arthur Rock, the legendary venture capitalist. Gordon Moore, the inventor of Moore's Law,[23] and Robert Noyce, one of the two inventors of the integrated circuit,[24] had been at the birth of Silicon Valley with William Shockley, the co-inventor of the transistor, when Shockley Semiconductor Laboratory was founded in Mountain View in 1956. They left Shockley in 1957 to found Fairchild Semiconductor, which in 1961 introduced the first commercial integrated circuit. In 1968, they left Fairchild to start Intel.

Ted Hoff, employee number 12 at Intel, invented the microprocessor in 1968. In 1971, Intel launched the first commercial microprocessor, heralding a new era in integrated electronics. Then, in 1974, it launched the first general-purpose microprocessor, the Intel 8080, which was the brain of the first personal computer,[25] the Altair 8800—a $439 hobbyist's kit—announced by MITS (Micro Instrumentation and Telemetry Systems of Albuquerque) on the front cover of the January 1, 1975, edition of *Popular Electronics*.

"When I was 19, I caught sight of the future and based my career on what I saw. I turned out to have been right."

—Bill Gates

According to personal computer folklore, Paul Allen, then working at the minicomputer division of Honeywell in Massachusetts, hurried to his childhood friend and fellow computer enthusiast, Bill Gates, who was a Harvard sophomore, and waving *Popular Electronics* with a mock-up of the Altair 8800 on its front cover, exclaimed, "This is it! It's about to begin!" Within a month or so, Gates had a version of BASIC to run on the Altair. He and Allen joined together in an informal partnership called Micro-Soft and moved to Albuquerque.

Microsoft grew steadily by developing software for personal computers. By 1979, it had moved to Bellevue, Washington, near Seattle, where Gates and Allen had grown up. It then had revenue of more than $2 million and 28 employees. It got its big break in 1980–1981 when, building on the core of a product acquired from Seattle Computer Products, Microsoft introduced MS-DOS for IBM's first PC. Fourteen years later,

when Microsoft released Windows 95 in 1995, it sold 4 million copies in four days. Its success helped to move the personal computer into 250 million homes, businesses, and schools worldwide. In the early 1990s, Microsoft committed itself to adding Internet capabilities to its products. When Microsoft joined the DJIA in 1999, there were more than 200 million Internet users, up from 3 million just five years earlier.

SBC came about in 1984 because of the breakup of AT&T. SBC's growth has come mainly through acquisitions, so we are not making the case that SBC itself is especially entrepreneurial. However, the breakup of AT&T did unleash a wave of entrepreneurship that produced the explosive growth of the telecommunications industry in the last 20 years. According to a recent survey, the top five innovations since 1980 are the Internet, cell phones, personal computers, fiber optics, and email.[26] No doubt about it, the phenomenal growth of wireless communications and the Internet would not have happened if AT&T had been allowed to keep its pre-1983 stranglehold on the telecom industry. (AT&T floundered after it was broken up. In 2004, it was dropped from the DJIA, and in 2005, it was acquired by SBC, which then adopted AT&T, Inc., as its corporate name; as a result, AT&T's legendary "T" ticker symbol on the New York Stock Exchange returned to the DJIA.)

Rob Kinmonth/Time & Life Pictures/Getty Images

Bernard Marcus and Arthur Blank, founders of Home Depot

Home Depot was founded in 1979 by Bernie Marcus and Arthur Blank. The chain of hardware and do-it-yourself (DIY) stores holds the record for the fastest time for a retailer to pass the $30 billion, $40 billion, $50 billion, $60 billion, and $70 billion annual revenue milestones. It is the second largest retailer in the United States, surpassed only by Walmart. And it almost set the record for the fastest time from starting up to joining the DJIA when it was only 20 years old. By comparison, Walmart was 35 years old when it displaced F. W. Woolworth in the DJIA. Along with Walmart, Home Depot has set the pace for the retail industry in the last two decades. Together, the two account for more than 2% percent of the nation's GDP and 1.7 million jobs.

At the turn of the 20th century, about 50% of U.S. workers were employed in agriculture and domestic service. Less than 100 years later, the number was about 4%. Much of this transformation came about because innovations, many of them introduced by entrepreneurs, made agriculture a shining example of increasing productivity, and labor-saving products such as the vacuum cleaner, gas and electric ranges, washing machines and clothes dryers, dishwashers, automobiles, lawnmowers, floor polishers, processed foods, microwave ovens, and services increased the productivity of household labor. The proportion of the workforce in manufacturing grew from 19% in 1900 to 27% in 1950, thereby providing alternative employment opportunities for farm laborers and domestic workers.

