We are entering a new era of innovation.
According to Robert J. Gordon, the best of times may be behind us. Mr. Gordon, an economist and professor at Northwestern University, struck a nerve recently in a provocative essay “Why Innovation Won’t Save Us,” published in the Wall Street Journal. For more than a century, Gordon wrote, the U.S. economy grew robustly thanks to big inventions. Those days, he said, are over.

Gordon made it clear he wasn’t forecasting an end to innovation, but he argued that inventions of the future won’t hold a candle to “the great inventions of the past.” Granted, it may be unlikely that another invention as significant as, say, the internal combustion engine is on anyone’s drawing board at the moment. Yet, a number of investment professionals at Capital Group see a new era of innovation taking hold in companies across a variety of sectors, from energy to health care.

“We are definitely in an age in which companies know that innovation can move the needle for them,” Claudia Huntington, Portfolio Manager

“Innovation has been, and continues to be, the cornerstone of economic growth and success,” says Elizabeth O’Connor, a Capital Group economist.

“I’m looking for companies that have developed an atmosphere of creativity, where the CEO has instilled a culture of innovation and invested in productive research and development.”

Claudia Huntington, Portfolio Manager

40 years of investment experience

A new era of innovation

Investments are not FDIC-insured, nor are they deposits of or guaranteed by a bank or any other entity, so they may lose value.

Past results are not predictive of results in future periods.
Countries on the cutting edge of change
Companies around the world are part of the global phenomenon of innovation

“Pessimists may be paying too little attention to the strength of the underlying economic and social forces that generate innovation in the modern world. Both humanity’s capacity to innovate and incentives to innovate are greater today than at any other time in history.”

Ben Bernanke, Chairman, Federal Reserve

Source: 2012 Thomson Reuters Top 100 Global Innovators. Data are based on the top 100 companies comprising the list of global innovators, as defined and determined by Thomson Reuters. The methodology used to arrive at that list is based on four principal criteria: overall patent volume, patent grant success rate, global reach of the portfolio and patent influence as evidenced by citations. While China leads the world in patent volume, Chinese innovators tend to have a more national focus on the protection of their inventions and, therefore, score lower on the global metric. As a result, China is not represented in the illustration.

- When it comes to innovation, pessimism seems to be in vogue. But across the world, companies, universities and individuals seem to be coming up with new ideas that are changing the way people live and new products that are boosting bottom lines.
- In the United States, for example, some familiar companies have some new ideas. They were recently listed among the Thomson Reuters 2012 Top 100 Global Innovators. Ford Motor Company, for example, was lauded for its innovative use of advanced high-strength steel in the Ford Fusion. The company also has been honored for its first three-cylinder engine. Another familiar name, Dow Chemical, has come up with a photovoltaic system that’s unlike other solar panels in that it’s nailed directly to the roof, like a shingle. Roche, the Swiss pharmaceutical company, is working on medicines for hepatitis C, for asthma, and drugs to alleviate or cure various disorders of the central nervous system, including Alzheimer’s, schizophrenia and depression.
- Those are just a few of the companies that made Thomson Reuters’ list. Of course, innovation spans the globe. The chart shows the countries in which the companies are headquartered. Among the innovative companies from Japan are Toyota and FANUC, a leader in robotics.
- Across Europe, there are five nations with one or more companies in the top 100 list. France is the innovation leader with 13 organizations spread across nine of the 21 industries. France continues to have the most scientific research centers.
From high tech to chemicals, innovation across the spectrum
The most innovative companies have a knack for turning concepts into cash

• Innovation not only seems to be occurring across the world, but in a variety of sectors. Although technology firms dominated Thomson Reuters’ 2012 Top 100 Global Innovators, the companies ranged from industrials, such as Goodyear Tire & Rubber, to L’Oreal, the French consumer products company.

• But the semiconductor industry led the pack. The companies include AMD, Intel, Qualcomm, TE Connectivity, SanDisk and Texas Instruments. Semiconductors are a critical component of products ranging from smartphones to cars. Their dominance reflects how essential they are to life in the 21st century.

