

September 2003 Commentary

Invention and Innovation: Driving Economic Growth

"Imagination is more important than knowledge."

Albert Einstein, 1879 - 1955

As the economy sputters out of recession, many investors are hard pressed to see from where future economic growth will come. Those who are pessimistic about future growth, citing statistics on weak manufacturing data and negative employment trends, contend that the economy isn't strong enough to post meaningful growth over the next decade. But what really drives economic growth? In the short run a lot of factors impact economic growth, but perhaps over the long run none are as important as new inventions and innovations. Thus, future growth in the economy will likely come from areas that we can't see or even possibly imagine today.

Past generations certainly weren't able to foresee the impact from future inventions. Back in the 1st century, Julius Frontinus (Roman aqueduct engineer) boldly proclaimed: "Inventions reached their limit long ago, and I see no hope for further development." While the Roman aqueducts were certainly a marvel in their time, innovation in plumbing has come a long way since then. And just over 100 years ago, the then commissioner at the U.S. Office of Patents, Charles H. Duell, exposed his shortsightedness in this remark made in 1899: "Everything that can be invented has been invented." No doubt future generations will find it as difficult to imagine far into the future. We must remind ourselves that many of the products and services we use today and perhaps take for granted were relatively recent inventions. The table below highlights some of the major achievements over the last 70 years.

Great Achievements, Inventions and Innovations of the Last 70 Years

1934	Magnetic Recording	1969	First Human on the Moon
1935	Radar	1970	Artificial Heart
1936	Jet Engine	1971	VCR
1937	Photocopier	1972	Word Processor
1938	Penicillin	1973	Genetic Engineering
1939	Helicopter	1974	Post-it Notes
1940	Color Television	1975	Laser Printer
1941	Aerosol Spray Can	1976	Home Computer, Apple II
1942	Duct Tape	1977	Voyager I Spacecraft
1943	Synthetic Rubber	1978	Magnetic Resonance Imaging
1944	Kidney Dialysis Machine	1979	Cray Supercomputer
1945	ENIAC Computer	1980	Hepatitis-B Vaccine
1946	Microwave Oven	1981	IBM PC & Microsoft DOS
1947	Transistor	1982	NASA Space Shuttle
1948	Velcro	1983	Soft Contact Lens
1949	Mobile Phone	1984	CD-ROM
1950	Credit Card	1985	Microsoft Windows
1951	Super Glue and Disposable Diapers	1986	Super Conductor
1952	Bar Code	1987	Disposable Camera
1953	Discovery of DNA	1988	Prozac
1954	Solar Cell	1989	High Definition Television
1955	Fiber Optics	1990	Hubble Telescope
1956	Integrated Circuit	1991	World Wide Web
1957	Satellite Sputnik I	1992	Bush & Yeltsin proclaim End of Cold War
1958	First Laser	1993	Pentium Processor
1959	Pace Maker	1994	HIV Protease Inhibitor
1960	Microchip	1995	Digital Video Disk (DVD)
1961	Human Space Travel	1996	Robotic Medical Surgery
1962	Audio Cassette	1997	Gas-Powered Fuel Cell
1963	Acrylic Paint	1998	Viagra
1964	Kevlar	1999	Internet Booms
1965	Compact Disc	2000	Human Genome Decoded
1966	Hand-held Calculator	2001	Segway Human Transporter
1967	Computer Mouse	2002	Sonic Bullet
1968	ATM machine	2003	Medical Miniaturization Technology

"[The television is] an invention that permits you to be entertained in your living room by people you wouldn't have in your home."

David Frost, author

While not all inventions are created equal, from Post-it Notes to Penicillin, all inventions are an effort to raise our standard of living. Many new inventions lead to new products and services that improve our everyday lives. They must. After all, every innovation must pass the test of the marketplace: if people don't want it, they won't buy it. The list of patented inventions that didn't quite make it illustrates the point. There wasn't much of a market for the boomerang bullet, eyeglasses for chickens, a solar powered flashlight or a power cord for your wrist watch. Capitalism gives incentives to innovate by bestowing profit on those who bring successful products to market.

