

The Secret of Building Innovation Economies

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For 250 years, technological innovation has driven economic development. But the economics of innovation are very different for those at the frontier versus those who are followers striving to catch up.

At the frontier, the innovation economy begins with discovery and culminates in speculation. From scientific research to identification of commercial applications of new technologies, progress has been achieved through trial and error. The strategic technologies that have repeatedly transformed the market economy — from railroads to the Internet — required the construction of networks whose value in use could not be known when they were first deployed.

Consequently, innovation at the frontier depends on funding sources that are decoupled from concern for economic value. Thus, it cannot be reduced to the optimal allocation of resources. The conventional production function of neoclassical economics offers a dangerously misleading lens through which to interpret the processes of frontier

innovation.

Financial speculation has been, and remains, one required source of funding. Financial bubbles emerge wherever liquid asset markets exist. Indeed, the objects of such speculation astound the imagination: tulip bulbs, gold and silver mines, real estate, the debt of new nations, corporate securities.

Occasionally, the object of speculation has been one of those fundamental technologies — canals, railroads, electrification, radio, automobiles, microelectronics, computing, the Internet — for which financial speculators have mobilized capital on a scale far beyond what "rational" investors would provide. From the wreckage that has inevitably followed, a succession of new economies has emerged.

Complementing the role of speculation, activist states have played several roles in encouraging innovation. They have been most effective when pursuing politically legitimate missions that transcend narrow economic calculation: social development, national security, conquering disease.

In the U.S., the government constructed transformational networks (the interstate highway system), massively subsidized their construction (the transcontinental railroads) or played the foundational role in their design and early development (the Internet). Activist states around the world have funded basic science and served as early customers for the novel products that result. For a quarter-century starting in 1950, the U.S. Defense Department, to cite one crucial example, combined both roles to build the underpinnings of today's digital economy.

For countries following an innovative leader, the path is clear. Mercantilist policies of protection and subsidy have been effective instruments of an economically active state. In the U.S., the first profitable textile mills blatantly violated British patents. And ferociously entrepreneurial private enterprise was supported by a broad array of state investments, guarantees and protective tariffs, in accordance with the "American system" inspired by U.S. founding father Alexander Hamilton and realized by 19th-century U.S. politician Henry Clay.

The great, neglected German economist Friedrich List, a student of Hamilton's work, laid out an innovation roadmap for his own country in 1841 in his principal work "National System of Political Economy." It has been used repeatedly by Japan beginning in the last decades of the 19th century, by the Asian tigers in the second half of the 20th century and now by China.

List noted how Britain's emergence as "the first industrial nation" at the end of the 18th century depended on prior state policies to promote British industry. "Had the English left everything to itself," he wrote, "the Belgians would be still manufacturing cloth for the English, [and] England would still have been the sheepyard for the [Hanseatic League]."

Coherent programs to promote economic catch-up are relatively straightforward. But the transition from follower to leader at the frontier of the innovation economy is more challenging and elusive.

The U.S. managed the transition roughly between 1880 and 1930, combining

the professionalization of management with a speculative taste for new technologies — electrification, automobiles and radio — and state tolerance of the Second Industrial Revolution's great industrial monopolies, which invested their super-profits in scientific research. The post-World War II invocation of national security as the legitimizing rationale for an economically active state extended U.S. leadership.

It is not yet clear whether East Asia's economic powerhouses will succeed in making the transition from follower to frontier. To begin, the "national champions" of the catch-up phase must be rendered accessible to competitive assault. More generally, the state's role must shift from executing well-defined programs to supporting trial-and-error experimentation and tolerating entrepreneurial failure. Moreover, the debilitating "corruption tax" that seems inevitably to accompany economic revolutions must be curbed, as it was in Britain during the 19th century and in the U.S. during the 20th century.

Here is the moment of strategic uncertainty. The "made in America" digital economy exhibits ample momentum in the private sector. But leadership of the next new economy — the low-carbon economy — is open. The U.S. is suffering the consequences of a generation-long effort to render the state illegitimate as an economic actor. Europe is mired in its oxymoronic commitment to "expansionary fiscal austerity."

Can China manage the economic, cultural, and political transitions necessary to assume the leadership role now up for grabs? I find it intriguing to go back almost 200 years and consider Britain's political economy when the First Industrial Revolution was gathering steam.

England in 1820 was governed by a corrupt oligarchy that exercised power in intimate collaboration with a national religious establishment. Political legitimacy was validated by fear of anarchy, the terrifying reality of which had been observable across the Channel within living memory. Arbitrary, draconian repression was the rule. Under the "Bloody Code" of criminal justice, more than 100 felonies were punishable by death or transportation. The patent system was notoriously expensive and inaccessible.

England's rulers sought in vain to keep a lid on the greatest explosion of economic energy and financial wealth in human history. Over a long generation, England was transformed. From the Great Reform Act of 1832 to the repeal of the Corn Laws in 1846 — and on to the civil service reforms initiated in 1853 and the Representation of the People Act of 1867 — Britain pursued its unique path toward a relatively stable and sustainable democratic capitalism.

No doubt China's own path will be as distinctive as the processes by which it has reached its current moment of opportunity. Whether or not its path proves to be as progressive as England's may determine who assumes the mantle of global economic leadership.

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