By 2005, only 17% of U.S. jobs were in the goods-producing sector and 83% were in the service-providing sector; the proportion of knowledge-based jobs was estimated to be more than 50%. The DJIA reflects the changing face of the U.S. economy: In 1896, the 12 companies that made up the DJIA reflected the dominance of agriculture and basic commodities; in 1928—the first time the DJIA comprised 30 companies—the members reflected the importance of manufacturing, retailing, and the emerging radio industry; and in 2012, the shift is toward knowledge-based, communications industries, and financial services.

DJIA Companies		
1896	**1928**	**2012**
American Cotton Oil	Allied Can	3M
American Sugar	Allied Chemical	Alcoa
American Tobacco	American Smelting & Refining	American Express
Chicago Gas	American Sugar	AT&T
Distilling & Cattle Feeding	American Tobacco	Bank of America
General Electric	Atlantic Refining	Boeing
Laclede Gas Light	Bethlehem Steel	Caterpillar
National Lead	Chrysler	Chevron Corporation
North American	General Electric	Cisco Systems
Tennessee Coal, Iron & Railroad	General Motors	Coca-Cola
U.S. Leather	General Railway	DuPont
U.S. Rubber	Goodrich	ExxonMobil
	International Harvester	General Electric
	International Nickel	Hewlett-Packard
	Mack Trucks	The Home Depot
	Nash Motors	Intel
	North American	IBM
	Paramount Publix	Johnson & Johnson
	Postum	JPMorgan Chase
	Radio Corporation	UnitedHealth Group
	Sears, Roebuck	McDonald's
	Standard Oil (NJ)	Merck
	Texas Corporation	Microsoft
	Texas Gulf Sulphur	Pfizer
	Union Carbide	Procter & Gamble
	U.S. Steel	Travelers
	Victor Talking Machines	United Technologies Corporation
	Westinghouse	Verizon
	Woolworth	Walmart
	Wright	Walt Disney

Of course, only a few of the entrepreneurial giants ever get into the DJIA, which is composed of only 30 of the most widely held stocks. The following are some of the other legendary entrepreneurs and their companies that played important roles in the entrepreneurship revolution of the last 30 years.

Perhaps one of the most revolutionary entrepreneurial ideas outside of high-tech industries was Fred Smith's notion to deliver packages overnight anywhere in the United States. Smith identified a need for shippers to have a system designed specifically for airfreight that could accommodate time-sensitive shipments such as medicines, computer parts, and electronics in a term paper that he wrote as a Yale undergraduate. Smith's professor did not think much of the idea and gave it a C. After tours of duty in Vietnam, Smith founded his company, Federal Express (FedEx) in 1971, and it began operating in 1973 out of Memphis International Airport. In the mid-1970s, Federal Express had taken a leading role in lobbying for air cargo deregulation, which finally came in 1977. These changes allowed Federal Express to use larger aircraft and spurred the company's rapid growth. Today FedEx has the world's largest all-cargo air fleet, including McDonnell-Douglass MD-11s and Airbus A-300s and A-310s.[27]

In 1971, when Southwest Airlines began operations, *interstate* airline travel was highly regulated by the federal government, which had set up the Civil Aeronautics Board (CAB) in 1938 to regulate all domestic air transport as a public utility, setting fares, routes, and schedules. The CAB was required to ensure that the airlines had a reasonable rate of return. Most of the major airlines, whose profits were virtually guaranteed, favored the system.

Not surprisingly, competition was stifled, and almost no new airlines attempted to enter the market. However, *intrastate* passenger travel was not regulated by the CAB, so Southwest, following the pioneering path of Pacific Southwest Airline's (PSA's) service within California, initiated passenger service within Texas. The success of PSA and Southwest in providing cheap airline travel within California and Texas provided powerful ammunition for the deregulation of *interstate* travel, which came about in 1981 as a consequence of the Airline Deregulation Act of 1978.[28] Since deregulation, more than 100 startup airlines have inaugurated interstate scheduled passenger service with jet aircraft.[29] Herb Kelleher, the charismatic co-founder of Southwest Airlines, is often credited with triggering airline deregulation by persevering with his legal battle to get Southwest airborne in the face of fierce legal opposition from Braniff, Trans-Texas, and Continental Airlines. Two of those airlines took their legal battle all the way to the U.S. Supreme Court, which ruled in Southwest's favor at the end of 1970.[30]