Just as important, capitalism shifts money, people and other resources from producing yesterday's goods and services to what consumers will buy today and tomorrow. In our free enterprise system, there is always competition from new inventors and innovators who meet consumers' needs in a different way or make existing products cheaper and easier to produce. Today that competition more often than not comes from foreign sources. China's labor force stands at 700 million people, almost three times that of Europe and twice that of North and South America combined. This increasing competitive pressure is challenging many industries here in the U.S., resulting in lower profits and many lost jobs. On the other hand, consumers benefit from lower cost products and the new jobs created in brand new industries formed by inventions and innovations.

Thus, there are at least two areas that give us much hope for future economic growth:

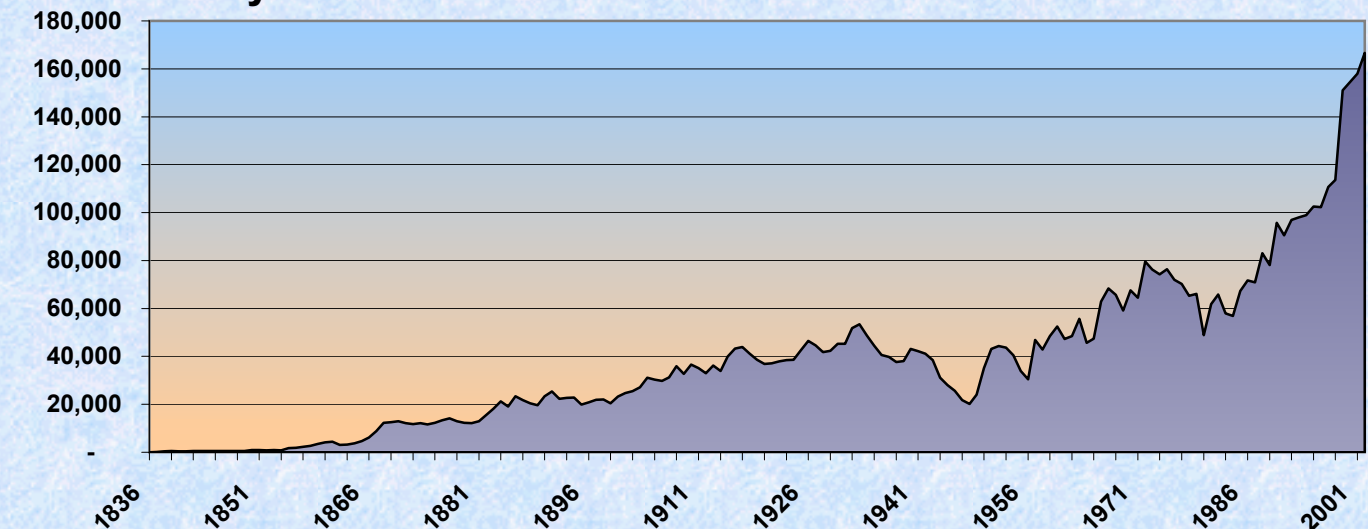
First, the pace of innovation seems to be accelerating. The chart below depicts the number of patents issued each year by the U.S. Patent and Trademark Office since 1836. Since the mid 1980's the number of patents issued has increased dramatically. Approximately one third of all the patents ever issued have been issued in the last 20 years. Of course, there is growing foreign competition here as well. About one half of all patents are issued to foreign sources. Of those, Japanese patents account for about half of all foreign patents, followed by Germany, France, United Kingdom and Canada which combined account for about one third of the foreign patents.

Second, our inventory of new tools and technologies is large and growing. Despite the rapid introduction of new products in recent decades, we still have a large, relatively untapped pipeline of new technologies. The U.S. has more personal computers than the next 7 countries combined. These tools and new inventions should provide many opportunities to create new areas of economic growth in the coming years.

"I can see the time when every city will have one."

An American mayor's reaction to the news of the invention of the telephone

Number of Patents Issued Each Year by the United States Patent & Trademark Office



Source: United States Patent and Trademark Office

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