



THE NEXT BOOM

WHAT YOU ABSOLUTELY, POSITIVELY HAVE TO KNOW
ABOUT THE WORLD BETWEEN NOW AND 2025



SAMPLER

Jack W. Plunkett

The following is an excerpt from Jack W. Plunkett's *The Next Boom: What You Absolutely, Positively Have to Know About the World Between Now and 2025*. This abridged version includes the Introduction and portions of chapters One, Three and Five. As this is only a sampler, you will not find any citations or reference material within this version of the text. These samples contain information that readers may find useful and interesting, but to get the full experience, we recommend purchasing *The Next Boom* in its entirety. For more information, please visit the Plunkett Research web site at <http://www.plunkettresearch.com/nextboom>.

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Interested in learning more about the topics covered in The Next Boom?
Watch our series of informative chapter videos!

<http://www.plunkettresearch.com/nextboom/videos>



— introduction —

A bumper sticker popular in West Texas during the oil bust of the early 1980s went something like this, “Please God, just give me one more boom—I promise not to blow it this time.” Today, millions of people around the world may be having similar thoughts. Fortunately, the foundations of the “Next Boom” are already being laid, and people who understand the massive changes that will bring that boom about will benefit greatly.

The Three Building Blocks of the Next Boom

The recipe for the Next Boom has been written: expanding markets, growing consumer demand in emerging nations, and motivated entrepreneurs combined with breakthrough technologies. The raw ingredients are already merging and taking shape like yeasty dough rising slowly in a baker’s oven, even if it seemed impossible to imagine during the dismal bust we recently endured. The core focus of this book is that three powerful platforms have tremendous synergy that will boost the world of business while bringing stunning global changes during the 2011-2025 period. These vital building blocks include:

- 1) A soaring global population.
- 2) Sweeping changes in consumers, demographics and education.
- 3) Emerging technologies, centered on health care, wireless communications, biotechnology, nanotechnology and energy.

The Next Boom and its underlying causes will have a deep, evolutionary effect on all of us. For example, the next billion consumers are right around the corner (including the next 40 million Americans). The U.S.

population was expanding at the rate of one person every 11 seconds, as of mid-2010, and you will soon see headlines proclaiming that the world's population has reached the 7 billion mark.

But First, What Launched the Last Boom?

During the final months of 1982, one of the most amazing eras of economic growth in history took off with a burst of strength, stamina and hope like Lance Armstrong charging up a mountain in the Tour de France. The United States was entering an era of economic expansion that endured (with occasional slow downs) until 2007, but you certainly couldn't tell it from the gloomy looks on Americans' faces. In the early 1980s, consumers were generally careful with their money. Jimmy Carter had left the White House the year before, losing to Ronald Reagan's campaign concepts of supply side economics and his warnings about the "misery index," which is the sum of the rates of inflation and unemployment. People were miserable indeed. Jobs were scarce, and the American unemployment rate reached 10.8% on December 1, 1982. People were thrifty; many stayed home, watched TV or read books. When some families wanted to splurge, they went to the movies. Escapism, introspection and grand feats of courage were the order of the day in entertainment. The film *Gandhi* won the Academy Award for best picture. *Falcon Crest*, *Dynasty*, *Three's Company* and *The Love Boat* were hot on TV. James Michener's novel *Space*, about the early heroes of space exploration, and Leo Buscaglia's feel-good guide *Living, Loving and Learning* were among the most popular books, while John Updike won a Pulitzer Prize for *Rabbit is Rich*.

The economy was lackluster as 1982 began. However, as the year progressed a fire started to glow in the minds of the nation's investors, financiers and entrepreneurs that soon erupted into a wildfire that took 25 years to extinguish: the Great Boom. New technologies and brilliant business startups were about to change the world, creating massive amounts of global wealth in the process. Information technology had whetted the appetite of a new generation of entrepreneurs who launched companies in 1982 that would become the foundation of the technology boom. A representative list of these firms should include Electronic Arts, Adobe, Autodesk, e-Trade, Compaq (which, along with hard drive maker Conner Peripherals, became one of the fastest startups to reach \$1 billion in annual sales while making global investors acutely aware of the potential high returns of well-placed venture capital), LucasArts, Lotus Soft-

ware, Sun Microsystems and Symantec. After a promising start, personal computing was going mainstream. While Atari and Radio Shack had sold small PCs in the late 1970s and the Apple II had gone on the market in 1977, it was 1982 that saw the PC market really begin to take off, bringing thousands of companies that sold software, printers, accessories, games or computer services along for the ride. The Commodore 64 personal computer was launched at the groundbreaking price of \$400, with an equally groundbreaking 64 kb of RAM memory. The IBM PC had been on the market briefly, since 1981, using an operating system called MSDOS. This software, incidentally, was co-written by Bill Gates, who went on to become one of the richest people in the world. Soon, 1983 saw the launch of Novell, AOL and Intuit on the tech side, and Sam's Club started its crusade to revolutionize warehouse-style retailing. By 1984, the Apple Macintosh hit the market and desktop publishing and computerized graphic design took off. Meanwhile, PC owners upgraded to hard drives from floppy disks for their storage needs, which made the usefulness of the personal computer virtually unlimited.

The Great Boom had a lot of help. Venture capital, leveraged buy-outs, private equity, deregulation, immigration, globalization, population growth, communication technologies, huge increases in the size of the global middle class, and the massive, well-educated Baby Boom generation in America and elsewhere combined to create near-perfect conditions for global stock markets. The Dow Jones Industrial Average of stocks (the "Dow") grew from 1,100 in February 1983, after a long, stagnant period, to 5,000 in November 1995, 10,000 in March 1999 and 14,000 in mid-2007. The International Monetary Fund ("IMF") reports that world trade grew by an average 7.1% yearly from 1991-2000. Those of you who know the "rule of 72" realize that a growth rate of this magnitude was enough to double world trade over a 10 year period. While a few people warned of "irrational exuberance," consumers went on a buying binge unrivaled in the history of the world. Sales of automobiles, houses, home furnishings, jewelry, apparel, electronic games, meals in restaurants, airline tickets and room nights in hotels all enjoyed amazing, long-term rates of growth. Eventually, that growth was equaled in the world of debt as interest rates fell and loans became astonishingly easy to obtain: credit card balances, car loans, home mortgages and corporate debt soared like there was no possible limit to the ability of borrowers to repay.

The dotcom era was born and technological innovation seemed endless. By 2000, unemployment in America had dropped to as little as 3.8%, and employers faced true worker shortages. Real GDP (adjusted

for inflation) for the world grew by 2.8% yearly for 1991-1998 and 3.9% yearly from 1999-2006. Growth rates in emerging countries were much higher. This was the boom that lifted hundreds of millions of people out of poverty throughout the world. When you consider the magnitude of the Great Boom, which officially peaked near the end of 2007, it becomes less surprising that it was followed by a significant correction: the Great Recession which devastated so many people and organizations in 2008 and 2009.

Today, Long-Term Trends Point to Another Powerful Boom

If I had to describe my point of view as an author, I would say that I am a “pragmatic optimist.” I am fully aware of the multitude of obstacles lying in the path of economic growth, but I believe those obstacles will be surmounted effectively. I developed the idea of this book in early 2009. The world had been bombarded with abysmal news—stock markets spiraling downward, foreclosures and bankruptcies mounting and unemployment soaring. Nonetheless, I knew instinctively that the gloom would eventually be followed by good times. Tight credit markets, such as those of 2008-2009, always ease. New waves of opportunity and prosperity course through the world of business and industry from time to time, always followed by a correction, mild or otherwise. I began to imagine what the positive side of business news would look like in coming years. From recent work we had been conducting at Plunkett Research, Ltd., I mentally plucked the mid- to long-term trends that were going to aid a recovery and eventually lead to the Next Boom. A strong picture began to take shape in my mind, and I realized I had the basis for a book. I outlined a succinct list of trends that will soon be positive for the economies of the U.S. and the world overall. To me, these trends are nearly irresistible. While they may accelerate or slow, depending on external influences such as war, interest rates, regulatory environments, terrorism or widespread disease, they are not likely to be stopped. In addition, I believe that there has been a sea change in the attitudes of voters and consumers—today there is a rising demand in America and many other nations for more efficient, effective government, better public education and job creation, while such challenges were easy to ignore or brush aside during the heady days of the Great Boom. This change in attitude and focus has the potential to be very positive for the world of business.

While it is impossible to foresee the length, extent and exact timing of the Next Boom, vital factors are combining that have the potential to launch a very exciting period of economic growth. Demographic changes and population growth patterns point to important new consumer markets. Meanwhile, technology continues to move ahead boldly and the Next Boom will follow. The world's brightest strategists are already looking ahead to the next billion wireless subscribers, the next billion car owners, the next billion Internet users and the next billion members of the global middle class. Information technology has only begun to enhance businesses of all types, drive the delivery and usefulness of information in real time, and make industries more efficient.

There is a lot to be optimistic about if you know where to look. I'm not suggesting that you look at the world through rose-colored glasses. Instead, I believe that you will benefit most from the state of the world today by understanding the changes that are occurring around you in order to prepare yourself for the Next Boom. Economic booms and busts have been recurring in cycles since organized trade and commerce first emerged in the earliest days of civilization. October 2009 marked the 80th anniversary of Black Friday: the great stock market crash of 1929 and the key that unlocked the Pandora's Box now called the Great Depression. Here's a bit more U.S. recession history: July 1990 began a 10-month recession. April 1980 saw the start of a 30-month recession. The oil embargo crisis launched a 24-month recession in April 1973. Slowdowns, recessions and burst bubbles occur on a regular basis, including an abrupt halt to business after 9/11. The Next Boom is coming, despite the Great Recession of recent years, and it will be an exciting period of solid global growth that will create immense opportunities for investment, business formation, innovation and job creation. Yes, there will be setbacks and challenges, but the Next Boom is already starting to roll down the track—eventually, it will reach full speed.

