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The New Economy and the Future of Competitiveness and Innovation

By Rob Atkinson and Adams Nager

POLICY IDEAS FOR AN EVOLVING ECONOMY

Economies are not static entities, but continually evolving, complex ecosystems driven by technological innovation and geographic changes in production. Around the world, countries are implementing policies in areas such as economic development analysis and practice, financial incentives for innovation, education reform for innovation, and start-up support to aid the evolutionary process. These policies seek not only to accelerate the rate of innovation and technology adoption, but also to encourage producers of advanced, tradable goods and services to locate in their country. To remain competitive, the U.S. should monitor and at times imitate policies from foreign competitors.

the new economy

AND THE FUTURE OF COMPETITIVENESS AND INNOVATION

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INTRODUCTION

The conventional view of state economies is as static entities which change principally in size (growing in normal times and contracting during recessions). But in fact, state economies are constantly evolving, complex ecosystems. Indeed, U.S. state economies of 2014 are not just larger but different than the state economies of past generations.

On any given day this year, each state will on average be home to businesses that receive 12 patents, release nine new products, and introduce nine new production processes, while about 32 firms will go out of business and another 32 will be launched. Firms in some industries will get bigger (the average number of workers in non-store retailers – e.g., the Amazon.coms of the world – grew 0.03 percent every day in 2013) while some will get smaller (the average size of data processing, hosting, and related services shrank 0.07 percent every day in 2013, despite the emergence of cloud computing). Understanding that we are dealing with evolving, rather than static, economies has significant implications for economic development policy.

So how exactly does economic evolution occur? Economist Joseph Schumpeter provides some answers. In his classic 1942 book *Capitalism, Socialism and Democracy* he wrote:

> The opening up of new markets, foreign or domestic, and the organizational development from the craft shop and factory to such concerns as U.S. Steel illustrate the same process of industrial mutation – if I may use that biological term – that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating the new one. [i]

In other words, two factors drive evolution: geographic changes in production and markets and technological changes.

If U.S. economic developers want to stay abreast of best practices, they would be well advised to track what their competitors are doing abroad, especially regarding technology-based economic development (TBED). Tracking TBED policies allows U.S. economic developers to pick from best-in-class policies and programs to institute at home, often with appropriate customization to fit local conditions and policy frameworks, and to maximize economic evolution and ensure that U.S. exporters are not being disadvantaged.

GEOGRAPHICAL AND TECHNOLOGICAL CHANGES IN THE U.S. ECONOMY

Prior to the 1980s the spatial relocation of economic activities, based largely on differential levels of production sophistication, occurred largely within America's borders. Higher income areas, mostly in the Northeast, the Midwest, and California, served as "seedbeds" for the development of new innovations, firms, and industries. However,

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Economies are not static entities, but continually evolving, complex ecosystems driven by technological innovation and geographic changes in production. Around the world, countries are implementing policies in areas such as economic development analysis and practice, financial incentives for innovation, education reform for innovation, and start-up support to aid the evolutionary process. These policies seek not only to accelerate the rate of innovation and technology adoption, but also to encourage producers of advanced, tradable goods and services to locate in their country. To remain competitive, the U.S. should monitor and at times imitate policies from foreign competitors.

once new product and process innovations matured and became more stable they were able to move away from these regions without any significant loss of economic viability, relocating to lower cost regions, often in the U.S. South and West.

So while for 30 to 40 years after WWII the U.S. economy was evolving spatially with innovation bubbling up in core regions and later diffusing to low-cost regions as it matured, this evolutionary spatial dynamic was largely a domestic one.[ii] Companies might be born in Boston or Chicago, but once their technology and/or production systems matured that production would be moved to a place like South Carolina, not South China.

By the late 1970s the process began to change, slowly at first and then much more rapidly as globalization took hold. As technology enabled more globally integrated trade and production systems, this evolutionary process of migration evolved into one where standardized production systems could now locate in a much larger array of places, most of them outside low-cost U.S. areas such as the South, which, in comparison to the new overseas alternatives, were not all that low cost anymore. These offshore locations were made all the more attractive by the lack of unions, generous investment incentives provided by governments desperate to attract foreign investment, and a relatively strong U.S. dollar which made offshore production cost less.