Robert Swanson was 27 when he hit upon the idea that a company could be formed to commercialize biotechnology. At that time, he knew almost nothing about the field. By reading the scientific literature, Swanson identified the leading biotechnology scientists and contacted them. "Everybody said I was too early—it would take 10 years to turn out the first microorganism from a human hormone or maybe 20 years to have a commercial product—everybody except Herb Boyer."[31] Swanson was referring to Professor Herbert Boyer at the University of California at San Francisco, co-inventor of the patents that, according to some observers, now form the basis of the biotechnology industry. When Swanson and Boyer met in early 1976, they almost immediately agreed to become partners in an endeavor to explore the commercial possibilities of recombinant DNA. Boyer named their venture Genentech, an acronym for genetic engineering technology. Just seven months later, Genentech announced its first success, a genetically engineered human brain hormone, somatosin. According to Swanson, they accomplished 10 years of development in seven months. Most observers say it was Swanson's entrepreneurial vision that brought about the founding of the biotech industry. By 2012, there were about 1,850 U.S. biotech companies with combined revenues of more than $87 billion.[32] At almost the same time that Swanson was starting Genentech in southern San Francisco, not many miles away Steve Jobs and Stephen Wozniak were starting Apple Computer in Silicon Valley. Their computer, the Apple I in kit form, was an instant hit with hobbyists. The Byte Shop—the first full-time computer store anywhere in the world, which opened in Silicon Valley in December 1975—ordered 25 of them in June 1976. The owner of The Byte Shop asked Jobs to put the Apple I computer board in a case because his customers were asking for complete units, not just kits. When they did so, both Apple and The Byte Shop had a hot product on their hands. The Byte Shop grew to a chain of 75 stores. "Without intending to do so, Wozniak and Jobs had launched the microcomputer by responding to consumer demand."[33]

Genentech's initial public offering (IPO) in October 1980, followed by Apple's IPO only two months later, signaled that something magical was stirring in the biotech and personal computer industries. It triggered a wave of venture capital investment and IPOs in both industries.

A tipping point in the infant personal computer industry was the introduction of the VisiCalc spreadsheet. Dan Bricklin conceived it when he was sitting in an MBA class at Harvard in 1978, daydreaming about how he could make it easier to do repetitive calculations. Bricklin designed the prototype software to run on an Apple II. Together with Bob Frankston, he formed a company, Software Arts, to develop the VisiCalc spreadsheet. When they introduced their first version in May 1979, it turbocharged the sale of Apple computers. Subsequently, sales of IBM PCs were rocketed into the stratosphere by Mitch Kapor's Lotus 1-2-3 worksheet.

The late 1970s and the early 1980s were miraculous years for entrepreneurial ventures in the computer industry. Miniaturization of hard-disk drives, a vital component in the information technology revolution, was pioneered by Al Shugart, first at Shugart Associates, then at Seagate Technology. Dick Eagan and Roger Marino started EMC Corporation in 1979, initially selling computer furniture, and with the seed money from that, they launched

into selling Intel-compatible memory. From that beginning, Eagan and Marino built EMC into a company that during the 1990s achieved the highest single-decade performance of any listed stock in the history of the New York Stock Exchange. Today it is the dominant company in the data storage industry.

Robert Metcalfe, the inventor of Ethernet, founded 3Com in 1979 to manufacture computer network products. 3Com built its business around Ethernet plug-in cards for personal computers. Today Ethernet is so widely used that it is usually built into most PC motherboards.

Michael Dell, while still a student at the University of Texas, Austin, in 1984, began selling IBM-compatible computers built from stock components that he marketed directly to customers. By concentrating on direct sales of customized products, Dell became the largest manufacturer of personal computers in the world, and Michael Dell was CEO longer than any other executive in the PC hardware industry.

Entrepreneurs were at the conception and birth of new products and services that have transformed the global economy in the last 35 years. However, what is turning out to be the biggest of them all began in 1989 when Tim (now Sir Timothy) Berners-Lee conceived the World Wide Web. We are in the midst of a revolution that is changing our lives more profoundly and faster than anyone could have imagined before the Web became operational in 1992. No major new product has been adopted as quickly by such a large percentage of the U.S. population as the Web.

Time for New Technologies to Penetrate 25% of U.S. Population	
Household electricity (1873)	46 years
Telephone (1875)	35 years
Automobile (1885)	55 years
Airplane travel (1903)	54 years
Radio (1906)	22 years
Television (1925)	26 years
VCR (1952)	34 years
PC (1975)	15 years
Mobile Phone (1983)	13 years
World Wide Web (1992)	5 years

Source: The Wall Street Journal, June 1997; http://en.wikipedia.org/wiki/Advanced_Mobile_Phone_Service; www.netbanker.com/2000/04/internet_usage_web_users_world.html.