• Big names in the computer hardware industry, such as IBM, HP, Hitachi and Fujitsu all made the top 100, as well as software firms Microsoft and Symantec. Elsewhere, government agencies made the list for the first time, represented by the U.S. Army and Navy.

• The list is also notable because some companies that were on the brink of demise just a few years ago have re-invented themselves to remain competitive. Ford Motor Company made the list for the first time in 2012, with the company’s work on alternative-powered vehicles cited in its selection.

• Many of the top 100 innovative organizations seem to have a knack for turning concepts into cash. Not only did the companies outpace the S&P 500 by 3% in market cap weighted revenue, they also added nearly 125,000 jobs over the previous year.

• Tech has a large representation partly because of the survey’s methodology. The criteria favor fast-moving, hyper-competitive industries such as computer hardware and semiconductors, where product life cycles are short and advancements are demanded by users.

“When investors have confidence that a company will continue to innovate and create new products, it bolsters the prospects for future revenue, earnings and dividend growth.”

Alan Berro, Portfolio Manager

Source: 2012 Thomson Reuters Top 100 Global Innovators.
The spirit of invention is on the rise

Patent activity around the world indicates innovation is alive and well

There’s some fascinating reading at the United States Patent and Trademark Office. Take Google’s description of how its robot would handle two conflicting commands, cleaning a room and walking the dog at the same time. What’s a robot to do? It depends on how bad the dog needs to go out: “The robot may determine through sensory data that the dog has begun to whine, and scratch at the door to the yard outside ... the robot determines that the dog is in distress as indicated by the dog’s conduct. The robot therefore determines that the “walk dog” command, which might have been suspendible, should now be executed and the “clean floor” command can be suspended.” Good call.

That’s called “autonomous robotic decision-making” and it’s just one example of the ingenuity and innovation behind the raw numbers in the nearby chart. Patent activity has long been an indicator of innovation, but it’s about more than just the volume of patent filings.

Innovation and intellectual property have played key roles for both the companies that innovate and the countries that encourage it.

Indeed, Robert Solow, who was awarded the Nobel Prize for his work, and others have concluded that development and adoption of economic innovation has been the single most powerful factor determining America’s underlying rate of growth and productivity.

Source: United States Patent and Trademark Office. Data represent the number of utility patents, also referred to as “patents of invention,” distributed by U.S. state/territory and country of origin by calendar year of grant. The origin of a patent is determined by the residence of the first-named inventor. A utility patent is issued for the invention of a new and useful process, machine, manufacture, or composition of matter, or a new and useful improvement thereof.

“The U.S. is one of the major innovation engines of the world. This is what gives U.S. companies a significant strategic advantage.”

Alan Berro, Portfolio Manager
For some companies, it all starts with a “big bang”

Acceleration in the rate of change has led to explosive growth

“Sometimes innovation is about making something faster, simpler and cheaper to meet the needs of the market. It’s less conventional than we’re used to, but nevertheless, it’s innovation.”

Keiko McKibben, Investment Analyst

- Remember the arcades that were full of kids pumping quarters into electronic game machines? They flourished from the 1970s to the early 1990s, but most of them are gone, and so are many of the companies that made the modern versions of the old-fashioned mechanical pinball machines. In 1994, something new and different came along and provided an early example of big-bang disruption — the Sony Playstation. Within just a couple of years, the consoles that cost $299 and supported hundreds of games were in millions of homes and had obliterated the arcades. Only one major pinball manufacturer still exists, selling machines mostly to gamers with a taste for nostalgia.

- That example of disruptive innovation, reported in the March 2013 Harvard Business Review, demonstrates the speed with which products and companies long considered a part of the landscape can be blown away. The account also illustrates the importance of a research network that can find the companies with the ability to disrupt, and avoid the ones that may be disrupted, especially in an era when zeal for a new product can span the globe in a matter of days.