In part because of this, U.S. manufacturing jobs peaked in 1979, with production jobs hemorrhaging particularly in the 2000s when the United States lost one-third of its manufacturing jobs, with over 60 percent of losses stemming from loss of global competitiveness[iii] Rural U.S. manufacturing was hit as hard as urban, and the South hit as hard as the North. During the 1970s, rural factory jobs increased three times faster than urban factory job growth as high-cost urban manufacturing migrated to low cost rural areas.[iv]

But in the 2000s, rural and urban areas lost factory jobs at the same rate since they were now both part of the higher cost core region (the United States). Of the top ten states in terms of the share of manufacturing job loss in the 2000s, four (North Carolina, Tennessee, Mississippi, and South Carolina) were in the South, all of which lost more than 37 percent of their manufacturing jobs.[v]

There is one other major change in the spatial environment that was critical to the evolution of the U.S. economy. For much of the 20th century, especially after WWII, the U.S. economy played the role of global "rain forest" for "species" evolution. In other words, America was the technological leader, with a large share of the new industries and new firms being developed and nurtured in America. In some industries, such as electronics and aerospace, America was the undisputed leader. In others, such as pharmaceuticals, chemicals, automobiles, machine tools, and steel, it had some competitors, but not so strong as to threaten U.S. leadership.

But that lead, while enormous, was not insurmountable. Indeed, competitor nations like Germany and Japan began to challenge the U.S. lead by the early 1980s. In the 1990s the Asian "tigers" of Hong Kong, Singapore, South Korea, and Taiwan emerged as strong competitors. And more recently in the 2000s, India and China have emerged.

Many nations realized – as the United States still has not – that they were in intense evolutionary competition with other nations. As such, the pace of competitive response dramatically ratcheted up in many nations, as they cut corporate taxes,[vi] increased R&D tax incentives,[vii] expanded funding for R&D,[viii] and established sophisticated national innovation policies. In the United States, however, the focus on the global "war on terror," the general belief that America's position as the innovation leader was unassailable, and the dominance of neoclassical economics that decried national innovation strategies as unwarranted distortions of optimized price mediated markets, meant that the U.S. federal government has been mainly on the sidelines in efforts to spur the nation's evolutionary response to changes in global market competition.

But that lead, while enormous, was not insurmountable. Indeed, competitor nations like Germany and Japan began to challenge the U.S. lead by the early 1980s. In the 1990s the Asian "tigers" of Hong Kong, Singapore, South Korea, and Taiwan emerged as strong competitors. And more recently in the 2000s, India and China have emerged.

In essence, the evolutionary environment went from one where the United States was dominant in generating new industries to replace the ones that were moving first to low-wage regions in the United States and then to low wage nations, to one where the competition for leading-edge evolutionary "replacement species" became much stiffer. As a result, it has become more challenging for America to develop new industries, products and services to replace the more mature ones lost at a more rapid pace to low-cost nations.

TRACKING COMPETITORS AROUND THE WORLD

This is all to suggest that not only is the U.S. economy in a continuous process of evolutionary change, but so too are state economies. Some firms go out of business, while others grow. Some states gain competitive advantage, while others lose advantage. Some technologies emerge that support economic development in particular states (e.g., shale gas technology in states like Ohio and Pennsylvania). So the challenge for state economic development is to encourage evolution. This means helping the states' traded sector companies, the firms competing directly with foreign producers, to both win in advanced

technology sectors and to slow the loss of more mature industries to lower cost locations.

Not only is the economy different today, so too is the practice of economic development. For many years, state and local economic development officials could be content to learn from each other when assessing best practices in technology-based economic development. But over the last two decades, many nations and sub-national governments around the world have embraced sophisticated economic development strategies.

If U.S. economic developers want to stay abreast of best practices, they would be well advised to track what their competitors are doing abroad, especially regarding technology-based economic development (TBED). Tracking TBED policies allows U.S. economic developers to pick from best-in-class policies and programs to institute at home, often with appropriate customization to fit local conditions and policy frameworks, and to maximize economic evolution and ensure that U.S. exporters are not being disadvantaged. This article looks at four areas of practice: economic development analysis and practice, financial incentives for innovation, education reform for innovation, and start-up support.

ECONOMIC DEVELOPMENT ANALYSIS AND STRATEGY

A core component of any effective economic development strategy is analysis and insight gathering. Many nations have undertaken a comprehensive analysis of their competitiveness and benchmarked it against other nations at both broad economic and major industry levels. Among other things, they assess their business climate for the competitiveness of their traded sectors and how their science and technology education and training policies affect competitiveness at the sector level.