How to Use This Book

This book is organized into four sections:

- Part One: People (demographics and consumers)
- Part Two: Places (global trade and rising middle classes)
- Part Three: Things (innovation, always-on/always getting smaller, energy and health care)
- Part Four: Change (generations and education)

As you will see, the “three building blocks of the Next Boom,” including the upcoming, powerful effects of advancing technologies, are woven throughout these sections of the book. The final chapter is an epilogue that includes a scenario of what world news might look like on January 1, 2026 and a very brief discussion of “what could go wrong?”

This book is not intended to be scholarly. Likewise, it is not intended to cover all possibilities, global challenges or points of view, or to prescribe answers to all problems and needs. Instead, it is designed to be an easy-to-understand and easy-to-use detailing of the obvious and not-so-obvious, written in lay terms that will not require any particular expertise or background on the part of the reader. I am assuming that you have a reasonable interest in societal changes, technological developments and the forces that are shaping the world around you, not necessarily that you have an extensive background in business, finance or economics.

Research Tools, Discussion Guide, Multimedia and Interactive Links

The book includes tables of vital data to help you understand and analyze the numbers for yourself. In addition, the end of each chapter includes a list of “Internet Research Tips,” that will make it easy for you to conduct additional research at some of the world’s best online resources. For those of you reading *The Next Boom* on an Internet-enabled eBook reader, it is intended to be a highly interactive, multimedia resource. The lists of research tips include the Internet addresses of my web-based video introductions to each chapter, as well as links to numerous related videos, guides and discussions published by other organizations. If you are reading the book in printed form or on an eBook platform that lacks connectivity, you can enjoy the lists of links by entering the Internet addresses into the browser of your favorite computer. You will also find a reading group guide in the back of the book and posted to *The Next Boom*’s page on my company’s web site, www.plunketterresearch.com/nextboom. To participate in online discussions, you are invited to join our “*The Next Boom*” group on LinkedIn, or you can “like” our *The Next Boom* page on Facebook.

A Last Bit of Business

No one can consistently, accurately predict the future. This book was not designed to be used as specific investment advice or a crystal ball that

perfectly illuminates your personal future. Instead, it was written to be a set of ideas, an analysis of global trends and synergies and a thought-provoking platform to help you do further research and make your own decisions. I have attempted to provide accurate data and analysis. Nonetheless, numbers and situations can change quickly in the worlds of business, finance, industry and government. In addition, forecasts of population, world trade and other important statistics, such as those quoted in this book, are frequently changed by the organizations that issue them. You should use caution and look for the latest data prior to making any decisions.

This book will be most useful when you keep two definitions in mind: First, when I say “near future,” I mean approximately 2013 through 2025, but this is not intended to be an exact phrase. Next, when I use the phrase “Next Boom,” I mean a significant, multi-year era of growth in GDP that is positive for most of the world’s modern and emerging economies. Please bear in mind that the boom will most likely have periods of interruption, correction or crisis that are painful. For example, the Great Boom of 1982 to 2007 was interrupted intermittently by the Black Monday stock market crash of October 19, 1987, when the Dow stock index fell 508.32 points, losing 22% of its value; the savings and loan crisis of 1989; the dotcom crash of 2000; and the terrorist attacks of September 11, 2001. Nonetheless, America and most of its major trading partners recovered quickly after each setback. Looking back, this period was indeed a Great Boom of 25 years in length.

In closing this introduction, I will relate a story about one of the people referred to in this book’s dedication. James Lorie was a close friend with whom I spent many long and entertaining evenings prior to his death in 2005 at age 83. Despite his advanced age and obvious frailness, he remained active and influential in the world of business, almost to his last days. We would meet for long dinners at his mountaintop home in Tesuque, New Mexico or dine in my house outside Santa Fe while a *pinon* wood fire roared in the fireplace. On summer evenings, we would often be joined by a group of friends to dine outdoors at one of Santa Fe’s restaurants where we would listen to Jim tell his stories. Jim had been a dean and professor at the Graduate School of Business at the University of Chicago. He served on the boards of organizations like Merrill Lynch and NASDAQ, and his books and research are among the foundations of modern finance. Jim was particularly famous for analyzing the past in order to better understand the future. He could talk for hours, but Jim was also known for short sentences that were to-the-point. One evening,

at a crowded dinner table, we had a lively conversation about business and what would happen in the near future. This particular conversation went on too long. In his highly effective manner, honed through decades of chairing panels, committees and meetings, Jim abruptly moved us along to another topic by stating the obvious, “There are no guarantees about the future.” I say the same to you now. About the future and the Next Boom, there are no guarantees. Nonetheless, there is good reason for optimism.

Jack W. Plunkett
Houston, Texas
2010

Join in the discussion!

- See the Reading Group Guide in the back of the book.
- Go to Facebook, search for The Next Boom.
- Join The Next Boom group on LinkedIn.

— chapter one —

**NEWLY BORN AMERICANS, AGING BABY
BOOMERS AND WHY AMERICA'S SOARING
POPULATION IS A HUGE ADVANTAGE**

"I always avoid prophesying beforehand because it is much better to prophesy after the event has already taken place."

-Winston Churchill

Sometime during 2010, a special person, a portent of the future, arrived in the United States of America. Statistically speaking, this arrival was probably a newborn female. She became the 310 millionth living resident of the U.S., a new milestone in the relentless upward march of America's population. As you will see, this is a strategic advantage and a source of great envy in many other nations. Overwhelmingly, the odds show that she was likely Hispanic, a ballooning sector that will account for one out of four Americans by the time she is 27 years old. Born too late to be part of Generation Y, she is a member of a new cohort, the Diversity Generation, which by 2020 will total 81 million young people. She could easily enter a career as a home health aid, based on future workforce trends. However, if the currently dismal public education system doesn't fail her (and promising reforms are gaining traction), she might become a registered nurse, an engineer, an entrepreneur or a scientist who discovers one of the vital future breakthroughs in biotechnology that will help to feed the world's soaring population. Based on the massive shifts

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in demographics currently underway, it isn't too hard to picture that she, or someone like her, could become the CEO of a major corporation, say Wal-Mart, or maybe a U.S. senator, or the leader of a giant, multinational financial institution.

In 2025, she will live in a world that, in many ways, is hard for us to imagine today: a world where enhanced technologies will provide immense boosts to productivity, energy efficiency, health care and food production—a world linked 24/7 by embedded communications and rapid transportation, where global trade is growing at a phenomenal rate. If America's government and educational institutions perform their jobs wisely and effectively, then she will become a young adult in an environment where the U.S. remains the world's most important economy and an enviable font of innovation and business creation. However, America will be sharing leadership to a growing extent with China while it faces intense economic competition from rapidly growing business sectors in Brazil and India, and in such advancing nations as Turkey. Africa will be a vital source of future young workers, as well as a promising market for exports, while Japan and much of Europe will suffer from aging, and in some cases shrinking, populations. These changes will be underway full steam while she is a high school student in 2025. Whoever she is, whatever she becomes, however her life, her dreams and her career evolve, she represents some of the dominant trends of the near future. She is a child of the Next Boom.

Meanwhile, we are living on a planet that supports 460 million North Americans, more than 1 billion people in each of India, China and Africa, 500 million residents of the EU and nearly 3 billion people scattered about the rest of the globe. The grand total is about 6.8 billion Earthlings. While these may sound like immense numbers, you haven't seen anything yet—populations in certain nations, including the U.S., are set to roar past these 2010 estimates like a wall of water in a tidal wave.

More people mean more demand and much larger markets for businesses. Some observers will dwell only on the massive challenges posed by such large populations. Others will make immense fortunes by solving those challenges, focusing on the opportunities, filling the needs of a booming global middle class, inventing the technologies that will move the diverse people of the world forward, and providing the infrastructure needed to sustain them. However, in order to best survive, serve or profit from this ballooning mass of mankind, you must understand the startling evolution taking place globally in demographic terms, the changing face of the typical American, and the advancing lifestyles of urban

consumers in India, China and Brazil, in addition to the growth in numbers. Also, you must understand the striking differences between growing nations, such as the U.S., and shrinking nations, such as Russia and Japan. I am not implying that the U.S. or any other nation can enjoy a boom by default because of an expanding population. As discussed in later chapters, economic success on a national scale requires a carefully fostered environment in which research and innovation can flourish, entrepreneurs and businesses can create jobs, and educators can properly prepare the workforce with vital skills and knowledge, while trade and investment are supported. America has a significant advantage in the robust growth of its population, and I believe this advantage will be a powerful component of an economic rebound if America has the will to seize this opportunity and move ahead into a new era of prosperity. As you will see, the world is on the cusp of many exciting developments that together will provide a significant boost to America and many of its trading partners. A good step toward understanding these developments is a discussion of changes in population, demographics and consumer habits, as provided in Part One of this book.

Grow the Economy, Stupid

America's rapid growth of the near future will push its population to 350+ million before 2025, and 400 million around 2043. This will be a vital leg under the Next Boom. In America, a rising head count will boost economic growth, fuel consumer demand and help bail out government debts and obligations. This trend will provide employers with a broad workforce while increasing both the tax base and deposits to the ailing Social Security system. In Bill Clinton's successful presidential campaign against George H.W. Bush in 1992, strategist James Carville came up with a powerful phrase, "It's the economy, stupid." This simple statement captured the attention of millions of voters and effectively painted Bush as a mediocre manager of America's future. A candidate in 2012 or 2016 might want to modify Carville's idea slightly to "Grow the economy, stupid," to help address rapidly growing concerns about federal debt and entitlement levels, which will be looming over the land like a vulture watching a wounded animal.

The United States remains an incredibly lucky land in many ways, despite current high debt levels, and despite rising competition from emerging nations like China. Part of America's good fortune lies in its population trend. The head count rises relentlessly, second-by-second, adding

about 3 million people yearly since 1990. If you want to know how large the population is at any given moment, simply log onto www.census.gov, the web site of the U.S. Census Bureau, which is the agency officially charged with counting the numbers and studying the demographics of the nation. On their web site, analysts at the Census Bureau maintain two “Population Clocks” providing estimates of the total counts of the U.S. and of the world as a whole. Tick after tick, these clocks paint a very useful picture of the future.