Web: Three Revolutions Converge

In 1989, when Tim Berners-Lee wrote a proposal to develop software that resulted in the World Wide Web, he was not the first to conceive the idea. As far back as 1945, Vannevar Bush proposed a "memex" machine with which users could create information "trails" linking related text and illustrations and store the trails for future reference.[34]

As it turned out, he was 50 years ahead of the technologies that were needed to implement his idea. After all, the first digital computer was then only a couple of years old. Fifteen years later Ted Nelson, inspired by Bush's "memex," was the first person to develop the modern version of hypertext. He wrote—prophetically, as it turned out—in 1960 that "the future of humanity is at the interactive computer screen . . . .the new writing and movies will be interactive and interlinked . . . .we need a world-wide network to deliver it . . . .[35]

But Nelson, too, was far ahead of the technology. In 1962, there were fewer than 10,000 computers in the world. They cost hundreds of thousands of dollars, they were primitive machines with only a few thousand bytes of magnetic core memory, and programming them was complicated and tedious. AT&T had a monopoly over the phone lines that were used for

data communication. And the ARPANET, which was the forerunner of the Internet, had not yet been conceived.[36]

Berners-Lee was a 25-year-old physics graduate of Oxford University working as a consultant at CERN, the European Particle Physics Laboratory in Geneva, Switzerland, in 1980 when he wrote his own private program for storing information using the random associations the brain makes. His Enquire program, which was never published, formed the conceptual basis for his future development of the Web.[37] In 1980, the technology existed for implementing Berners-Lee's concept, but the power of the technology was low, and the installed base of computers was tiny compared to what it would be 10 years later. By 1989, when he revived his idea, three revolutions were ready for it. They were in *digital technology, information technology (IT)*, and *entrepreneurship*. The semiconductor revolution enabled the digital revolution, which in turn enabled the IT revolution. By 1992, when the Web was released by CERN, the Internet had 1 million hosts, computers were 1,000 million times faster, and network bandwidth was 20 million times greater than 20 years earlier. The entrepreneurship revolution meant that there was an army of entrepreneurs and would-be entrepreneurs, especially in the United States, with the vision and capacity to seize the commercial opportunities presented by the Web. In February 1993, the National Center for Supercomputing Applications (NCSA) released the first alpha version of Marc Andreessen's Mosaic. By December 1994, the Web was growing at approximately 1% a day—with a doubling period of less than 10 weeks.[38] In the next 10 years, Internet usage exploded.* By 2009, users numbered 1.7 billion, which was about 25% of the entire population of the world.

Entrepreneurship Revolution Strikes Gold

Marc Andreessen moved to Silicon Valley in 1994, teamed up with veteran IT entrepreneur Jim Clark, and incorporated Mosaic Communications (later renamed Netscape Communications). Clark put $6 million of his own money into Mosaic, and venture capitalists added another $6 million.[39] Their intent was to create a browser that would surpass the original Mosaic. It was a classic Silicon Valley startup with programmers working 18-hour days, seven days a week, sometimes even working 48 hours at one stretch just coding. In October 1994, the Netscape browser was posted as a download on the Internet. In no time at all, it was the browser of choice for the majority of Web users; in December 1994, Netscape Communications began shipping Netscape Navigator, which started to produce income.

Netscape Navigator was an instant success, gaining 75% of the browser market within four months of its introduction. Netscape Communications was only 16 months old when it went public in August 1995. Its IPO was one of the most spectacular in history and made Jim Clark the first Internet billionaire. According to an article in *Fortune*, "It was the spark that touched off the Internet boom."[40]

A gold rush was under way. "Netscape mesmerized investors and captured America's imagination. More than any other company, it set the technological, social, and financial tone of the Internet age."[41] A generation of would-be entrepreneurs was inspired by Netscape's success. What's more, corporate executives from established businesses wanted to emulate Jim Barksdale, the former president of McCaw Communications, who joined Netscape's board in October 1994, became CEO in January 1995, and made a huge fortune in just eight months. Investors—both angels and venture capitalists—hustled to invest in Internet-related startups. It seemed as if everyone was panning for Internet gold, not only in Silicon Valley but also throughout the United States—and a couple of years later throughout the rest of the world.

* The Internet and the World Wide Web (now usually called the Web) are two separate but related entities. However, most people use the terms interchangeably. The Internet is a vast network of networks, a networking infrastructure. The Web is a way of accessing information over the Internet. It is an information-sharing model that is built on top of the Internet.