A core component of any effective economic development strategy is analysis and insight gathering. Many nations have undertaken a comprehensive analysis of their competitiveness and benchmarked it against other nations at both broad economic and major industry levels. Among other things, they assess their business climate for the competitiveness of their traded sectors and how their science and technology education and training policies affect competitiveness at the sector level.

These nations further identify critical emerging technology areas, chart research road maps needed to keep their companies at the cutting edge of these emerging technologies, look to identify gaps or shortfalls in investments or technology competencies, and attempt to bridge those gaps. The innovation strategies of many countries also support the coordination of technology development within industry across a vertically fragmented ecosystem in order to align with larger commercial, societal, or security goals.

For example, Germany's High-Tech Strategy for Germany, released in 2006, identified 17 advanced, cross-cutting technologies (ranging from biotechnology, to microsystems technology to information and communications technologies) that are critical to the ability of German industries and its broader economy to compete. For each technology, the strategy undertakes a SWOT (strengths, weaknesses, opportunities, and threats) assessment of where Germany's enterprises, universities, and research institutions stand with regard to the development and deployment. The strategy helps to identify gaps and to coordinate the limited resources of Germany's government, enterprises, and universities toward charting technology road maps (and making the requisite investments) to ensure German leadership in these technologies.[ix]

Ensuring that knowledge is effectively transferred to enterprises is also a central goal of many regions' innovation strategies. This involves not only providing financial support to research universities but also creating new knowledge about innovation processes, methods, techniques, measurements, and how best to diffuse innovation throughout an economy.

For example, through its Technology Review series, Finland's innovation funding agency, Tekes, has a long history of funding research that seeks to create new knowledge about innovation. The Tekes Technology Review 205, "Seizing the White Space: Innovative Service Concepts in the United States," surveyed innovative business models in U.S. financial services, professional services, logistics, and retail trade industries and explained how Finnish small and medium-sized enterprises could adapt those models.[x]

FINANCIAL INCENTIVES FOR INNOVATION

A number of nations and regions are using novel incentives to spur research and innovation. For example, some countries – including Denmark, the Netherlands, and Norway – have extended R&D tax credits to cover R&D activities focusing on new production processes, effectively extending the R&D tax credit to include service industries as well as goods. Other nations have more generous credits for companies co-funding research at national laboratories or universities. For example, in France, companies funding research at national laboratories and universities receive a 60 percent credit on every dollar invested. Denmark, Hungary, Japan, Norway, Spain, and the United Kingdom provide firms more generous tax incentives for collaborative R&D undertaken

with public research institutions than for R&D activity undertaken independently.[xi]

In addition, a number of countries have implemented innovative tax policies offering preferential tax treatment to small businesses, especially those engaged in innovative activities. For example, France's Jeunes Enterprises Innovantes (JEI) program targets young companies that are less than eight years old, have fewer than 250 employees and less than approximately $63 million in turnover, devote at least 15 percent of their expenditures to R&D, and are independent and not listed on a stock exchange. Another innovative tax technique France uses to support entrepreneurs is giving wealthy individuals the opportunity to invest in startups in lieu of paying a wealth tax.[xii]

Australia, Canada, France, Norway, and the United Kingdom also offer young innovative firms refundable R&D tax credits in lieu of using carry-forward or carry-backward provisions on business losses. Within the EU, governments can give extra incentives to firms less than six years old that invest more than 15 percent of their total revenues on R&D across all regions and sectors without breaking EU state aid rules.[xiii]

Many countries rightly see educational institutions as having a key role to play in supporting innovation-based growth and are therefore adopting innovation policy measures to match educational curriculums and research efforts with the needs of businesses competing in the New Economy.

Several countries, including Austria, Belgium, Canada, Denmark, Germany, the Netherlands, Ireland, and Sweden, have begun using Innovation Vouchers to support small and medium sized enterprises (SMEs). These vouchers, usually ranging in value from $5,000 to $30,000, enable SMEs to "buy" expertise from universities, national laboratories, or public research institutes.[xiv] The intent is to provide incentives for research institutes to be responsive to the needs of SMEs and to stimulate knowledge transfer, whether assisting SMEs with particular technical research challenges or helping them implement improved innovation systems.