As of June 2010, the bureau figured there was one U.S. birth every 7 seconds, which more than offset the rate of death (one every 13 seconds). Furthermore, the bureau calculated that there was one net immigrant every 36 seconds. Doing the math showed a gain of 7,854 Americans per day, enough to create a small town. In one year, it’s enough to match the number of people living within the city limits of Chicago. Every 11 seconds, the clock cranks up one more person, steadily pushing America’s count well past the 300 million mark that was achieved in 2006.

While you are on the bureau’s web site, it is worth studying the World Population Clock as well. For the 12 months ended June 30, 2010, the bureau estimated the Earth’s tally of inhabitants to have grown by 76 million. That one year’s growth was an amount roughly equal to the combined populations of California, Texas and New York.

How Crowded Is America?

For a few years in the mid-2000s, I commuted by air on a regular basis from Houston, Texas to Santa Fe, New Mexico, usually via the Albuquerque airport. The Houston – Albuquerque flight is a bit less than two hours, but it nevertheless covers a lot of territory, through a vast expanse of central and west Texas, and on to central New Mexico. Two facts were apparent as I gazed out the airplane windows on those repetitive flights. First, there is a massive amount of room left in America for future multitudes to live and work. Yes, the greater Houston area may cover 600 square miles, and it looks pretty well packed from the air, but it quickly passes from sight as rolling, rural Texas countryside emerges. The next major city in the usual flight path is Austin, with about 1.7 million people in the metro area as of 2010. Then there is next to nothing: hundreds and hundreds of miles of near emptiness until the aircraft abruptly descends over the Sangre de Cristo mountains to provide a first glimpse of Albuquerque which, like Austin, is a city of relatively modest size. These open expanses and mid-size cities are important building blocks of

the future. America's vast size will give its growing population a wide variety of choices in terms of urban, suburban and rural lifestyles. As you will see, population density in the United States is remarkably low.

A second fact that I mulled over on those aircraft: while technologies leap forward constantly, this progress may be largely out of sight to most of the population. From the air, traveling west from Houston or Dallas has always offered a look at oil and gas wells far below on the Texas plains. Their number increased quickly in the mid-2000s as the price of oil soared. But, at the same time, wind mills sprouted beneath the flight path—thousands of them, turning Texas into America's largest wind-power generating state almost overnight. Change is constant; progress is nearly as constant, but we may not be very aware of it. Technological progress is a second, absolutely vital building block of the Next Boom, and it will enable prosperity to advance along with population growth.

1 Billion Americans?

To a stunned crowd at the American Planning Association's 2008 conference in Las Vegas, demographics expert Arthur C. Nelson made the case that America can sustain immensely larger populations, and may well need to do so in the relatively near future. He explained that by 2100 to 2120, the U.S. head count could grow to as much as 1.0 to 1.2 billion (at the high end of Census Bureau estimates), due to high fertility rates, continuing streams of immigrants and the much longer life spans of the future. While population increases of this order would create intense demands on infrastructure such as energy, transportation and water supply, denser housing could easily make room for a vastly higher number of Americans. This is an important thought, when you consider the great success that some nations have enjoyed in developing prosperous but extremely dense cities. The United Nations estimated the 2010 density of the U.S. at only 33 people per square kilometer, far below the average density of all the world's land mass, excluding Antarctica, (55) and vastly below that of Singapore (7,082), South Korea (487) and Japan (336). A mammoth surge in U.S. population to 1.2 billion would create a density of about 130 people per square kilometer, about 20% higher than today's France and significantly lower than today's Germany.

Growing the Tax Base

There is intense concern in the finance and investment community

that the U.S. government will be forced to utilize inflation to help ease the effect of today's massive federal debts. This may or may not turn out to be true, but there is a much better method than inflation to help reduce these obligations: utilize growing tax revenues from a rising population base and a booming economy. If you have any doubt of the value of a growing, working-age population in the U.S., consider the following facts: As of the fourth quarter of 2008, the Peterson Foundation estimated that unfunded U.S. federal liabilities totaled \$56.4 trillion, an amount equal to \$483,000 for each American household. This figure includes Medicare benefits not covered by taxes and other contributions (\$36.3 trillion), Social Security benefits similarly not covered (\$6.6 trillion) and other federal government liabilities (\$13.5 trillion). If you are an American taxpayer, exactly how do you plan to pay your share? Federal deficits planned for subsequent years will make this look even worse. It will be a great deal easier for future administrations to find a way to fund this financial abyss if there is a much larger workforce, a thriving entrepreneurial business community creating new jobs, and a much bigger base of taxpayers.

A Brief Lesson from U.S. Population History, the Baby Boom and the Re-opening of the Door to Immigrants in the 1960s

Predicting population growth is an inexact art, and forecasts often prove to be embarrassingly far off the mark. The late Julian L. Simon wrote widely on the likely ability of the Earth to provide for an expanding number of humans. In the second edition of his book *The Ultimate Resource*, he pointed out that "The history of demographic predictions calls for humility...and teaches caution rather than fear-motivated, over-reactive policies." Simon tells the story of a "Presidential Research Committee" composed of noted scientists who, in the depths of the Depression in 1933, reported to President Herbert Hoover that America "shall probably attain a [maximum] population between 145 and 150 million in the present century." The 20th Century's end on December 31, 1999 proved them basically blind to future developments, as the actual population turned out to be 279 million. From the day of their forecast in 1933, through the end of the century in 1999, America emerged from the Great Depression, battled in yet another world war and enjoyed several periods of economic boom. Meanwhile, technologies in food production and health care advanced with a resulting boost to nutrition and an extension of average life span, the Baby Boom ensued and immigra-

tion brought waves of new people in the tens of millions to enjoy the fruits and freedoms of the United States.

Future growth in America's population will not be steady. In fact, it varies widely from year to year, and many adjustments to estimates will be required over time. The state of the economy is a major factor in population growth and new household formation. For example, the lowest population gain of recent history was during the height of the Depression in 1933. Still, even during a miserable year known for hunger, poverty and unemployment, human reproduction remained a powerful factor, and the U.S. population increased 0.59% for a net increase of 741,000.

The post-war period saw the head count grow dramatically, starting in 1947, as soldiers were resettled back home and many women left the work force or their military and wartime volunteer posts. (This population boom occurred throughout much of the world.) In 1950, America's annual population gain exceeded 3 million for the first time. The "Baby Boom" was well under way, roaring ahead non-stop through 1964, resulting in today's 76 million surviving Baby Boomers. As you will see, the Baby Boom that started more than 60 years ago is about to have a significant effect on the near future.

The face of America began to change dramatically after a 1965 reform of immigration laws in America opened the doors to large numbers of new residents, immediately after the Baby Boom ended. As a result, an immigration boom ensued that, in terms of numbers, equaled the booms of the late 19th and early 20th Centuries, when newly arrived Europeans and Asians flooded U.S. cities. An important factor in the success of this 1960s renewal of immigration is that America, with its centuries-long history of growth via hopeful new arrivals from Ireland, Poland, Germany, China, Mexico, Africa and elsewhere, did a better job of assimilating its post World War II immigrants than did many other nations. Today, this trend that began decades ago is having a dramatic effect on the America of the 2000s, as second- and third-generation members of many immigrant families obtain high levels of education and push forward America's innovation, technology base and economic output. If you have trouble grasping this, check the number of Asian surnames on the roster of physicians and scientists at any major American teaching hospital.

Later, social upheaval of the Vietnam era and the soft economy of the 1970s led once again to tepid population growth until an immense bounce back starting in the early 1990s. At that point, the economic outlook was brighter and the technology boom gained traction with the widespread introduction of cheap personal computers and cellphones,

along with rapidly growing adoption of the Internet. Jobs were plentiful and household formation was high, along with strong growth in births and immigration.

Immigration—Problems, Policy and Potential

Immigration has always been a fundamental component of America's growth. Many of today's immigrants are highly educated professionals. However, a large number of immigrants have little education and tend to fill low-paying, entry-level or temporary jobs, such as those in meat processing plants, landscaping and agriculture. They also fill jobs in elder care, a need that is going to soar in the near future as Baby Boomers age. U.S. labor market conditions of 2009-2010 reduced immigration because job availability was constrained. When unemployment falls significantly, immigration is likely to resume in earnest.

The logistics, legislation and implications of immigration remained a politically and emotionally charged quagmire as of 2010. It is a national challenge that bears full, impartial and continuous attention. There is the ongoing need to fill low-end jobs, such as home health aides and food industry workers.

Do low-skilled Americans have the motivation and mobility required to fill these jobs, or is a supply of immigrants essential to such tasks? There is the potential to attract and encourage the immigration of highly educated scientists, engineers, researchers, doctors and entrepreneurs who could boost America's competitive advantage in science and technology. There is the possibility of boosting the economy by retaining and assimilating the most gifted of the foreign students who come to the U.S. by the tens of thousands each year to obtain advanced degrees and vital work experience, many of whom currently take their educations, useful experiences and talents back to the benefit of their home countries, particularly India and China. There is the need to resolve the problems of selected border states and communities that bear the costs and disruptions fostered by large numbers of illegal immigrants and by the lack of an effective national immigration policy.