- The chart above shows the traditional pattern of customer adoption described by Everett Rogers. In his model, shown in gray, new products sequentially gain popularity with five market segments. The big-bang model is taller and much more compressed: In it, new products are perfected with a few trial users and then are embraced quickly by a vast majority of the market.

50 million users in a flash

Social technologies have been adopted at record speed

“We are seeing a really significant acceleration in how fast products can arise and reach a massive global audience. And that has incredible disruptive impacts on industries. But it is also very exciting.”

Brad Barrett, Investment Analyst

“Move Fast, and Break Things.” That’s what the motivational posters hanging on the walls of Facebook say. One problem: Facebook is one of the companies redefining the word “fast.”

- The chart shows how fast Facebook and other innovations and technologies reached 50 million users. Of course, Facebook has since amassed about a billion users, but the chart is illustrative of just how rapidly users have been flocking to new technology, and how quickly it can become a part of life.
- YouTube, for example, announced in March that it was averaging about a billion visitors every month. That’s up from 800 million monthly viewers in October 2011. In the U.S. alone it reaches more 18- to 34-year-olds than any cable TV channel or network, creating a new landscape for reaching consumers, and a disruption in an old way of doing business.
- Twitter is perhaps the ultimate example of rapid adoption. Created in March 2006, Twitter reached 50 million users in nine months. The service had more than 500 million registered users as of 2012, generating over 340 million tweets daily and handling over 1.6 billion search queries per day. Since its launch, Twitter has become one of the 10 most visited websites on the Internet, and has been described as the SMS (short message service) of the Internet.
- During just the past decade, innovation has transformed the way billions of people communicate, listen to music, and buy and sell products.

DNA analysis opens a new era in medicine

The cost of sequencing genes has fallen at a rate that exceeds Moore’s Law

“We are at the very beginning of DNA sequencing changing the way we deliver care and improving health care outcomes.”

Rich Wolf, Investment Analyst

- In 2003, scientists announced they had sequenced the human genome. It took eight years of work, thousands of researchers and cost about $2 billion. Today, scientists can sequence a human genome in a couple of days for well under $10,000.
- During the past decade there have been remarkable advances in DNA sequencing technologies. DNA, or deoxyribonucleic acid, is the hereditary material in humans and almost all other organisms. These advancements have tremendous implications for the diagnosis and treatment of illnesses.
- The potential for commercial development of genomics research presents U.S. industry with a wealth of opportunities, as do the sales of DNA-based products and technologies in the biotechnology industry.
- To illustrate the nature of the reductions in DNA sequencing costs, the chart shows hypothetical data reflecting Moore’s Law, which describes a long-term trend in the computer hardware industry that involves the doubling of ‘compute power’ every two years. Technology improvements that keep up with Moore’s Law are widely regarded to be doing exceedingly well, making it useful for comparison.
- On the horizon is a new era of medicine characterized less by treating symptoms and more by looking to the most fundamental causes of disease. Rapid and more specific diagnostic tests will make possible earlier treatment of countless maladies.

Source: National Human Genome Research Institute. Data for DNA sequencing cost represent the cost of sequencing a human-sized genome and are from September 2001, the date when figures became available.
Big data, big opportunity
The race is on to make sense of a mountain of digital information

“I want you to think about data as the next natural resource.”
Ginni Rometty, CEO of IBM


- Help wanted: Mid-size company seeks something called data scientist to help take us to the next level by turning a ton of messy and unwieldy information into a competitive advantage. The ideal candidate should be able to wrap his/her head around numbers with 21 zeroes and help us understand terms like zettabyte (zb) and yottabyte (yb).
- Welcome to the world of “big data,” a world that’s bursting with information that has the potential to stimulate innovation, productivity and profits.
- What is big data? It’s largely a product of the Internet and comes from sources ranging from smartphones to machine sensors. As the term implies, the amount of information is vast, unstructured and being created so fast that it can’t be processed, stored or analyzed with traditional databases and tools. Every day, 15 petabytes of new information are created, about eight times the information housed in all the academic libraries in the U.S. (A petabyte is one quadrillion bytes of information). The race now is to gather and make sense of the information that’s relevant and potentially profitable. That’s an opportunity for some companies that supply hardware, software and services that facilitate the collection and analysis of data. For companies that accurately assess and apply the data it could mean a competitive advantage.
- There’s been a lot of hype about big data. Indeed, as a science, it’s in its infancy. But the field clearly holds significant potential for innovative companies, and for investors aware of the opportunities a rapidly evolving technology presents.
Out with the old, in with the new

