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America the Innovative?

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CONGRESS might be at loggerheads, the unemployment rate might be too high and America's infrastructure might be crumbling — but Americans of all political viewpoints comfort themselves with the notion that at least they lead the world in high technology and always will.

It's a pleasing, convenient idea. China can't outrun the United States, because it's not creative enough. It's authoritarian. Democracy is central to innovation, according to this comforting scenario.

Although America has accounted for a sizable share of all technological innovations that have shaped our modern world, the wider historical evidence is disappointing for anyone who thinks political freedom is a fundamental precondition for innovation.

Few of the most creative societies of the ancient world were free. Certainly not Mesopotamia or Egypt. As for the spectacular creativity of early modern Europe, this somehow flourished alongside bloodcurdling efforts at mind control. More recently, both Nazi Germany and the Soviet Union, with authoritarian cultures, punched well above their weight in innovation.

Even the evidence of America's own history undercuts the "all you need is freedom" story. Though from the start freedom was central to the country's political culture, Americans have not always ranked as technological leaders. America's technological coming of age was remarkably recent. As Ralph Gomory, former head of I.B.M.'s research department pointed out to me in an interview, America was noted up to the 1930s mainly as an inspired adapter of other nations' technologies — a role similar to that of Japan and other East Asian nations in more recent times.

How do we explain America's sudden mid-20th-century ascent to technological glory? The credit goes not to freedom but to something more prosaic: money. With World War II, the United States government joined corporations in ramping up spending on R&D, and then came the cold war and the Soviets' launch of Sputnik in 1957, which gave further impetus to government-funded research. One result was Darpa, which helped develop the Internet.

Throughout history, rich nations have gotten to the future first. Their companies can afford to equip their tinkerers and visionaries with the most advanced materials, instruments and knowledge.

This raises an epochal question: as China becomes richer, is it destined to pass the United States as the world's most inventive nation? The question is all the more pertinent because many experts contend that America's inventive spirit is already flagging. As the Silicon Valley venture capitalist Peter Thiel put it to me in an interview, American innovation in recent decades has been remarkably narrowly based. "It has been confined largely to information technology and financial services," he said. "By contrast in transportation, for instance, we are hardly more advanced today than we were 40 years ago. The story is similar in treating cancer."

Rob Atkinson, president of the Washington-based Information Technology and Innovation Foundation, points out that China is rapidly ramping up its research spending. "The Chinese have the ability to throw a lot of resources at this, and some will stick to the wall," he says.

According to the Organization for Economic Cooperation and Development, China's research spending increased from 0.9 percent of gross domestic product in 2000 to 1.7 percent in 2009. Meanwhile, China's total number of researchers in R&D more than doubled from 2000 to 2007. During that period in the United States, the number of researchers in R&D grew less than 10 percent.

The Battelle Institute, based in Columbus, Ohio, predicts that China may pass the United States in R&D spending by 2023.

Meanwhile the evidence of international patent filings is looking increasingly ominous. According to data compiled by the World Intellectual Property Organization, the world's single most prolific filer of international patents as of 2011 was ZTE, a Chinese telecommunications corporation. Its filings were up an astounding fivefold from 2009. Another Chinese corporation, Huawei, moved up to third in the 2011 league table. The only United States corporation to make the Top 10 was Qualcomm. All this is the more troubling because United States patent law has now been drastically weakened. Congress has made it much harder for small American inventors to protect their intellectual property from infringement and theft.

Pat Choate, the author of "Hot Property," a book on the theft of intellectual property, maintains that if the new patent regimen had existed when corporations like Apple and Microsoft first got going, they might never have made it out of the little leagues. Their patents would have been quickly infringed by predatory larger corporations, and rather than engage in unequal litigation battles against deep-pocketed and ruthless opponents, they could have felt forced to share their technology on concessionary terms.

Another concern is that American corporations have been moving their R&D operations offshore. According to the National Science Foundation, fully 27 percent of all employees in United States multinational corporations' research departments were based abroad as of

2009, up from 16 percent in 2004.

China seems to be benefiting from the trend. Both Intel and Applied Materials are developing major research facilities there. According to Paul Michel, a former federal appellate judge who is an authority on patent law, these operations will be larger than anything either corporation has in the United States. He adds: “Most of the staff in these labs will be Chinese, and undoubtedly many of the resulting manufacturing jobs will be located in China.”

But if East Asian culture is not a serious hindrance to technological creativity — and presumably neither Intel nor Applied Materials think it is — why are East Asian scientists and engineers generally typecast as underachievers? Part of the explanation is that there are different kinds of technological creativity. Fundamental breakthroughs generate headlines and win Nobel Prizes, but as Ralph Gomory pointed out, it is the more mundane task of turning breakthroughs into affordable products that matters economically. East Asian corporations tend to focus on this second task, and though the details of their “continuous improvement” in production technology are rarely noted in the press, their success has been a driver of the region’s spectacular enrichment in the last 60 years.

James Wilsdon, a British professor who has studied Chinese technological creativity, sees a parallel between China’s scientific agenda and its sporting one. China ranked a distant 11th for the number of gold medals at the Seoul Olympics in 1988. Twenty years later, it topped the table.

“If this is what China can achieve in sport,” he said, “how quickly can it become a leader in science and innovation?”

Eamonn Fingleton is the author of “In the Jaws of the Dragon: America’s Fate in the Coming Era of Chinese Hegemony.”