Last, but not least, there is the need to deal with the status of approximately 11.5 million illegal aliens residing in the U.S. What is America's policy going to be? Round them up and send them home? Tolerate them? Integrate them effectively into society by creating paths to legal status for illegal aliens who qualify as desirable long term residents? Such a strategy would come with strings attached. For example, a first step

could be temporary work permits for those who register with the government, file income tax returns and have no criminal background outside of their illegal entry. Current problems, particularly in U.S.-Mexico border areas, include human smuggling, drug smuggling, document fraud, trespassing, violence and a shadow workforce that avoids taxation. The illegal status of millions of immigrants strikes a raw nerve among vast numbers of American citizens, and the fact that the government is unable to control the borders is infuriating to many. There is absolutely no reason why America should settle for lackluster immigration enforcement and poor immigration policies that lead to millions of illegal residents, on one hand, and the rejection of highly skilled immigrant scientists and engineers on the other. Meanwhile, as the number of senior citizens soars in the United States over the near future, and the economy resumes serious growth, the nation will likely have a vital need for large numbers of new, legally documented, immigrant human capital during the Next Boom, including workers on the highly educated level and the unskilled level. Needed workers might come in the form of immigrants who could enter the country legally and be fully accounted for, taxed and employed under better-managed visa and guest worker programs. A primary cause of America's uncontrollable borders and large number of illegal residents is the fact that, as *The Wall Street Journal's* editors succinctly put it, "the demand for entry visas outstrips the supply... the reality is we can't secure the borders without reform that allows more legal ways to work in America."

Trends That Will Fuel the Coming American Population Boom:

Population and Households:

- Total population will rise rapidly, with about 3.2 million average yearly U.S. growth over the mid-term.
- The Latino segment will show the biggest growth.
- A strong fertility rate will boost yearly births from about 4.2 million in 2010 to 5.6 million by 2050.

Immigration:

- Immigration slowed due to the Great Recession, but is likely to accelerate when economic growth resumes. During the last boom, immigration was running at about 1.5 million people yearly. It may reach as many as 2.0 million immigrants yearly by 2050.

U.S. Population, Selected Years 1930-2010

*(In millions; Resident population as of July 1st;
Excludes Alaska & Hawaii before 1950)*

Year	Total Population	Net change from previous period ¹
1930	123.077	16.616
1940	130.880	7.803
1950	151.868	20.988
1960	179.979	28.111
1970	203.984	24.005
1980	227.225	23.241
1990	249.623	22.398
2000	282.224	32.601
2010	310.233	28.009

¹ Net change from prior year shown; 1930 from 1920, etc. Change calculations for 1930 and 2010 are Plunkett Research estimates.

Source: U.S. Census Bureau

Seniors:

- Growing life expectancy will create a vast senior population, where the 65+ years segment will swell from about 40 million in 2010 to 80 million by 2040. This means that more than one in five Americans will be what we currently refer to as “senior citizens.” However, longer careers and life spans could easily move our concept of “senior” status up to 70 or 75 years of age.

The Hispanization of America

One particularly dramatic demographic change could be described as “the Hispanization of America.” The Hispanic segment is growing at such a rapid rate, through both fertility and immigration, that a sea change is occurring. A major influx of a specific segment of people is not unprecedented in the history of America’s development. In earlier decades, extremely rapid changes occurred due to massive arrivals of immigrants from Germany at one time (an estimated 6 million immigrants from 1840 to the beginning of World War I) and Ireland at another (by one count, the Irish were ancestors of 12% of the American population of 2006).

How Hispanics are Counted

Hispanics or Latinos, as defined by the U.S. Bureau of the Census, are those people who classified themselves in one of the specific Spanish, Hispanic or Latino categories listed on the census questionnaire (“Mexican, Mexican Am., Chicano,” “Puerto Rican,” or “Cuban”) as well as those who indicate that they are “other Spanish/Hispanic/Latino.” Persons who indicated that they are “other Spanish/Hispanic/Latino” include those whose origins are from Spain, the Spanish-speaking countries of Central or South America, the Dominican Republic or people identifying themselves generally as Spanish, Spanish-American, Hispanic, Hispano, Latino and so on. Origin can be viewed as the heritage, nationality group, lineage, or country of birth of the person or the person's parents or ancestors before their arrival in the United States. People who identify their origin as Spanish, Hispanic, or Latino may be of any race. Thus, the percent Hispanic should not be added to percentages for racial categories. Tallies that show race categories for Hispanics and non-Hispanics separately are available.

Source: U.S. Census Bureau

Large numbers of Chinese immigrants changed the face of the West Coast in the mid to late 1800s, and hundreds of thousands of Vietnamese entered the U.S. and assimilated quickly, starting with the end of the Vietnam War. Today, however, and for the foreseeable future, Hispanics hold the keys to demographic change and population growth. This segment originated largely in Mexico, but has also been fueled by immigrants from Central American nations such as El Salvador and Guatemala as well as Cuba, Brazil and elsewhere. By as early as 2037, Hispanics in America will total 100 million and make up about 25% of the population.

Meanwhile, America faces an immense challenge: devising effective ways to fully integrate this Hispanic sector, a cohort of rapidly expanding size and economic importance, into society in a way that will foster future generations of well-educated, highly productive citizens. Unfortunately, this is a multi-faceted problem; many immigrants have not acquired high proficiency in the English language, and Hispanic high school students suffer from an 18.3% drop out rate, according to the National Center for Education Statistics, compared to 9.9% for blacks and 4.8% for whites. (The good news is that these drop out rates declined by about one-half from 1980 through 2008.)

Businesses and investors wishing to capitalize on trends will see this Hispanization as a ripe opportunity. To begin with, Hispanics will become more mainstream as their adoption of American lifestyles continues along with their continued intermarriage with non-Hispanics. At the same time, their own tastes, styles and culture will have an influence on everyday American life. If you have difficulty envisioning this, consider the immense number of extremely popular “Mexican” restaurants located all across America, or wander the food aisles of any major supermarket and note the wide variety of Mexican foods and other Hispanic foods, such as those packaged under the popular Goya brand. (An Anglo living in San Antonio, Texas became quite wealthy by building his Pace brand of Mexican sauces to national prominence and later selling it to the Campbell Soup Company.)

The retail and telecommunications industries have been quick to tailor offerings to the Spanish-speaking community. Both Wal-Mart and Best Buy are installing bilingual English/Spanish signage in their stores in neighborhoods that are high in Hispanic counts, and they operate Spanish-language pages on their web sites. Today, savvy businesses know that marketing to Hispanics may involve a number of special initiatives and new services, including signage in Spanish and Spanish-speaking employees on hand. Advertising campaigns aimed at Hispanic consumers are now common, and several advertising agencies specialize in this market. Another example of an industry adapting to the Hispanic market has been financial services. Bank of America and Citibank have both designed special branches in locations where the percentage of Hispanics is particularly high. Most of these lie within Arizona, California, Florida, New Mexico, New York and Texas.

When Does the White Majority Become the Minority?

The growth of the Hispanic segment is dramatic, but it is not by any means the only big change underway. White “majorities” are rapidly becoming minorities in many cities, and that trend will continue aggressively. I recall a day in December 2005 when I made a trip to Houston’s massive Galleria shopping mall, home to hundreds of stores ranging from a mainstream book store to popularly priced clothing boutiques to high end luxury retailers including Neimans, Saks and Tiffany. Weaving my way through the crowd, I was suddenly struck by the fact that, among the hundreds of shoppers I passed, I saw mainly Hispanics, Asians, Middle Easterners and African Americans. There were shoppers in modest Mus-

lim garb, brightly colored Indian saris, African robes and turbans among mainstream people wearing hip or high fashion American clothes. But there were few white faces that made me think of English, Irish, French or German ancestry. It struck me that I was transported to the future of American shopping, where successful retailers would adapt quickly to local demographics and ethnic tastes. America's "minority" population was about 35% of the total as of 2009. In addition to America's rapid growth in the Hispanic segment, (15.8% in 2009), there are significant numbers of Asians (4.5%), and there have long been large numbers of African Americans, but their share of the total population is declining rapidly (12.3%). "White persons not categorized as Hispanic" were 65% (down from about 79% in 2000). Minority segment growth will continue to create a significant evolution in political and demographic terms. In August 2008, the Census Bureau projected that white children will become the minority in the 18-and-under age segment in 2023, and that white people of all ages will become the minority in 2042. A tipping point was expected near the beginning of 2011, when more than 50% of births would be to minorities.

Minorities are already the majority in Texas, Hawaii, New Mexico, California and the District of Columbia. The effects of the Great Recession, including temporarily slower immigration and slower new household formation, may delay the progress of this transition, but the point is clear: America is well on the road to becoming more of an ethnic melting pot than ever.

While immigration is a powerful factor in population gain, the rate, recently estimated at about 1.3 million net new immigrants in the U.S. yearly, is not necessarily constant. You might assume that immigration rates change due to federal regulations and the rate of enforcement of those laws. That is certainly correct, but immigration is also subject to the influence of the economies of the United States, and of the home country of the person who is considering emigrating. The deep, recent recession created an immediate drop in immigration, and many immigrants already on U.S. soil, legally or not, found themselves out of work. More than a few returned home discouraged.

In 2010, as it does every 10 years, the Census Bureau employed legions of people and millions of pieces of mail in attempting an accurate count of the American population. Hundreds of thousands of temporary workers were employed shuffling papers, making phone calls and knocking on doors in a last gasp effort to get people who had not responded to Census questionnaires to cooperate. The effort cost about \$14.5 billion and

**Projections of the Hispanic
Population in the U.S.: 2010 to 2050**

*(In millions; Resident
population as of July 1)*

Year	Population
2010	49.726
2015	57.711
2020	66.365
2025	75.772
2030	85.931
2035	96.774
2040	108.223
2045	120.231
2050	132.732

Source: U.S. Bureau of the Census

will have a direct effect on politicians and voters alike, as the number of congressional seats allotted to each state is determined by census count. You might be wondering whether illegal immigrants are counted as part of the official population. Good question. The goal of the Census Bureau is to count, and gain basic demographic knowledge of, all citizens and all residents of the nation, regardless of their legal status. Census forms are mailed to all known residential addresses, and personal calls are made on addresses that do not respond to the mail. It is easy to imagine that a household of illegal aliens won't fill out the form, and won't want to talk to a stranger carrying a clipboard and asking questions about the age, race and occupation of a building's residents. Consequently, some observers feel that illegal aliens are largely undercounted. Projections of growth in population made before the 2010 Census will eventually be recalculated and may be ratcheted down a bit.