“Creative destruction” is a driving, and often harsh, force in the U.S. economy

In 1942 Joseph Schumpeter wrote a book called *Capitalism, Socialism and Democracy* in which he coined the term creative destruction. The term denotes a “process of industrial mutation that incessantly revolutionizes the economic structure from within, incessantly destroying the old, incessantly creating a new one.”

In short, creative destruction occurs when something new replaces something older. That description may seem a tad harsh, but the chart above shows that the rate of creative destruction has increased in the United States since 1960, with the average time a company spends in the S&P 500 falling by about a third since the 1970s.

This chart is one measure of a dynamic economy in which companies that once revolutionized and dominated new industries have seen their profits fall and their dominance vanish as rivals came up with new technologies that disrupted the old way of doing business.

One need not look further than the music business and Apple’s iTunes Music Store for an example of how innovation can transform an industry. After decades of distributing music to consumers in essentially the same fashion, or physically, everything changed in 2003. Since then, music sales have dropped from about $12 billion to $7 billion last year. But during that same time, people have been buying more music than ever, but in the form of the digital singles popularized by iTunes. The low cost and ease of downloading digital singles has been a blessing for music fans, but a curse for the music industry.

“There’s a process of creative destruction that goes on in the economy. It’s both an opportunity and a threat to companies. It’s critical to understand and anticipate these changes.”

Barry Crosthwaite, Portfolio Manager

Source: Dr. Richard N. Foster, Yale University.
Data from 2011 through 2029 are projected.
Shopping now means going online as well as going to the store
Room to grow: The rewards of successful innovation in e-commerce could be large

“E-commerce has forever changed the landscape for traditional U.S. retailers. From the consumer perspective, it’s changed the shopping mindset of entire generations, forcing a new model for the retail value proposition.”

Emme Kozloff, Investment Analyst

Source: United States Census Bureau. Data reflect quarterly estimates adjusted for seasonal variation but not for price changes. Total sales estimates are also adjusted for trading-day differences and moving holidays. E-commerce sales are sales of goods and services, excluding food services, where an order is placed by the buyer or price and terms of sale are negotiated over an Internet, extranet, electronic data interchange network, electronic mail or other online systems; payment may or may not be made online. Data for the fourth quarter of 2012 are preliminary.

- Americans are buying more products and services than ever through the Internet. While e-commerce remains a relatively small percentage of the retail sales in the U.S., the potential for companies and the economy seems to be significant.
- In 2012, for example, e-commerce sales reached $225 billion, up 15.8% from 2011, according to the U.S. Department of Commerce. E-commerce sales in 2012 accounted for 5.2% of the approximately $4.3 trillion in sales, excluding food service.
- While electronic commerce in the U.S. is growing more significant, it pales compared to China’s e-commerce giant Alibaba, which dominates the market. In 2012, Alibaba’s portals handled about $170 billion in sales, more than eBay and Amazon combined.
- Beyond the issues e-commerce may raise for traditional retailers, the Internet has become a force for rapidly changing markets and driving efficiencies. The Internet already accounts for a significant and growing portion of global gross domestic product.
- A study by the McKinsey Global Institute found that the Internet accounts for 3.4% of overall GDP in the 13 nations studied, which included the United States, Germany, Japan and other major developed countries. And the Internet’s impact is increasing. The net accounted for 10% of GDP over the 15-year period from 1995 to 2009. Over the last five years of that period, its contribution to GDP growth in these countries doubled to 21%.
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