Holland's innovation agency, Senter Novem, has found that their voucher program substantially stimulates innovation – eight out of ten vouchers issued resulted in an innovation that otherwise would not have come to fruition and 80 percent of new R&D jobs created in Holland since 2005 are attributable to the vouchers.[xv] Likewise, a 2011 review of the Austrian Innovationsscheck program found it to be "a very useful program" that engendered positive networking effects between SMEs and research institutions and through which approximately 500 SMEs had started an R&D effort.[xvi]

EDUCATION REFORM FOR INNOVATION

Many countries rightly see educational institutions as having a key role to play in supporting innovation-based growth and are therefore adopting innovation policy measures to match educational curriculums and research efforts with the needs of businesses competing in the New Economy.

Several countries have taken initiatives to match industry demand with educational focus. For example, Finland's Oivallus (Insight) project interviews individuals at corporations worldwide to understand what skills will be required by businesses in the years 2020 to 2030, and has combined several universities to provide students comprehensive training programs in business, technology, and design.[xvii] [xviii]

Germany's Fraunhofer Institutes and Austria's Kompetenzzentren provide a compelling model for performing applied research of direct utility to industry by helping to translate research into marketable products.[xix] Organized around specific advanced sectors and technology platforms, these programs unite public and private pre-competitive research agendas and funding for bilateral applied research with individual firms, prototype manufacturing, and pre-production and cooperative technology transfer arrangements with companies.[xx]

Frequently, university research is too abstract to be applied in corporate settings. Companies, on the other hand, often fail to take advantage of strategic knowledge and research. Many countries have attempted to bridge that divide.

Denmark's Industrial Ph.D. Program combines the academic rigor of a traditional doctorate with a research project for a private company with direct industry applications. The program is funded by both the Danish Agency for Science, Technology and Innovation and private companies, and allows students to earn a wage while still in school. The program has led to higher patent applications, increased gross profit, increased overall employment, and increased total factor productivity for the participating companies.

Likewise, multiple German states facilitate the transfer of new knowledge from universities to SMEs by co-financing the placement of recent Ph.D. graduates with SME manufacturers. Other countries have adopted similar efforts.

The UK's Designing Demand program helps SMEs gain a deeper understanding of design processes and how to specify demand projects and issue design tenders. Canada's Industrial Research Assistance Program provides direct financial support for Youth Employment in Canadian SMEs, funding up to $30,500 in salary for six to 12 months for recent college or university graduates employed by SMEs. Australian businesses selected to receive a Researchers in Business grant receive funding for up to 50 percent of salary costs, to a maximum of $53,000, for each placement between two and 12 months.[xxi]

Korea's Small and Medium Business Administration encourages the linkage of enterprises with technical high schools and junior colleges that produce graduates especially suited to SME requirements. Ontario's Design Industry Advisory Committee provides businesses with a "design audit" to identify areas of potential improvement and then supports a one-week design project that introduces the SME to the strategic design process and tactics for leveraging design opportunities. [xxii]

By improving educational alignment with industrial needs, states can improve the employability of high school and college graduates and ensure that state supported research ultimately helps produce new technologies, products, and industry sectors.

Many regions around the world are focusing on establishing better support systems for high growth entrepreneurs. One core step is to simply make it easier to register a new business with the government. Some countries have streamlined their new business registration procedures, often with dramatic results.

STARTUP SUPPORT

Many regions around the world are focusing on establishing better support systems for high growth entrepreneurs. One core step is to simply make it easier to register a new business with the government. Some countries have streamlined their new business registration procedures, often with dramatic results. Portugal's "On the Spot Firm" initiative enables new businesses to register with the government in just 45 minutes online, which replaced 20 different forms which took up to 80 days to process. The program has been so successful that 60,000 new firms have formed in just two years.

Countries are also establishing programs to help their high-growth entrepreneurs improve networking opportunities. For example, the Chilean Economic Development Organization has created a program for Chilean SMEs where selected enterprises will reside in Austin, Texas, in order to accelerate their business in international markets.

Israel has also established "8200 workshop," a program sponsored by alumni of an elite Israeli military unit (akin to the U.S. NSA) in cooperation with major high-tech law firms, Tel-Aviv University, and investors. Every year, 20 entrepreneurs (usually pre-seed stage with an idea and a full-time team) are selected to attend a 12-day workshop (one full day twice a month) ending with a demo day that lets participants present their ideas to the investment community.