Population—A Boom for Some Countries, a Painful Bust for Others

- In 2050, the global population may peak near 9.1 billion (about 55 million average yearly growth from 2010).
- Growth will not be universal—according to the United Nations, only nine nations will account for about 50% of the increase (U.S., India, China, Pakistan, Bangladesh, Nigeria, the Congo, Uganda & Ethiopia).

- Fertility rates, the quality of health care (and the typical life span) and immigration rates vary widely from region to region.
- The effect of population changes will vary widely, creating highly negative or positive impacts, depending on locale.
- In fact, many developed economies will suffer from significant population declines.

Babies, Boomers and the Next Billion Humans

Earlier, we looked at the ways in which a growing, changing population in the U.S. will bolster the workforce, increase output, fuel demand and help create the Next Boom. When you consider the rapid rates of new births and immigration, it is easy to envision the economic activity of the America of the near to mid-future: a growing workforce and consumer base, new households being formed, continued high demands on public and private education, as well as new residential neighborhoods being built alongside new schools, shopping centers and workplaces.

Now, in contrast, imagine a nation with a very low birth rate and little immigration, combined with a long life span and excellent health care. These factors paint a picture of an aging nation brimming with senior citizens, but suffering from a lack of children, little need for new construction other than buildings created under government stimulus plans, little innovation, a shrinking base of people of working age and a disproportionately high economic burden of health care and pensions for the aged. Such a nation will have a severe challenge in maintaining a workforce of sufficient size to grow the economy, fuel the tax base and care for its senior population, and may be forced to dramatically increase immigration, temporary work permits for foreigners or offshoring of as many tasks and services as possible. This is the direction that nations such as Japan and Italy are headed under current trends.

... Chapter One is continued in the complete book.

— chapter three —

**GLOBAL TRADE 2.0 AND THE PHONE
LADIES OF BANGLADESH**

"My interest is in the future because I am going to spend the rest of my life there."

*-Charles Franklin Kettering (American inventor,
1876-1958, head of research for General Motors)*

Much of the impetus for the Next Boom will come from emerging nations—those countries around the globe that will continue to enjoy soaring economic growth as their levels of commerce, education and infrastructure escalate to new heights. Consequently, Part Two of this book focuses on important factors that will combine to create unprecedented opportunities for business and investment: the world's quickly expanding middle class, an extension of modern services and technologies into developing nations, and the coming evolution in global trade.

A Day in New Delhi—Not Walking

I generally walk miles and miles in every new city I visit—sometimes spending an entire day tramping 10 or 12 miles through neighborhoods to get the local flavor. On a recent trip to India, my habit came to an abrupt halt in New Delhi. All I could do was walk around the block once, because to me, as a westerner accustomed to a reasonable level of protection as a pedestrian, it was nearly impossible to cross the street. There are

no crosswalks and few traffic lights in central New Delhi. Traffic uses rotaries or roundabouts—I suggest that you don't try being a pedestrian in a six-lane roundabout jammed with cars, trucks, scooters, buses and the occasional elephant. If I could magically be leader of India for a day, I would issue a decree calling for the construction of 1 million pedestrian bridges. (The city of Mumbai is now experimenting with a small network of pedestrian bridges.)

Leaving Delhi by car for the adjacent high-tech suburb of Gurgaon, we crawled through traffic, even on the broad new multilane freeway that was intended to efficiently support Gurgaon-bound traffic. Hundreds of unfortunate pedestrians gathered on each side of the freeway were hoping to dash across a dozen lanes of traffic so they could continue on their way on foot. This would be similar to attempting to walk across a Los Angeles freeway at rush hour.

In Gurgaon, a relatively new development of skyscrapers filled with entrepreneurs, analysts and software engineers, modern civilization is advancing in fits and starts. Electric lines dangling from poles on some street corners look like massive tangles of spaghetti instead of orderly wiring. A hog nosed about for food on an empty lot next to a modern multi-story building. Nearby, a cow stood chest high in a garbage dumpster, foraging for supper. The stark contrast between proper construction and barely supported structures, good highways and impossible traffic, modern infrastructure and barely-on electricity, even in this new city, the Indian equivalent of Silicon Valley or the Boston area's Route 128, is a fair representation of both India's challenges and its remarkable progress. The scene made me wonder whether India could ever catch up to its infrastructure needs. In the smaller cities and agricultural villages, a lack of modern infrastructure is much more pronounced.

This description of urban problems is not intended to take away from India's significant progress. For example, I spent half a day in the high rise headquarters of Evalueserve, a purveyor of outsourced research services that has grown at blinding speed. This is the type of Indian company you might envision, ballooning from a couple of hundred people when I first met with them in 2003, to about 2,500 today—MBAs, engineers, analysts, a mass of bright young people sitting in cubicles analyzing market shares, trade patterns, and industry's needs around the world for blue ribbon clients. Evalueserve was started by a small group of highly educated people who were formerly with IBM, or were consultants at one of the world's leading management consulting firms, McKinsey & Company. They realized that they had a unique opportunity to hire some of

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the thousands of eager new graduates who are pouring out of India's booming universities each year, and put them to work at modest prices serving the competitive intelligence needs of the world of business. For example, an investment firm in the U.S. might want a 20-year forecast of the rate of growth of uranium usage by the nuclear power industry worldwide. Evalueserve can promptly assemble a qualified team to prepare a detailed report on such a topic, and deliver it quickly at perhaps one-half the price that a company in the U.S. might charge. In the world of business, this industry is referred to as KPO—knowledge process outsourcing. There are hundreds of successful companies in India that specialize in this field.

Over tea in Evalueserve's main offices in Gurgaon a few months ago, COO Ashish Gupta explained to me how the company had recently opened offices in places like China and Chile, in addition to Europe, India and the U.S. It now has people available in the world's most important markets and in the most vital time zones. For instance, if a client in Mexico City wants to talk to an analyst in the Spanish language in the middle of the business day, the office in Chile can handle it. Ashish is typical of the leadership of the firm—formerly at McKinsey & Company, educated in America with an MBA from Carnegie Mellon, in addition to his engineering degree from the highly regarded Indian Institute of Technology. In the U.S., I had lunch with the firm's chairman and co-founder, Alok Aggarwal. He holds a Ph.D. in computer science from Johns Hopkins University, as well as a degree in electrical engineering from the Indian Institute of Technology. Alok was formerly the Director of Emerging Business Opportunities for IBM Research Division worldwide. These are the types of highly competent, extremely well-educated, very competitive people who are reshaping the world in the new era of global trade.

I visited beautiful, modern homes in Gurgaon that would rival similar homes in America, and offices that were perfectly modern and teeming with talented, well-educated technicians, analysts and professionals. I was invited to an elegant lunch in the home of an exceptional young couple. Both had excelled at an American Ivy League university. He has family in America, and they could have easily built a successful life together in any city in the U.S. However, they decided to live in India, her family home, where he is a respected entrepreneur and she is a high-powered business attorney. These extremely intelligent high achievers see a very bright future for themselves, and for their children, in the heart of urban, high-tech India rather than in America. To me, they are an indicator of the potential for India's growth and its future powerful role in global busi-

ness.

Challenges for India and China

There will soon be a lot more money to be made in the developing world. Less-developed nations already represented 82% of the world's population in 2008 and will account for 86% in 2050. These countries will be responsible for the vast majority of population growth between now and 2050. As household incomes rise in these nations, and they will grow dramatically, business opportunities will be immense.

“Globalization” is a somewhat overused word, and it has negative connotations to many people. Since I believe that we are going to be rocketing to new levels of trade that will be generally positive to the global economy, I will refer to the enhanced world of business that will evolve over the near future as Global Trade 2.0 (“GT2”). However, GT2 will be full of surprises. It will not always look like what you might expect it to.

Are China and India economic miracles that will continue to post incredible growth year after year? Growth will eventually moderate, but trends point to decades of significant expansion in their GDPs. China and India today are somewhat analogous to America of the late 1800s—a booming young nation that had resources in place to start modernizing and building the economy at a very high rate, a process that continued with a few interruptions until the Great Depression of the 1930s. For example, railroad mileage in the U.S. soared from 30,000 miles in 1860, to 163,000 miles by 1890, and 248,000 in 1920, allowing for very rapid industrialization. The establishment of telegraph and telephone service, electric supply, roads and water works expanded at a high rate, further enabling business and industry to grow. Similar patterns are occurring now in India and China, with modern infrastructure growth that includes cellphone towers, highways, shipping ports, airports, waterworks, electric plants and railroads. (In the recent past, we also saw this pattern of growth in South Korea, Singapore, Taiwan and Japan.)

Although there were some problems, India and China barely stumbled during the Great Recession. India's banks had been conservatively managed, and weren't forced through the gut-wrenching pain that enveloped the banks of the Western World. In China, the government promptly poured money into public infrastructure construction projects during the recession, while opening the spigots at Chinese banks to flood industry with loans and fund consumer purchases of cars and homes. It remains to be seen whether these loans will eventually create bad debt problems

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or excess inflation. China was unusually proactive and effective in facing the recession, and its massive new investments in badly needed infrastructure were timely and reasonably effective.

From a structural point of view, China faces dramatic changes. Li Keqiang, a high ranking and closely watched Chinese official, made a speech in 2010 noting China's biggest challenges. Despite the nation's tremendous record of economic growth, he cautioned that it must, "change the old way of inefficient growth and transform the current development model that is excessively reliant on investment and exports...We will focus on boosting domestic demand." He was referring to the need to evolve, to become a sustainable economy based on growing local markets, greater spending by households and rising incomes in addition to its powerful export engine. Also, curtailing pollution and environmental destruction will be a vital part of moving China's economy to the next level. In a nation of more than 1.3 billion people, these are developmental and economic tasks on a greater scale than any nation has ever faced before.

Global Trade 2.0—A Tripling of Trade by 2030 Will Raise Personal Incomes, Build the Middle Class and Create Massive Business Opportunities

How will world trade evolve over the near future? In *Global Economic Prospects 2007*, the World Bank states, "Global integration is likely to enter a new phase. In virtually every growing economy the importance of trade...will rise, continuing the trend of the past two decades. The growth...over the next 25 years will be powered by a new dynamism in global trade within [the services sector]." The World Bank goes on to forecast that trade will rise threefold by 2030, to \$27 trillion. Emerging countries will benefit greatly as they continue to modernize. Markets for services will boom along with rising household income, including domestic demand for entertainment, restaurants, retailing, communications, education, transportation, residential services and health care. The challenge for mature nations is to remain innovative and competitive, using their strong bases of higher education and advanced technologies to create products and services that the developing world will want to purchase in large quantities. Many U.S. and European firms, such as GE and Siemens, already have strong efforts in this regard.

Although they will certainly evolve and adapt, China, India, Indonesia, the Philippines and similar offshore work centers will remain moderate-

cost, highly competitive providers of services and manufacturing for the near future. However, local costs in these countries are rising—eventually, they will rise substantially. At the same time, as their economies grow, their business structures and middle classes will grow as well, and they will offer lucrative markets for exported intellectual property, technologies, certain manufactured goods and high-level services created in the U.S., Europe, Japan and elsewhere. In particular, these emerging nations can be spectacular markets for major brands of consumer goods. While the brands (Gillette, Apple, Starbucks, Nestle, Kleenex, KFC, etc.) will be American or European, much of the manufacturing will be done in local markets such as Guangzhou, Mumbai, Jakarta and Manila.

Meanwhile, these developing nations face immense challenges prerequisite to substantial future growth, including the need to:

- Greatly enhance infrastructure such as roads, highways, railways, airports and electricity networks
- Extend and improve public education systems, particularly into the villages
- Control pollution and clean up existing environmental damage
- Provide access to basic health care services
- Create a social safety net that includes unemployment insurance, pension plans and retraining for laid off workers
- Foster a healthy level of local consumer demand while evolving, from economies highly dependent on exports, to economies with vibrant domestic markets
- Provide greater economic opportunities to residents in rural areas
- Enhance energy efficiency
- Promote property rights and rule-of-law while combating graft and corruption

Wake Up, Your Hotel May Be Under Attack!

The above list contains structural challenges. Then there are the political problems to consider. India and China combined hold about one-third of the people on the planet, many of them jammed into some of the world's largest cities. Within each nation there lies a mind-numbing array of religions and philosophies, political factions ranging from communists to anarchists to radical religionists, and languages spoken in one part of a

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nation that can't be understood in another, along with traditional tribes, castes and even a few nomadic groups. The potential for strife and conflict is beyond measurement, and it is often compounded by agitators from neighboring nations. This was brought home to me in a personal way while I visited New Delhi in November 2008. Despite the extra fees I was paying my U.S. cellphone provider for international use, and the firm's highly convincing ads about ease of access abroad, my handset only worked once out of the dozens of times that people tried to call me. The single call that arrived woke me up in the middle of the night at the Taj Mahal Palace hotel. "Wake up, your hotel may be under attack," someone from my office said. That statement woke me up all right. Coverage of the horrible terrorist attacks in Mumbai were the focus of worldwide news that day, and the Taj Mahal Palace was at the center of the tragedy that eventually claimed 170 lives and injured 400. Fortunately, I was at the Taj Mahal Palace in Delhi, not Mumbai—an easy mistake for someone back home to make in the panic of the day. Nonetheless, I didn't sleep much during the rest of the trip, and my hotel was soon enough surrounded by army personnel toting guns, while the lobby was awash with men in dark suits, stationed every few feet, wearing tiny earphones. A metal detector was installed at the front door, and purses and packages were searched at the entrance. Cars were inspected at the driveway gates by a swarm of guards wielding under-car mirrors on poles. (Nonetheless, a passerby could easily have lobbed a small explosive device over the wall surrounding the hotel's grounds.) All of this within a few yards of the houses of government and the presidential palace. Polite settlement of political and religious disputes is not something you can take for granted in the developing world, and this problem will remain a serious impediment to growth in far too many nations.

Falling Off the Train, Five to a Scooter

In addition, rapid growth in offshoring centers in China and India has created myriad shortages and problems. The most popular Indian business centers, such as Bangalore, Mumbai and Gurgaon, are experiencing daunting shortages of infrastructure of all types. A simple, but horrifying, example: Thousands of people die each year when they tragically stumble or are accidentally pushed off India's vastly overcrowded commuter trains on the way to work, or are hit by trains as they try to walk across the tracks—a gruesome fate that Indian commuters risk daily. Despite the recent construction of new highways in India, traffic delays and ineffi-

ciencies are an immense burden. India's traffic deaths were the highest in the world in 2008, at 118,000. If you have a mental image of India's work centers as modern communities that look like Atlanta, you have the wrong idea. Instead, there are stark contrasts between the modern and old worlds, often in the same city block. In India, my car shared the road with a working elephant—lumbering along on the way to a construction site, driven by two young men, “*mabouts*,” sitting on a wooden platform—in the middle of New Delhi on a major street near the halls of government, a street equivalent to Pennsylvania Avenue in Washington, D.C. At various times, in India's cities, we shared the road with bicycles, goat carts, ancient tractors serving as taxis by stacking passengers like bowling pins on wooden decks perched behind the drivers, buses groaning with riders packed into their interiors like chickens in a shipping crate, and motor scooters carrying families of five on one small seat, weaving through the traffic in a motorized ballet. For some reason, if anyone on a scooter is wearing a helmet, it is the man who is driving, while his family rides unprotected. Traffic deaths are common and horrible, and entire households are frequently wiped out in a single collision.

Services vs. Manufacturing

India is already focused to a large extent on service industries and knowledge workers. However, this nation is also home to several industrial giants, and leading Indian companies such as Tata Group and Reliance Industries are investing substantially in manufacturing businesses such as steel products, chemicals, textiles and automobiles. There is also a booming pharmaceuticals industry in India.

While India thrives on service businesses, China remains mired in an export-driven, manufacturing-intense economy. However, China has a unique opportunity to partner with its neighbor Japan in order to evolve. Despite its immense investments in universities and research parks, China continues to need to boost its innovation and intellectual output. While China could benefit from additional expertise in areas such as software, electronics, renewable energy and environmental controls, Japan has abundant intellectual resources in these fields. This will be a powerful partnership for the long haul—in 2008, China became the largest export market for Japan's products, a distinction formerly held by the U.S. Japan is also one of the largest direct investors in China. Meanwhile, Japan, with its dwindling, aging population and shrinking domestic market, needs China's abundant capacity to provide outsourced services and

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manufacturing for the Japanese. This could be a spectacular economic match if a proper foundation is laid. Meanwhile, some Indian firms are developing new strategies in order to gain market share in Japan. Wipro Technologies, a leading Indian outsourcing firm, saw its revenues in Japan grow from less than \$40 million in its fiscal 2004 period to \$115 million in 2009. Indian firms are educating some of their workers in Japanese language, culture and business practices in order to promote business in Japan. This reminds me of the way in which my sons studied the Japanese language and culture, laying the groundwork for their own success in the world of business in Asia.

The growing economies of Asian nations such as China, India, Malaysia and Indonesia are neither foolproof nor recession-proof. Crashes can and will eventually happen. For example, Japan showed such exceptional growth in the late 1970s and early 1980s that many observers thought it could grow to be the world's largest economy. Technology-based manufacturing was soaring, and Japanese makers of consumer electronics and automobiles, such as Sony and Honda, had become global leaders in terms of quality and branding. Fueled by easy lending and overinvestment, Japanese real estate and stock market values reached insane heights. The eventual crash was devastating. As we have seen in other fast-growing Asian nations that are now relatively mature, such as South Korea and Thailand, financial crises, currency calamities and other problems can, and do, occur. Nonetheless, in a relatively short few decades, Korea, Singapore and Taiwan, like Japan, became true economic powerhouses with vibrant middle classes, and they matured into exceptionally successful nations despite their relatively small populations. The same level of widespread economic and social success could be developed in China and India over the long-term.

Entering the Middle Class

The future rise of vast numbers of low-income people to the middle class will create the biggest marketing opportunity the world has ever witnessed. Wal-Mart already has 137 million visitors to its U.S. stores in an average week. How large will this number be on a global basis when the firm expands ever more deeply into Latin America, Asia and eventually Africa? 500 million? 1 billion? China is already a bigger market for GM's cars than its home nation of America. Amazon.com, Avon and McDonald's would not be the companies they are today without their massive overseas customer bases, and they have barely scratched the sur-

face of their potential growth.

Think of “middle class” as a condition that indicates, at the very least, that a family has a steady flow of a small amount of discretionary income that can be spent on luxuries or non-essential items. Solid entry into the middle class means that a household may own a scooter or a car (instead of walking, or riding a horse or a bicycle). A middle class family may own modern consumer electronics or be able to pay school tuition for its children. It is difficult for a Westerner to imagine the living conditions in a rural Asian village without seeing it firsthand, but hundreds of millions of people are living in the most basic conditions imaginable. Nonetheless, this is changing steadily. The World Bank forecasts that, by 2030, the number of people living on less than \$1 per day (extreme poverty) will drop to 550 million, a decline of 50% from 1.1 billion in 2007. Looked at in broader scale, they forecast that people living on less than \$2 a day should fall below 1.9 billion by 2030, a reduction of 800 million from 2007 levels.