Some regions have established sophisticated entrepreneurial support networks. For example, the Ontario Network of Entrepreneurs (ONE) was launched in May 2013 by integrating its Small Business Enterprise Centres and local business advisory services with its 14 Regional Innovation Centres.[xxiii] ONE offers a broad array of resources, including:

- Educational programs to enhance entrepreneurial skills and talent development
- Advisory services to provide clients with coaching and mentorship opportunities
- Industry-academic programs to encourage knowledge exchange and resource sharing
- Customer development opportunities to provide clients the opportunity to engage with users
- Financing programs and opportunities with potential investors from the private sector as well as from municipal and federal sources.[xxiv]

Furthermore, entrepreneurs and technology-based companies working with ONE have access to over 400 "commercialization experts" located across the province who can provide them with the assistance necessary for launching and growing their businesses.

CONCLUSION

The process of innovation has globalized and U.S. states face much tougher competition for good jobs and fast growing industries. But the competition is also from other nations and sub-national regions that have put in place well-funded and innovative innovation policies for economic development. U.S. economic developers need to track not just what their counterparts in other states are doing, but what their counterparts in other parts of the world are doing as well. Imitating policies from around the world could accelerate the rate of U.S. innovation, make the United States a more competitive production location, and strengthen the U.S. evolutionary ecosystem.

U.S. economic developers need to track not just what their counterparts in other states are doing, but what their counterparts in other parts of the world are doing as well. Imitating policies from around the world could accelerate the rate of U.S. innovation, make the United States a more competitive production location, and strengthen the U.S. evolutionary ecosystem.

ENDNOTES

[i] Joseph A. Schumpeter, *Capitalism, Socialism and Democracy*, (New York: Kessinger Publishing, 1943), 83.

[ii] Prior to WWI, this spatial reallocation process tended to take place within regions of the United States, not across them and whole regions of the nation (e.g., the Mountain West, the South) were largely natural resource input providers.

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[iv] Jason Henderson, "Rebuilding Rural Manufacturing," Federal Reserve Bank of Kansas, no. 2 (2012), Chart 1, " Rural Manufacturing Employment and Earnings," www.kansascityfed.org/publicat/mse/mse_0212.pdf.

[v] Atkinson, et. al., "Worse Than the Great Depression: What Experts Are Missing About American Manufacturing Decline," Figure 18.

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[xi] Matthew Stepp and Robert D. Atkinson, "Creating a Collaborative R&D Tax Credit" (ITIF, June 2011), http://www.itif.org/files/2011-creating-r&d-credit.pdf.

[xii] Organization for Economic Co-operation and Development, *OECD Innovation Strategy* (OECD, 2010), 97.

[xiii] Ibid.

[xiv] M. Cornet et al., "De effectiviteit van de innovatievoucher 2004," CPB Document No. 95 (The Hague, 2005).

[xv] Ibid.

[xvi] Barbara Good and Brigitte Tiefenthaler, "Zwischenevaluierung des Programms Innovationsscheck" (Technopolis Group, August 11, 2010), http://www.bmvit.gv.at/innovation/strukturprogramme/downloadsstruktur/zwischenevaluierung_innovationsscheck.pdf.

[xvii] Clyde Prestowitz, *The Betrayal of American Prosperity: Free Market Delusions, America's Decline, and How We Must Compete in the Post-Dollar Era* (New York: Free Press, 2010), 94.

[xviii] Stephen Ezell, "Effective Innovation Policies and Institutions Continue to Help Drive Success of Nordic Economies," *Innovation Files* (blog), ITIF, October 17, 2013, http://www.innovationfiles.org/effective-innovation-policies-and-institutions-continue-to-help-drive-success-of-nordic-economies/#sthash.irwXDtwa.dpuf.

[xix] "Fraunhofer Business Model," on the Fraunhofer Institute website, http://www.fraunhofer.de/en/about-fraunhofer/business-model.

[xx] "Institutes and Research Establishments," on the Fraunhofer Institute website, http://www.fraunhofer.de/en/institutes-research-establishments.

[xxi] "Our Services," on the Australian Department of Innovation, Industry, Science and Research website, http://www.enterpriseconnect.gov.au/about/Pages/default.aspx.

[xxii] Ibid.

[xxiii] Nicola Hepburn, Allison Bramwell and David A. Wolfe, "Growing Innovation Ecosystems: University-Industry Knowledge Transfer and Regional Economic Development in Canada" (Innovation Policy Lab, Munk School of Global Affairs, University of Toronto, May 15, 2012), http://www.utoronto.ca/progris/presentations/pdfdoc/2012/Growing%20Innovation%20Ecosystems15MY12.pdf.

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