Mobile Phones and the Next Boom

Mobile phones have the unique ability to leap past barriers. No highways? No landlines? No banks? No Internet connections? No problem. Cellphones create instant links to modern civilization that can be carried around in subscribers’ pockets. Low-cost, easy to erect service towers solve the logistics problem instantly. State of the art telecommunications equipment made by companies like China’s Huawei provides the network systems at relatively low cost. This is true even in the deepest, darkest corners of the world, from Nigeria to New Guinea, from Cambodia to the Congo. By 2010, there were already more than 5 billion cellphone subscriptions on Planet Earth—providing instant, mobile communications to more than two-thirds of the world’s total population! Even people living the simplest lives imaginable, with no running water, dirt floors in their homes and cooking over wood fires, have cellphones. Soon enough, virtually every adult on Earth who wants one will have at least one cellphone, as will a vast number of their children. In India, for example, innovative business practices have created the world’s most efficient cellphone companies, bringing the wireless world to subscribers at rock bottom prices. Traveling salesmen come through villages and put on entertaining shows in the village squares, extolling the virtues of the latest handsets like traveling potion salesmen of late 19th Century America.

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India's base of cellphone subscribers was growing at a rate of several million monthly in 2010. Here, service providers are extremely aggressive, and their prices are among the most competitive in the world. India's Bharti Airtel had 135 million cellphone subscribers as of mid-2010. At some firms, cellphone calls cost \$0.02 (U.S.) per minute or less. In February 2010, Vodaphone announced a simple new phone, the 150, which it will sell for under \$15 in Africa, which is a non-subsidized price. For less than \$20, consumers can buy the model 250 which includes such upgrades as a larger color screen and an FM radio.

... Chapter Three is continued in the complete book.

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— chapter five —

**COMPETITION, INNOVATION AND
ENTREPRENEURSHIP—HOW WE’RE GOING TO
SOLVE THE WORLD’S BIGGEST PROBLEMS AND
CREATE VAST WEALTH IN THE PROCESS**

“It is said that the present is pregnant with the future.”

-Voltaire

How Do We Feed Them?

If we’re going to add nearly 2.5 billion more people to the world over the long term, and rising incomes are going to push hundreds of millions of them into the middle class, then a few BIG questions regarding these hordes of humans float to the top:

- Can we produce enough food to feed them, and clean water for them to drink?
- Can we create enough energy to power their needs?
- Can we provide them with a reasonable level of health care?
- Can we, without ruining the environment or facing drastic shortages, manufacture the consumer goods and provide the services they will desire?

The answer to these questions is a BIG yes, but a lot of things will change in the process, daunting problems will arise, controversies will ensue, mistakes will be made and a great deal of innovation and entrepreneurship will be needed to make it all work. It could easily require thousands of pages and a lifetime of work to discuss these issues in depth. For the purposes of this book, I am going to spend much of this chapter discussing important aspects of global innovation, entrepreneurship and scientific research, because they are the keys to a prosperous future. To begin with, I will show how this environment of innovation is already laying the groundwork to solve the most basic big question of all: how do we feed them?

Seed Genetics in Paradise

Kauai is a quiet, sparsely populated spot in the chain of islands that make up the American state of Hawaii, one of the remotest places on Earth, nearly 1,900 miles from the closest major land mass. Only 65,000 people live on Kauai, and much of the island is comprised of wilderness preserves, rain forest and the wide, waterfall-enshrouded gorge known as the Waimea Canyon, which is often referred to as the “Grand Canyon of the Pacific.” The head of this canyon lies on a mountaintop of volcanic origin in lush Kokee State Park, at an elevation high enough that you can feel a very cool difference in temperature when you drive up from sea level, following a spectacular serpentine road. From Kokee’s center, the mountain slopes downward, toward the western shore, until it reaches a sheer drop off at the famous Na Pali Coast, a dramatic, massive seaside cliff that leaves visitors gaping in awe. This landscape represents paradise to some, and business opportunity to others. Not long ago, I hiked along a muddy track from Kokee, down through the forest, to an overlook on the Na Pali cliff tops. Hundreds of feet below me, I could see helicopters and tour boats crisscrossing the waters adjacent to the surf-crowned coast, where tourists on board could enjoy stunning views of the ever-changing colors in the towering cliffs. They would have been surprised if they knew what was going on in the green fields nearby.

Back at sea level, I drove the Kaumualii Highway and then North Nohili Road to the beach near the Na Pali cliffs. This little-used route passes the Barking Sands Pacific Missile Range Facility for miles along the shore, a military base that is highly secure and secretive. If the high fences and military security of the missile tracking station don’t scare tourists away,

the next set of signs along the road might. At the bitter end of the road lies a deep plain cached between the foot of the mountains and the sea. Here sits a perfect setting for a Michael Crichton novel, a dramatic and otherworldly spot that looks like strange creatures might arise out of the powerful surf, or come swooping off the cliffs onto the green fields below. Notices along the way warn passersby of the criminal penalties they may incur for trespassing, and especially for picking any of the thriving plants that stretch across the carefully tilled fields as far as you can see. Thousands of acres of fertile agricultural soil lie in an area between the radar station, the beach, the foot of the mountain and the Na Pali cliffs, with abundant tropical sunshine, a year-long growing season and vast quantities of water for irrigation streaming from the nearby mountain. You can look, from a distance, but don't touch. Why the intense focus on security? Because this isolated spot is where the future of much of the world's food supply is being created, tested and planned by some of the world's largest corporations. Kauai is ground zero for some of America's most talented geneticists who specialize in agriculture.

“Modified” is Not a Dirty Word

GM is the biotechnology industry's acronym for “genetically modified.” The phrase applies to organisms, such as plants, that have been painstakingly, scientifically restructured on a genetic level, in a process often referred to as bio-engineering. Much of the world's most advanced crop science is centered on the use of biotechnology to create new versions of basic food crops: GM seeds for corn, soy, wheat and rice. GM seeds are a relatively young industry, first made commercially available to farmers in the mid-1990s. When you think of Hawaiian agriculture, you may tend to think of pineapples (now grown here mainly for local consumption by tourists, not for export, as much of the pineapple industry has moved to nations with lower labor costs) or perhaps Kona coffee (one of the world's most expensive coffees, and my favorite by far), but the fact is that GM corn for seed is now Hawaii's most interesting crop, and one of the state's major industries. In a late 2008 edition of *Scientific American* magazine, Robynne Boyd reported that Hawaii had already been the site for 2,230 field trials of GM crops. While much of the focus is on corn, these trials have included a search for better wheat, potatoes, rice, cotton and other staples. The world's leading GM plant companies are here: Pioneer Hi-Bred (part of DuPont), Syngenta and Monsanto. Their trials now cover 4,800 acres, where biologists and their helpers walk their

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very private fields, sampling, testing and observing. Nearby in their laboratories, geneticists, statisticians and other scientists tabulate field trial results in their effort to create ideal, high-output, hard-to-kill plants.

This is biotechnology in one of its most productive arenas, the modification of the genetic makeup of seeds in order to make plants resistant to insects, capable of fighting off diseases, loaded with nutrients, able to grow with less water and/or much more productive per acre of planting. Crop science has evolved through the decades to the point that, in a good year, a densely populated nation like India can be capable of growing enough grain to feed its hordes of people. Because of rising incomes—leading to more demand for foodstuffs—and a growing global population, a forecast made by analysts at the UN’s Food and Agriculture Organization in February 2010 is that agricultural output worldwide needs to increase by 70% by the year 2050. This may place intense demand on the world’s supply of water and land for agricultural purposes. On the other hand, biotechnology may well solve much of the problem through the creation of GM seeds that use less water and provide higher output per unit of land. In addition, many other promising technologies and practices will boost agricultural output over the near future. These range from low-cost drip irrigation systems being developed for emerging nations by farsighted entrepreneurs, to better roads for access to food markets (thereby reducing spoilage and waste), to highly efficient professional farm management due to corporate ownership. As we have seen, the adoption of new technologies, such as the use of cellphones on remote farms to access agricultural advice and seek the best buyers for crops, will be a big boost as well.

Much of Africa Will Evolve from a Hunger Spot to a Bread Basket

Investment firms from around the globe are investing in farmland in Africa, and their managers are establishing modern methods and boosting output. Some observers think that Africa has the potential to become a major food supplier to the entire world. Rice, fish from farms (“aquaculture”) and crops such as soybeans are becoming lucrative export items in Uganda and elsewhere in East Africa. In Malawi, an innovative government plan for the distribution of fertilizer to farmers has enabled much of that nation’s rural population to rise from lives mired in consistent poverty to careers as money-making growers of crops for export. By one estimate, Malawi has come full circle, from importing 40% of its food needs in 2005 to exporting one-half of its home-grown crops in 2009. Lonrho

Plc is a multi-faceted corporation that owns businesses ranging from hotels to aviation operations to farms across 17 African nations. Among its businesses is a food processing plant in Johannesburg, South Africa that packs fresh fruit, vegetables and flowers for air shipment to European markets. The crops are grown on the firm's own lands and those of independent farmers in Zambia, Zimbabwe, Malawi and the Democratic Republic of Congo. The Lonrho firm, which decided to reinvent itself from a worldwide collection of businesses to an Africa-focused conglomerate beginning in 2005, may be on the right track. It signed an agreement in June 2008 to develop another major agri-processing center in Malawi and announced plans to rehabilitate 62,000 acres of land in Angola, where it will provide the latest in agricultural management methods. Lonrho's foods currently land on the shelves of such European retailers as Marks & Spencer, Tesco and Carrefour.

Like residents of much of the world, many Africans do not trust GM plants. This will change, slowly but surely. Like the Chinese, the 1 billion inhabitants of Africa have little choice but to adopt higher-output agricultural methods if they are going to feed themselves and take advantage of tremendous opportunities available to their economies from agribusiness. China is setting an example that much of Africa will likely follow. In November 2009, the Chinese Ministry of Agricultural Biosafety Committee issued approval certificates to pest-resistant GM rice. This rice is of the "Bt," or *Bacillus thuringiensis*, variety, which indicates that it contains a naturally occurring, pest-killing bacterium found in soil. (This substance is so safe and effective that organic farmers often spray a solution containing Bt on their crops.) Bioengineers have developed very successful ways to introduce Bt into plant seeds. The bacteria become part of the plant itself, creating an inherent resistance to insects, with tremendous results. This particular strain of Bt rice was created locally at the Huazhong Agricultural University, and is reported to enable an 80% reduction in the use of pesticide while upping crop yield by as much as eight percent. If you stop to consider the economics for a moment, this is huge: an 80% reduction in the cost of one of your most expensive supplies, the pesticide, coupled with a substantial boost in output, times 71 million acres of Chinese rice farming! Such is the promise of biotechnology when skillfully applied to agriculture. According to the International Rice Research Institute, the Chinese have already more than tripled their rice crop over the past 50 years, largely by improving yield per acre, which is now two-thirds higher than the world's average. The institute estimates that China will need to further boost output by 20% by the year

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2030. China recently budgeted \$3.5 billion toward GM research on rice, corn and wheat. Positive results from China's massive GM effort may make it more acceptable to other governments to follow suit. China also approved a GM maize in late 2009, which will be an important boost to its ability to raise feed for livestock.

Innovation = Biotechnology Applied to Agriculture = a Better-fed World and Vast Profits for the Food and Agriculture Industries

This is how we will feed the world of the future—through continual enhancement of agricultural technology. Biotechnology is developing the seeds that will enable the farmers of Planet Earth to feed the growing population of the Next Boom. Billions of people will benefit, and billions of dollars in profits will be earned. GM technology is relatively easy to distribute and utilize on a global basis.

ISAAA, the International Service for the Acquisition of Agri-Biotech Applications, published a fascinating study that tracks the global adoption of GM crops from their early days in 1996. By the end of 2009, the group found that worldwide planting of GM seeds had reached 134 million hectares (331 million acres), representing an 80-fold increase over a small beginning 13 years earlier. There was an increase of 9 million hectares in 2009 alone. The largest grower of GM plants by far is the United States at, 64 million hectares, followed by Brazil (21.4 million), Argentina (21.3 million), India (8.4 million, primarily in cotton) and Canada (8.2 million). To look at the numbers in a different manner, consider this: ISAAA reports that 85% of America's maize crop was GM, as were 90% of the cotton crops in America, Australia and South Africa. In total, 14 million farms in 25 nations, ranging from simple family establishments to giant commercial operations, were growing GM crops ranging from soy to corn to cotton. Continued growth in the agribio sector will combine with other farm technologies to enable the world to grow more food and better feed the global population. At the same time, agribio will foster sustainability, including more efficient utilization of water and crop land, and lower use of chemical pesticides.

Crop yields per acre will continue to increase over time as technology becomes more advanced. Due to expiring patents on older products and intense competition from its peers, Monsanto, a leading agribio corporation, is forced to innovate constantly, which is a good thing for the future of food production. The newest corn seeds from Monsanto feature enhanced immunity to herbicides—chemicals used to destroy weeds, but

hopefully not the crops themselves. Drought resistance is another focus for upcoming Monsanto seeds. Monsanto recently introduced a soy seed that it hopes will increase yields by seven percent per acre over the previous generation of seeds. Equally exciting, seed engineers are developing plants that will feature significant increases in their nutritional qualities. For example, scientists are engineering a soy plant that contains highly desirable omega-3 fatty acids, thought to greatly reduce the risk of heart disease and provide other health benefits. In other words, you may get the same benefits from eating soy products in the future that you get from salmon today. While GM seed makers set ambitious goals, achieving the desired results can be a difficult matter, and companies in this business have to take a persistent long-term view while continuously supporting their expensive research efforts. In some cases, initial crop yields are not up to the goal. In others, farmers are slow to adopt the high-priced seeds. Also, while many GM seeds have been successfully engineered to resist glyphosate, the herbicide branded by Monsanto as “Roundup,” some weeds are developing resistance to this chemical. Nonetheless, within a history of less than two decades, the GM seed industry has achieved tremendous results.

Change = Controversy

The GM plant industry is a good example of the types of challenges that entrepreneurs and scientists will endure as they struggle to help the world move through the trials of the future via technology and innovation. Although scientists have been able to engineer many desirable traits in GM seeds, and the scientific community has largely given GM foods a clean bill of health for years, such modified foods have faced stiff resistance. While many areas of biotechnology are controversial, agricultural biotech has been one of the largest targets for consumer backlash and government intervention in the marketplace. Criticism will continue. For example, a recent documentary film that paints a dark picture of large-scale commercial agriculture, *Food Inc.*, was critical of Monsanto to the extent that the firm published a sharp rebuttal on its web site. Several organic food producers promoted the film, seeing it as a vehicle that will push consumer interest in their non-GM foods. This is exemplary of the wide divergence of opinion about food production—a debate that will not end any time soon. Consumer resistance to food products containing GM material is sometimes fierce. Many consumers in Europe have a strong fear of such foods.

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Despite the resistance to GM foods, the need to increase production will not go away, and consumers often respond quickly and violently when food shortages arise. Riots in 2007 and 2008 in a number of Third World countries were fueled by a combination of short supplies and very high prices for staples such as rice and corn meal (this period has been described as the “2007-2008 world food price crisis”). Contributing factors included extremely high transportation fuel costs, booming commodity markets and the unfortunate and unprecedented conversion of a food crop—corn, into a fuel—ethanol, resulting in supply and demand distortions. Price and supply pressures boosted by rising demand for food will eventually make GM foods more acceptable around the world. For example, in Japan and South Korea, a number of manufacturers have begun using sweeteners based on genetically engineered corn for use in soft drinks, snacks and other foods. The manufacturers were looking for alternatives to rising prices for corn starch and corn syrup made from conventionally grown crops. According to Yoon Chang-gyu, director of the Korean Corn Processing Industry Association, non-GM corn cost Korean millers about \$450 a metric ton in early 2008, up threefold from \$143 in 2006. GM corn was purchased at a cost savings of about 30% per ton.

Syngenta (www.syngenta.com), the result of a merger between the agricultural divisions of two pharmaceutical firms, AstraZeneca and Novartis, is focused on seeds, crop protection products, insecticides and other agricultural needs. Syngenta is in a position to make powerful strategic investments. The firm’s annual outlay for research and development is substantial, at about 10% of revenues. Meanwhile, industry leader Monsanto has invested heavily in biotech seed research with terrific results, achieving sales of more than \$11.7 billion in 2009. By 2010, the company was facing expiring patents on some of its most important products, Roundup in particular, and its profits are down. This will force the firm to continue to innovate with newer products, while generic versions of older Monsanto items will reach farmers at lower prices.

A particular concern among farmers in many parts of the world is that GM crops, when they pollinate, may affect neighboring fields, thus triggering unintended modification of DNA in nearby plants. In any event, there is a vast distrust of GM foods in certain locales. America is a noted exception. If you are dining in America, unless you carefully grow all of your own food, you are undoubtedly eating at least a partial GM diet. Meanwhile, a handful of localities in the U.S. have banned or restricted the planting of GM seeds, hoping to protect traditional crops for which local growers are widely known. A typical restriction is to require that

GM seeds be planted a certain distance away from non-GM crops.

GM plants and their seeds are highly prized, carefully protected intellectual property, developed at great cost. Consequently, legions of attorneys make sure these seeds are covered by patents. They also draft contracts that the farmers who are end-users must sign, stipulating that the science behind the seeds, and the right to replicate those seeds, is retained by the companies that developed them. Some people have accused Monsanto of being overzealous in pursuing farmers who appear to be using Monsanto-developed seeds without paying for them. The company has also received criticism due to the fact that, at one time, it manufactured toxic chemicals that have risen to varying levels of infamy, such as DDT and Agent Orange. These chemicals have nothing to do with the firm's present business. Unfortunately, anti-GM protestors are sometimes violent or destructive. In the early 2000s, Associated Press reported protests ranging from the bombing of a San Francisco Bay area biotech company, Chiron Corp., to the trashing of a biology lab at Louisiana State University, to extensive destruction of experimental GM plants in France.

Cloned Cows and Nano-enhanced Foods

Meanwhile, food science continues to progress. In early 2008, the U.S. Food and Drug Administration (FDA) declared food derived from cloned cows, pigs and goats to be safe for consumption. In economic terms, this could be a big boost in the near future—the most perfect, healthiest, fastest-growing animals may be consistently reproduced through cloning—the use of genetic technologies to create offspring that are exact duplicates of other animals. The European Food Safety Authority has also declared cloned animal output to be safe, although the EU is talking about new restrictions. A number of food companies, including Smithfield Foods, Inc., Kraft Foods, Inc. and Tyson Foods, Inc., quickly pledged not to use milk or meat from cloned livestock, distancing themselves from what will undoubtedly become a highly controversial matter. Food firms know that a lot of consumer education will be required to make farm animal cloning understood by and acceptable to consumers. In 2010, the possible approval by the FDA of a GM salmon was a hot topic. A firm called AquaBounty Technologies appeared close to winning approval for its farm-raised fish that grow about twice as fast as natural fish. The salmon contain a gene from another fish, and this gene accelerates their growth. This is a technology that may be applied to a wide variety of farm animals in the future.

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Nanotechnology is affecting foods as well. As of mid-2010, there were four nano-engineered foods on the market according to The Project on Emerging Nanotechnologies. They were Canola Active Oil, which contains an additive called nanodrops that carry desirable vitamins, minerals and phytochemicals; Maternal Water, which is formulated for gestating mothers and uses colloidal silver ion technology to purify mineral water; Nanotea, which is formulated for an enhanced release of tea essences for taste, as well as an increase in its selenium mineral supplement qualities; and Nanoceuticals Slim Shake Chocolate, a chocolate-flavored diet shake that uses nanoclusters to improve taste and health benefits without the need for added sugar. This is a small beginning to what will eventually be widespread use of nanotechnology in the food industry to do such things as extend shelf life, improve nutritional qualities or create production efficiencies.

... Chapter Five is continued in the complete book.

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